# From library automation to smart libraries and public access computing: A US-China comparison

A PhD dissertation proposal by Guangchun Zheng

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April 15, 2026

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## Abstract

I propose a study to investigate and compare the development of the public library's technical services in United States and China. The study will describe and analyze the historical characteristics of the development of digital technologies in libraries in each country, identify the key players involved, and conduct a comparative analysis. The central research question guiding this study is: How and why do digital technologies in public libraries differ between China and the US?

The study aims to contribute primarily to the field of public librarianship by drawing on concepts from theory of practice and activity theory. Specifically, it seeks to: (1) reconstruct the historical development of digital technologies in public libraries in the US and China; (2) identify the key factors shaping these developmental trajectories; and (3) conduct a systematic comparison of the two cases. The study examines influences associated with capitalism and socialism, operationalized through national and institutional dimensions such as economic conditions, policy frameworks, cultural contexts, and historical trajectories.

Methodologically, this study will select representative academic journals in the field of library technologies in both countries. From each decade, four representative articles will be selected for literature review and content analysis, in order to identify overarching patterns and developmental trends. The study will also select one public library in each country as a representative case for in-depth analysis: the Urbana Free Library in the US and the Suzhou Library in China. Data for the case studies will be collected through participatory observation, documentary research on sources like published literature and institutional documents, and interviews with current or former library staff and possible others.

The study seeks to contribute knowledge about how public libraries adapt to technological change and how new service systems are adjusted and formed over time. Although the research examines the historical development of library technologies, its findings are intended to provide insights that can assist libraries in responding to emerging technologies and ongoing technological transformations. By drawing on experiences from different national contexts, the study aims to foster mutual learning and reflection, offering insights for practitioners' professional development, helping patrons better understand the functions of public libraries, and enabling policymakers to gain a clearer understanding of the mission and social role of public libraries.

## 摘要

本研究拟考察并对比中美两国公共图书馆技术服务的发展历程，系统描述并分析两国图书馆信息技术应用演进的历史特征，识别其中的关键角色，并在此基础上开展比较研究。本研究的核心问题为：中美两国公共图书馆中的数字技术在何种方面存在差异，以及这些差异为何产生？

本研究主要通过引入实践理论与活动理论的相关概念，为公共图书馆学领域作出贡献。具体而言，本研究旨在：(1) 重构中美两国公共图书馆领域数字技术的历史演进过程；(2) 识别塑造上述演进轨迹的关键因素；以及 (3) 对这两个案例进行系统性比较。本研究考察了两国社会体制，即资本主义和社会主义带来的影响，并通过经济状况、政策框架、文化语境及历史轨迹等国家与制度层面的维度进行了具体的操作化分析。

在方法上，本研究将选取两国图书馆技术领域具有代表性的学术期刊，针对每个十年，从中选出四篇具有代表性的论文进行文献回顾与内容分析，以识别整体性的发展模式与趋势。同时，研究将分别选取两国各一所具有代表性的公共图书馆开展深入案例研究，具体的图书馆是美国的厄巴纳自由图书馆（Urbana Free Library）与中国的苏州图书馆。案例研究的数据将主要来源于现场观察，对公开文献、机构档案的文献调研，以及对在职或曾任职馆员及其他相关人员的访谈。

本研究旨在深化对公共图书馆如何适应技术变迁、以及新型服务体系如何在时间进程中不断调整与形成的理解。尽管本研究以图书馆技术的历史发展为主要考察对象，但研究发现亦期望为图书馆应对新兴技术与持续性的技术变革提供参考。通过比较不同国家情境中的实践经验，本研究希望促进跨国经验的相互借鉴与反思，为图书馆从业人员的专业发展提供启示，帮助公众更好地理解公共图书馆的功能与价值，并为政策制定者提供更为清晰的公共图书馆使命与社会角色认知依据。

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# 1 Introduction

Technological development has brought profound changes across all sectors, and libraries have long been at the forefront of technological adoption. New technologies have transformed how libraries and librarians organize and perform their work while also reshaped patrons' experiences of library services. Many scholars regard libraries as unquestioned community information centers and public computing spaces. Empirical evidence supports this view: in the US, 98.9 percent of public libraries offer free public access to computers and the Internet (Bertot & Palmer, n.d.). In China, data from the National Bureau of Statistics indicate that in 2024 there were 3,248 public libraries nationwide, equipped with a total of 209,879 computers -- an average of approximately 65 computers per library (*National Data*, n.d.). At the same time, however, some public libraries, particularly those in the rural areas, do not make computers available to patrons or restrict their use to catalog searches without Internet access. Within both academic and professional communities, there are also voices arguing that traditional collection-based services remain the core mission of public libraries.

This tension points to a practical challenge for public libraries. Technical services require sustained financial investment, and libraries must continually justify their importance. To understand the role and positioning of digital technologies in public libraries, it is therefore necessary to examine how they have developed historically. While China and the US may share certain similarities in this regard, they have also followed distinct trajectories shaped by differing historical processes, sociocultural contexts, and political systems. These factors have profoundly influenced the formation and evolution of library technology in each country.

The research proposed here will investigate and compare the development of digital technologies in public libraries in the US and China, with the aim of (1) reconstructing the historical development of digital technologies in public libraries in the US and China; (2) identifying the key factors shaping these developmental trajectories; and (3) conducting a systematic comparison of the two cases. The study draws on concepts from community informatics, theory of practice, and activity theory, and also engages with ideas related to capitalism and socialism as contextual frameworks for understanding the two political systems. At the theoretical level, this research offers not only a systematic historical review of the development of digital technologies in public libraries, but also a broader response to how national contexts shape public libraries as social institutions. At the practical level, the study seeks to inform public libraries in different countries about how to learn from one another while remaining attentive to contextual differences, offering insights for practitioners' professional development, helping patrons better understand the functions of public libraries, and enabling policymakers to gain a clearer understanding of the mission and social role of public libraries.

Methodologically, the study will conduct a review and analysis of representative academic journals in the field of library technology in both countries in order to identify overarching patterns and trends. The study will also select one public library in each country as a

representative case for in-depth analysis: the Urbana Free Library in the US and the Suzhou Library in China. Data for the case studies will be collected through published literature, institutional documents, and interviews with current or former library staff and possible others.

The first section of the dissertation proposal includes (1) definitions of key concepts and (2) a statement of the research problem.

### *1.1 Definitions*

This section will provide working definitions of the following key concepts in this proposal.

(1) Public library. According to the American Library Association (ALA) (Library, 2025), the key elements of a *public library* include (a) an organized collection of printed or other library materials, or a combination thereof; (b) paid staff; (c) an established schedule that presents when services of the staff are available to the public; (d) the facilities necessary to support such a collection, staff, and schedule; and (e) support that comes, in whole or in part, from public funds. Similarly, under *the Public Library Law of the People's Republic of China*, a *public library* is a public cultural institution that is open to the general public free of charge, responsible for collecting, organizing, and preserving documentary and information resources, providing search, consultation, and lending services, and carrying out social education functions (National People's Congress website, 2018). Both definitions emphasize the social functions and public-service nature of libraries. Drawing on these definitions, this study's *public library* refers to a library that is stably open to the general public and provides information services free of charge, supported primarily by government tax funding.

**Table 1. Comparison of Library and Population Indicators in the US and China**

| | United States (2023) | China (2024) |
|---|---|---|
| Number of public libraries | 9246 | 3,248 |
| Population | 338,419,500 | 1,408,000,000 |
| Served population per library | ≈36,602 | ≈433,498 |

Note: Data for the US are drawn from the *FY 2023 Public Libraries Survey* published by the Institute of Museum and Library Services (IMLS) and from the official website of the United States Census Bureau. Data for China are obtained from 2024 statistical data published on the official website of the National Bureau of Statistics of China.

(2) Technology, digital technology, digital technology in library. Cambridge English Dictionary defines *technology* as "the methods for using scientific discoveries for practical purposes" (Cambridge English Dictionary, n.d.-b) and defines *digital* as "using or relating to computers and the internet" (Cambridge English Dictionary, n.d.-a). Accordingly, digital technology can be understood, in a literal sense, as computer- and internet-based systems, tools, and infrastructures that apply scientific knowledge to practical tasks.

In the scholarly literature, technology has been analytically described as a "designed, material means to an end (Agar, 2020)." Brown (2019) argues from a practice-oriented perspective that

technology operates within social and cultural settings and is embedded in institutional contexts, professional routines, user needs, and value frameworks. Within this study's context of Library and Information Science (LIS), *digital technology in library* refers to computer- and internet-based technological systems, infrastructures, and applications that support library operations and services, including but not limited to library automation systems, public access computers, and related technology-based services.

(3) Library automation. Even within the LIS literature, the term *library automation* has been defined in multiple ways. The *Glossary of Library & Information Science* (Haider, 2025) defines *library automation* as "the use of the computer to automate the typical procedures of libraries such as cataloging and circulation" and argues that its primary purpose is "to free the librarians and library staff and to allow them to contribute more meaningfully to the spread of knowledge and information." This definition highlights three key elements: the tool (computer technology), the application domain (traditional library operations), and the users (library staff). Riaz (1992), in his book *Library Automation*, describes the field as the use of computer techniques to solve library problems. He lists a broader range of activities that may be considered library problems, including circulation control, acquisitions, cataloguing, bibliographic processing, serials control, information searching and retrieval, and data reformatting. Although the orientation is not explicitly specified, these activities may involve both library staff and patrons.

Saffady (1989), in contrast, defines *library automation* as the use of "technology in general, and computers in particular, to automate a wide range of administrative, public, and technical services tasks," thereby extending the scope beyond internal administrative procedures. Bailey (1989) further notes that while earlier generations of library automation primarily focused on internal processes, later developments increasingly emphasized systems designed for direct patron use, which he called public access computers.

Considering the scope of this study, *library automation* is defined here as the use of computer and internet technologies to help processing libraries' administrative and public service tasks, facing both library staff and patrons.

(4) Public access computer, public computing. A *public access computer* can be defined simply as any library computer that is available to patrons. Bailey (1989) classified *public access computers* into nine categories: online catalogs, electronic information systems, information presentation systems, instructional systems, consultation systems, information service and delivery systems, conference systems, integrative systems, and end-user computing facilities. During the 1970s and 1980s, as microcomputers became increasingly widespread, the English-language literature commonly employed the term *public access microcomputers*, which referred to essentially the same concept as *public access computers*.

Although Bailey characterizes *public access computer* as a new form of library automation, the rapid development of computer technologies and Internet services has expanded the range of services it provided beyond the scope of traditional library automation. It becomes a concept that

scholars in community informatics have paid particular attention to. Williams (2013) defines public computing as the public space where people can become familiar with and use computers and emphasize that it plays a critical role in bridging the digital divide. To reflect conditions at the level of practice, references to *public computing* in this study encompass not only public computers but also related facilities, including supporting hardware such as charging stations and printers, and associated software resources such as the Microsoft Office Series.

Figure 1 presents a conceptual diagram of the relationships among the concepts discussed above. Although digital technologies are applied across a wide range of library functions, library automation and public access computing represent two major areas of focus in both research and professional practice and constitute the primary focus of this study. The intersection of these two domains lies in patron-oriented automated services, such as online catalog searching, access to digital collections, and online reference services.

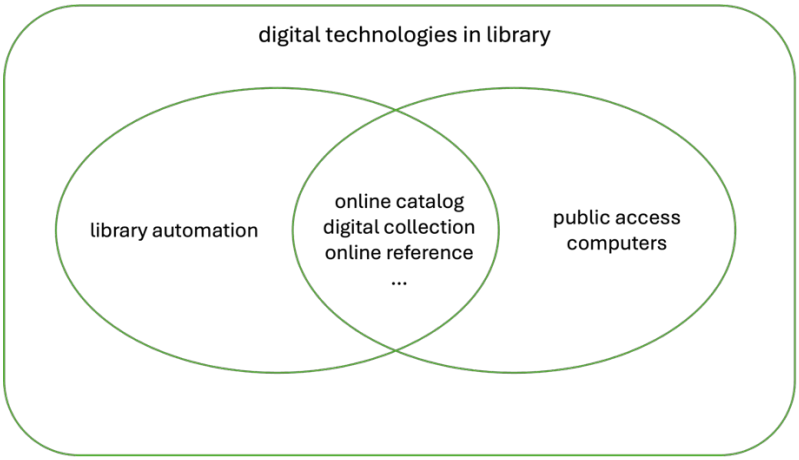


**Figure 1. Diagram of Key Concepts in the Study**

(5) Capitalism and socialism. *Capitalism and socialism* represent two distinct economic systems. *Capitalism* is characterized by the private ownership of goods and services, with market competition serving as the primary driving force, and individuals acquiring resources based on their performance and achievements within a free-market environment. In contrast, *socialism* emphasizes public ownership of the means of production and aims to achieve a more equitable distribution of resources among citizens according to their contributions to society (*Capitalism vs. Socialism*, n.d.). Countries guided by these differing economic philosophies tend to adopt distinct policy frameworks and governance approaches. The US and China are often regarded as representative cases of capitalist and socialist systems, respectively. However, despite the apparent ideological opposition between capitalism and socialism in political discourse, in practice, elements of both systems coexist and intersect within the social and policy landscapes of each country.

(6) Democracy. *Democracy* is a governance framework grounded in the principle of popular sovereignty, which means power ultimately resides with the people. It can be understood as a

moral, legal, and political practice embedded in civil society. Democracy rests on three interdependent elements: rights, law, and elections, each of which expresses and institutionalizes the idea of popular sovereignty (Kahn, 2025). While democratic ideals are emphasized in both capitalist and socialist societies, both systems continue to exhibit persistent inequalities in resource distribution and social stratification, reflecting the gap between normative democratic principles and their realization in practice.

### *1.2 Statement of the research question*

The specific research question in this study is *how and why do digital technologies in public libraries differ between China and the US?*

Based on the research problem, this study proposes three hypotheses.

Hypothesis 1. The development of digital technologies in public libraries has followed a broadly similar trajectory in both countries, moving from early library automation toward more widely integrated information technologies.

Hypothesis 2. Despite this shared trajectory, the historical development and current implementation of digital technologies in public libraries differ between the two countries. Public access computing, for example, emerged and became widespread in US public libraries, whereas in China it has been introduced but remains less prevalent, with other institutions in some cases assuming the role of providing community access to computing services.

Hypothesis 3. Different structural and institutional factors have shaped the development of digital technologies in public libraries in the two countries, and different sets of players have played key roles in this process.

These hypotheses are derived from preliminary literature review and the author's prior observations of library practice in the two countries; their theoretical foundations are discussed in detail in Section 2 (Literature Review). The first two hypotheses address the "how differ" question and require a systematic description and comparison of digital technology development in public libraries in each country, including what technologies were introduced, when they were adopted, and how the library services were changed accordingly. The third hypothesis addresses the "why differ" question. Multiple explanatory perspectives may be relevant, including technological factors (e.g., language-processing challenges), social factors (e.g., differing public perceptions of libraries), historical trajectories, and political and institutional contexts. Taken together, these perspectives frame public libraries as entities situated within interrelated social, cultural, and institutional structures, offering a basis for systematically comparing their development across national contexts. While acknowledging the potential importance of these various dimensions, this study focuses particularly on the influence of historical processes and institutional systems, examining how changing social environments and policy contexts have shaped public library development, and how capitalism in the US and socialism in China have influenced the evolution of public libraries.

Both methodological components of the study, the journal review and the case studies, will address the three hypotheses. The journal review will provide a macro-level perspective by identifying broad patterns and trends, while the case studies will offer micro-level insights that enable deeper analysis of the mechanisms underlying observed differences. Theory of practice and activity theory will be introduced in the data analysis stage as interpretive frameworks for explaining the observed differences. Figure 2 gives an overview of the general structure of this study.

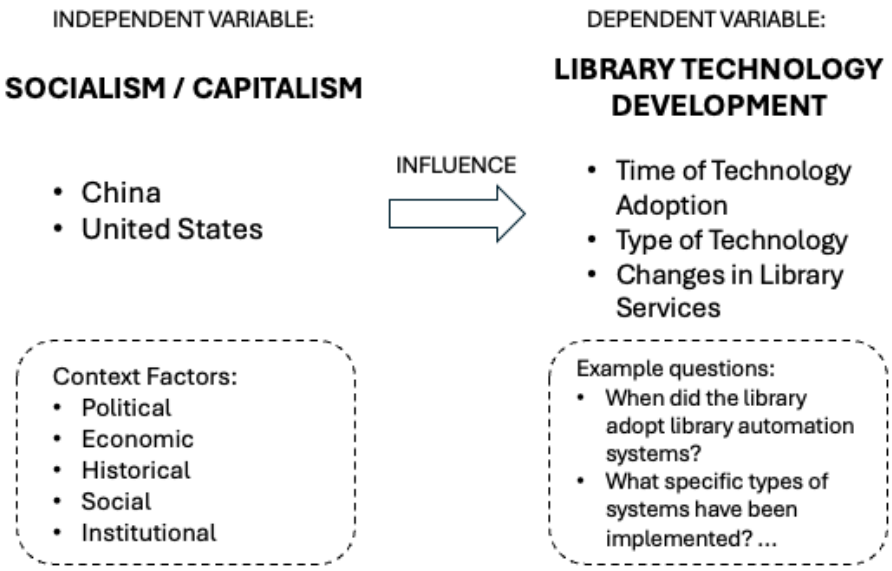


**Figure 2. Model of the research**

## 2 Literature review

This section reviews the relevant literature from four perspectives. First, it examines research on digital technologies in libraries. Second, it reviews library studies that adopt a comparative perspective, with particular emphasis on international and cross-national comparisons. Third, it discusses theory of practice and its applications in library contexts. Fourth, it reviews activity theory and its applications in library research. It should be noted that although this study focuses on public libraries, the literature review encompasses studies of other types of libraries in order to provide a comprehensive overview of the relevant research.

### *2.1 Digital technologies in libraries*

Current literature on digital technologies in libraries encompasses a wide range of topics. As noted in the definition section, these technologies include library automation systems, public access computing, and related technical support services. The adoption and application of digital technologies in libraries have also evolved over time. This section therefore reviews the development of digital technologies in libraries in China and the US separately.

### *2.1.1 Digital technologies in US libraries*

Computer use in libraries began in the 1950s. A bibliometric study of library literature shows that the heading "computer" first appeared in the volume covering the period from 1958 to 1960 (Morris, 1984). In early English-language scholarship, references to digital technologies in libraries generally referred to library automation. It developed along two major trajectories: the automation of libraries' internal operations, such as cataloging, acquisitions, and circulation, and user-oriented services, such as applications designed to enhance information retrieval and access (Kilgour, 1970). These trajectories were eventually consolidated into a unified platform known as the integrated library system (ILS). As shown in Table 2, Rayward (2002) proposed a three-stage periodization of library automation, emphasizing key historical turning points. Milestones highlighted by Rayward include the emergence of machine-readable cataloging (MARC) formats in 1965 and the introduction of the International Standard Bibliographic Description (ISBD) in 1971, both of which made large-scale library automation technically feasible. The establishment of the Ohio College Library Center (OCLC) in 1971 further advanced cooperative processing and significantly reduced the costs associated with library cataloging (Rayward, 2002). Similarly, Brown-Syed (2011) characterizes the history of the ILS in three phases. His periodization is based primarily on the level of development of ILS, and it has some temporal overlaps with Rayward's periodization.

**Table 2. Historical Stages of Library Automation in the United States**

| Periods | Rayward (2002) | Brown-Syed (2011) |
|---|---|---|
| Pre-1960s | pre-MARC | - |
| -1965 | | the Era of Conceptualization |
| -1971 | - | |
| -1977 | Post-OCLC | |
| -1990s | | the Era of Commercialization |
| 1990s to present | post-Internet | the Era of Consolidation |

In the realm of education and academic research, a significant milestone occurred in 1962 when the Graduate School of Library Science at the University of Illinois introduced a pioneering graduate course on "Information Storage and Retrieval." This innovation was followed by the 1963 Clinic on Library Applications of Data Processing in Urbana, which showcased early implementations of computer-based library operations and illustrated emerging directions in automation during the early 1960s (Goldhor, 1963). The field's principal journal, Journal of Library Automation, was established in 1968 and was renamed Information Technology and Libraries in 1982 (Morris, 1984).

Although Kilgour highlighted user-oriented services as a key trajectory of library computerization, the term *user* in his statement referred to both librarians and patrons. Moreover, early automation systems were designed primarily for librarians, and patron use received limited attention in the early literature. One early discussion appears from Saffady (1974), who

examined the feasibility and implementation of using Computer Output Microfilm (COM) to deliver computer-generated catalogs for user search. The General Library of the University of Illinois at Urbana-Champaign introduced its online circulation system, the Library Computer System (LCS), in 1978. The library made LCS accessible to patrons even though it was not primarily intended for public use (Specht, 1980). By the 1980s, the concept of Public Access Microcomputers (PAM) or Public Access Computer Systems (PACS) had gained prominence. Bailey (1989) classified PACS into nine categories: online catalogs (such as LCS), electronic information systems, information presentation systems, instructional systems (for example, the University of Delaware Library employed computer-assisted instruction using the PLATO system to teach basic library skills in 1981 (Arnott & Richards, 1985)), consultation systems, information service and delivery systems, conference systems, integrative systems, and end-user computing facilities. End-user computing facilities, referring to microcomputers at the time, are close to the public access computers common in libraries today. A 1982 survey showed that 12 out of 88 public libraries had already acquired microcomputers (Kusack & Bowers, 1982). The North Pulaski branch of the Chicago Public Library set a microcomputer in 1981 and was among the earliest adopters. Its branch head, Patrick Dewey, played a key role in promoting microcomputers in public libraries (Williams, 2013b). The primary social driver behind the rise of PAM in public libraries during this period was the growing recognition that computer literacy was becoming as important as learning to read and write. Thus, public libraries were increasingly expected to assume a new role in helping improve the public's computer literacy (Dewey, 1983; Julien, 1985). While software and digital resources became more integral to public library services, Library Trends published a special issue for "Software for Patron Use in Libraries" in the Summer of 1991 (Beaubien et al., 1991). Its content ranged from policy, selection, copyright, and reference services to case studies of different libraries, providing a comprehensive account of how software evolved from an emerging tool to an institutionalized component of the library service system.

The development and rapid diffusion of the World Wide Web during the 1990s reshaped library practices for information organization, user access, and resource discovery. A major federal milestone arrived in 1996 with the establishment of the E-Rate program, which tied national funding to internet connectivity in schools and libraries, and catalyzed the widespread deployment of public-access computers and networked services in public libraries (Jaeger et al., 2005). At present, a crucial part of contemporary library services is technical services, including access to the Internet, free use of computer equipment, and the provision of electronic resources.

### *2.1.2 Digital technologies in Chinese libraries*

In China, both the development of information technology and its application in libraries began later than in the US. In 1958, China placed its first digital electronic computer into service. In 1965, the Computing Institute of the Chinese Academy of Sciences developed the country's first large-scale transistor computer. A major milestone in the application of information technology in libraries occurred in August 1974, when the Chinese Character Information Processing System

Project, a national strategic research and development initiative, was jointly launched by multiple state-level institutions. This project introduced three key subprograms: precision Chinese typesetting, Chinese information retrieval, and Chinese digital communication, marking the formal beginning of computer applications in Chinese libraries (Shen, 2016). Similar to the situation in the US, early applications of information technology in Chinese libraries were primarily directed toward the automation of library processes. Early automation systems could only process Western alphabetic scripts and could not be operationalized in libraries, because Chinese characters, as a logographic and pictographic writing system, differed fundamentally from the alphabet-based encoding architectures that dominated early Western information-processing design (Xiao, 2003). Following the 1980 release of GB 2312 (the national Chinese character encoding standard), China overcame core technical barriers in Chinese-language computing during the early 1980s, laying the essential foundation for practical and scalable library automation systems. In January 1988, the Ministry of Culture commissioned the development of the Integrated Library Automation System (ILAS) project, and it was led by Shenzhen Library (D. Chen, 2016). The first version of ILAS was initially completed in April 1990. By late 1991, ILAS passed acceptance trials and soon entered stable operation. Around the time, 16 libraries across China completed successful ILAS pilot adoption. System iterations such as ILAS II reached their peak deployment in the 1990s and were widely adopted by libraries across the country (Lin, 2008; Zhao, 2003).

With the rise of the Internet in the 1990s, a more diverse range of technology-based services was introduced into libraries. The China Primary Digital Library Project (CPDLP) was launched in July 1996. The project was coordinated by the National Library of China and jointly undertaken with multiple technology-enabled public libraries, including Shanghai Library, Zhongshan Library (Guangdong), Liaoning Provincial Library, Nanjing Library, and Guangxi Guilin Library (Sun et al., 2006). Initial digital library development primarily focused on building digital platforms and constructing large Chinese-language digital resource repositories. In 1998, the proposal of national digital library strategy proposal received formal endorsement (C. Zhang et al., 2011). In April 2002, the Ministry of Culture, together with the Ministry of Finance, launched the National Cultural Information Resources Sharing Project, aiming to build a nationwide network-supported, co-constructed, and publicly shared system for distributing digital information resources. This project was both an extension of national digital library services and also one of China's earliest state-supported efforts to extend digital resources into rural communities (S. Chen, 2015).

### *2.1.3 Digital technologies in public libraries*

Early applications of digital technologies in libraries were primarily concentrated in academic libraries, with public libraries adopting such technologies at a relatively later stage. One evidence is that, among the 243 papers published in Journal of Library Automation (JOLA), only four explicitly report cases from public libraries. This section provides a focused review of these four articles.

Two of the papers examine cases from the Orange County Public Library in California (Kountz, 1968, 1972), while the remaining two focus on the New York Public Library (Malinconico & Rizzolo, 1973) and the Austin Public Library (Juergens, 1979), respectively. All four studies document the implementation of integrated library systems (ILS) or specific components of these systems, such as computer-assisted cataloging. The two studies on the Orange County Public Library compare the development and operational costs of computer-based systems, demonstrating their long-term cost advantages. The study on the New York Public Library highlights the operational mechanisms of an automated bibliographic control system developed since the late 1960s. In contrast, the study on the Austin Public Library focuses on the human dimension of technological implementation, emphasizing the importance of training coordinators, tiered training structures, and continuous learning. The author argues that the success of such systems depends largely on staff adaptation rather than the technology itself.

Taken together, these studies suggest that early library automation was characterized by a transition from function-specific, batch-processing systems to more integrated, data-centered architectures. Although most of these studies adopt case-based and practice-oriented approaches, their findings converge on a key point: while automation improves efficiency and standardization, its ultimate success depends on organizational adaptation and staff training rather than technological factors alone.

## *2.2 Comparative studies of libraries*

The development of libraries cannot be separated from the political, economic, social, and cultural environments in which they are embedded. Therefore, cross-national comparative research is essential for understanding library systems, technological development, and information policy. Both Chinese- and English-language scholarship contain a substantial body of comparative studies examining libraries in different national contexts. This section first introduces the definitions of international librarianship and comparative librarianship as academic fields and then reviews relevant studies in Chinese and US scholarship respectively.

For Chinese-language literature, this study used the keywords “library” and “comparative study” to conduct searches in China National Knowledge Infrastructure (CNKI) academic journal database. The retrieved records were screened to identify studies that conduct cross-national comparisons of public library services or comparative analyses of digital technology applications in libraries. For English-language literature, this study employed the keywords “public library” and “compare” to search Web of Science. Supplementary searches were also conducted using the keywords “compare” or “China” in *Public Library Quarterly* and *The Library Quarterly*. The retrieved records were then screened to identify articles focusing on cross-national comparisons.

### *2.2.1 International and comparative librarianship*

The terms international librarianship and comparative librarianship first emerged in the 1950s, and their associated bodies of literature showed considerable overlap from the 1960s through the 1980s. In practice, these two areas are often grouped together under the label “international and

comparative librarianship." In his comprehensive review, Lor (2019) provides the following definitions of the two concepts:

> International librarianship "consists of activities carried out among or between governmental or non-governmental institutions, organizations, groups or individuals of two or more nations, to promote, establish, develop, maintain and evaluate library, documentation and allied services, and librarianship and the library profession generally, in any part of the world." (page)
>
> Comparative librarianship is defined as "an area of scholarly investigation and research that may be defined as the analysis of libraries, library systems, some aspect of librarianship, or library problems in two or more national, cultural or societal environments, in terms of socio-political, economic, cultural, ideological, and historical contexts."

The purpose of such analysis is to identify similarities and differences across contexts, to explain the factors underlying these differences, and ultimately to develop generalizable insights and theoretical principles.

Lor (2014) emphasizes the necessity of incorporating theory into the field of international and comparative librarianship. He argues that the field has long been characterized by a tendency toward "naive empiricism," in which studies primarily focus on the collection and description of data while lacking explanatory analysis and systematic theoretical grounding. To address this limitation, Lor (2019) identifies several theoretical perspectives that can inform comparative inquiry, including the classic information transmission model proposed by Claude Shannon and Warren Weaver, systems theory and systems analysis, ecosystem approaches to the LIS environment, and cultural frameworks derived from anthropology. These perspectives conceptualize libraries as dynamic systems embedded within complex social, cultural, and institutional environments, thereby providing an analytical foundation for cross-national comparison.

Lor (2019) further examines research approaches in this field across three levels: metatheory, methodology, and method. At the level of metatheory, he identifies three major research paradigms: positivism, postpositivism, and interpretivism. A positivist study in LIS might use large-scale statistical data (e.g., national library surveys) to identify general patterns in library automation. For example, a comparative study of public libraries' contribution to digital inclusion in Korea and the United States employs a survey-based design, using standardized questionnaires and statistical analysis to measure levels of digital inclusion across libraries in both countries (Noh, 2019). In contrast, an interpretivist study might rely on interviews, document analysis, or conceptual inquiry to understand how libraries are embedded in broader social and cultural contexts. For instance, a comparative study of cultural policy, the public sphere, and public libraries in Norway, the United States, and Japan adopts a qualitative and theoretically informed approach, analyzing how different governance structures and cultural

policy traditions shape the role of public libraries in the public sphere (Widdersheim et al., 2021). Postpositivist approaches occupy an intermediate position, combining empirical measurement with an awareness of contextual limitations. In this way, metatheoretical assumptions directly inform methodological choices, particularly the distinction between quantitative and qualitative approaches. With regard to comparative research methodology, Lor highlights the classic four-step method (Adick, 2018), which structures comparative inquiry as a sequential process of description, contextual interpretation, systematic juxtaposition, and hypothesis-driven comparison. This framework ensures that cases are made analytically comparable before drawing conclusions. At the level of specific methods, Lor identifies key challenges in cross-cultural research, including the transferability of concepts, the comparability of data, and the influence of linguistic and cultural differences. These are issues that require careful consideration during the process of operationalization.

Building on Lor's framework, this study positions itself as an empirical engagement with his call for theoretically informed comparative research. While Lor primarily outlines a methodological agenda, this study seeks to apply these principles in the specific context of public library technology development in China and the US. [enrich my understanding of his work] In doing so, it aims not only to affirm the value of his framework, but also to provide empirical evidence on how broader structural and institutional factors shape digital technology applications in public libraries in different national contexts.

### *2.2.2 Comparative studies of libraries in Chinese literature*

#### *2.2.2.1 Comparative studies of public libraries*

Comparative research on public libraries in Chinese-language scholarship spans a broad range of service domains, including services for special populations (Ma et al., 2020), youth services (Deng, 2011), health information services (J. Wang, 2022), reading promotion (D. Wang, 2019), mobile services (L. Zhang & Wang, 2020), reference services (Yuan, 2017), and broader discussions of equitable service provision (Su & Liu, 2013). These studies typically compare service coverage and accessibility, policy and legal safeguards, organizational structures, service content frameworks, and implementation mechanisms.

Methodologically, most scholars employ literature review and web-based investigation. Data sources commonly include academic publications, publicly available information on library websites, government policy documents, national legislation, and media reports. Comparisons most frequently focus on China and the US, though some studies also examine Western European and other developed countries (Wu, 2015). In many cases, the US (and other Western countries) is portrayed as a relatively mature reference model, and the analyses conclude with targeted recommendations for Chinese libraries to improve service scope, standardization, and governance capacity (J. Wang, 2022; Yan, 2013). Overall, the dominant conclusion across these comparative studies is that while Chinese public libraries have rapidly expanded their service scope, they continue to face structural challenges in standardization, policy and legal safeguards,

professional staffing, inter-organizational collaboration, and differentiated service provision for specific communities.

*2.2.2.2 Comparative studies of digital technologies in libraries*

The literature addressing the application of digital technologies in libraries primarily examines digital reference (virtual reference) services, mobile services (including WAP/mobile web, apps, and mobile reading), social media services, personalized systems (e.g., MyLibrary), automation and integrated library systems, and digital library operational models and resource development. These studies typically compare functional modules, service workflows, platform and system architectures, content formats, and patterns of user interaction.

In the area of digital reference services, research commonly contrasts service content, consultation modes, system design, service quality, management practices, and collaborative models. Methodologically, these studies often combine literature review with website-based investigation (Yuan, 2017; T. Zhou & Liu, 2010). Studies of mobile services focus on WAP/mobile web platforms and library applications, emphasizing coverage rates, functional breadth (e.g., OPAC access, renewals, database access, and e-resources), and user interface design. These comparisons repeatedly conclude that overseas libraries tend to provide more comprehensive and better-integrated mobile services, whereas Chinese libraries display uneven development and more limited feature sets (Jiang, 2011; J. Zhang et al., 2017). Comparative research on social media services (e.g., Weibo versus Twitter) typically employs statistical and content analysis to examine account development trajectories, content formats, thematic orientations, and levels of user engagement (Peng, 2012).

Whether focusing on comparative studies of public library services or digital technology applications in libraries, the majority of studies rely primarily on descriptive statistics, with relatively limited attention to causal explanation. Explicit theoretical frameworks are rarely introduced to systematically interpret cross-national differences.

A small number of studies move beyond description to provide explanatory analysis. For example, Guo (2012), in a comparison of volunteer services in Chinese and US public libraries, attributes observed differences to cultural background, institutional arrangements, and funding sources. Similarly, Yu and her colleagues (2007) analyze how broader social development contexts, public service governance structures, cultural traditions, political systems, and professional norms shape library development trajectories. Li (1999) identifies differences in administrative systems, operational mechanisms, professional ideologies, and levels of financial investment as key explanatory factors in affecting the development of library automation in China and the US. Taken together, these explanatory variables can be synthesized into two broad dimensions: first, historically embedded cultural backgrounds and professional traditions; and second, contemporary differences in national institutional arrangements and governance structures.

### *2.2.2 Comparative studies of libraries in English literature*

Comparative research on public libraries in English-language scholarship likewise spans a diverse set of service domains and institutional roles, including digital inclusion (Gould & Gomez, 2010; Noh, 2019), public library programming and access models (Lenstra & Mathiasson, 2020), and libraries' cultural and sociocultural functions (Audunson et al., 2019; Lo et al., 2019; Widdersheim et al., 2021). In addition, some studies examine broader outcome-oriented dimensions, such as the perceived social, educational, and economic benefits of library services (Vakkari et al., 2014). These studies typically compare service provision, technological infrastructure, governance models, and funding mechanisms of libraries, often situating public libraries within larger frameworks such as digital inclusion, cultural policy, or democratic participation.

Methodologically, English-language studies employ a wider range of empirical approaches compared to Chinese-language scholarship. These include large-scale cross-national surveys (e.g., patron perception and outcome studies), questionnaire-based institutional assessments, secondary data analysis, and multi-country comparative research designs. For example, survey methods are frequently used to measure patron perceptions and outcomes across different national contexts (Audunson et al., 2019; Vakkari et al., 2014). Some studies combine datasets from independent national projects to enable cross-national comparison (Lenstra & Mathiasson, 2020). Geographically, these studies extend beyond US-centered comparisons to include Europe, East Asia, and global South contexts, often adopting a more explicitly international or global comparative framework.

Overall, the dominant conclusions in English-language comparative studies emphasize structural and contextual variation across countries. Findings highlight how differences in governance structures, cultural policy regimes, and resource allocation shape library functions and outcomes. For instance, variations in cultural policy and governance lead to different emphases on public sphere functions, educational roles, or community engagement across countries (Widdersheim et al., 2021), while disparities in ICT infrastructure, service diversity, and institutional support affect libraries' contributions to digital inclusion (Gould & Gomez, 2010; Noh, 2019). Rather than prescribing uniform solutions, these studies tend to underscore the importance of local context, institutional arrangements, and policy environments in shaping public library development trajectories.

## *2.3 Theory of practice*

The theory of practice was developed by the French sociologist Pierre Bourdieu. It was first systematically articulated in *Outline of a Theory of Practice* and further elaborated in subsequent works, including *Distinction: A Social Critique of the Judgement of Taste* and *The Logic of Practice*. Practice theory revolves around three core concepts: *field*, *habitus*, and *capital* (Bourdieu, 2010). Bourdieu considers practice as a dynamic and complex process that involves both individual agency and the structuring constraints of social systems. It therefore cannot be

adequately explained through either subjectivism or objectivism alone. To overcome this dichotomy, Bourdieu introduced the concept of *habitus* as the mediating link between individual action and social structure. *Habitus* refers to the dispositions shaped by people's social and historical experiences. It functions as the generative principle of practice, shaping perception, judgment, and action within specific fields. *Field* refers to a structured social space constituted by networks of relations among actors and institutions, within which actors compete for various forms of capital and positions of power.

*Capital* refers to the resources and assets that actors possess and mobilize within a field, including economic capital, cultural capital, social capital, and symbolic capital, which can be converted into advantage within specific social contexts (Bourdieu, 2010; Da Silva et al., 2025).

The application of practice theory in Library and Information Science (LIS) remains relatively limited. At the level of theoretical development, Yu (2011) argues that research on information inequality requires an integrative theoretical framework similar to theory of practice in order to address the longstanding theoretical dualisms in the field, such as macro versus micro, structure versus agency, and objectivism versus subjectivism. She suggests that information inequality is both the result of structural forces and the outcome of the reproduction of individual habitus, continuously produced and reproduced within social fields. Some empirical studies have demonstrated the explanatory potential of theory of practice. For example, Vaidya and Myers (2021), in their analysis of an informatization project implemented by an Agricultural Market Committee in Madhya Pradesh, India, apply a practice-theoretical framework and argue that symbolic practices constitute part of habitus. These practices prevented the technical rationality embedded in the ICT system from becoming integrated into the existing social field, thereby explaining the mechanisms behind the failure of the ICT4D initiative. Similarly, a study of fisheries governance in the Brazilian Amazon shows that, under conditions of digital social exclusion, the implementation of digital public services is not merely a technological transformation, but a socially embedded process shaped by historically constituted power relations (Da Silva et al., 2025).

This study likewise argues that the development of digital technologies in public libraries should not be understood simply as a process of technological upgrading or system iteration. Instead, public libraries need to be analyzed as institutions situated within broader social fields. As noted in the previous review of comparative public library research, scholars have highlighted the influence of historical and cultural continuities in shaping differences between China and the US. Such factors correspond closely to Bourdieu's concept of habitus. Therefore, theory of practice provides an appropriate theoretical lens for examining cross-national differences in the development and application of digital technologies in public libraries in China.

### *2.4 Activity theory*

Activity theory, also known as Cultural-Historical Activity Theory (CHAT), is often regarded in contemporary social science as a branch of practice-based theoretical traditions and as a

framework capable of integrating long-standing dualisms in social science. CHAT analyzes how individuals and organizations learn new practices and how social systems undergo transformation. The theoretical and methodological foundations of the approach originate from the works of Lev Vygotsky and A. N. Leontiev (Daniels, 2010). Through subsequent development by a number of scholars, the most comprehensive formulation of activity theory today is the model proposed by Yrjö Engeström, which is also the model adopted in this study.

Engeström distinguishes between actions and activity. Actions are relatively short-term, goal-directed behaviors, whereas activity refers to a historically evolving collective system organized around an object. Activity theory emphasizes that the appropriate unit of analysis is the historically evolving, object-oriented collective activity system rather than isolated individual behavior (Engestrom, 2000).

As illustrated in Figure 3, an activity system consists of six fundamental components: *subject*, *object*, *instruments (tools)*, *rules*, *community*, and *division of labor*. The *subject* refers to the individual or organization initiating the activity. The *object* denotes the target toward which human activity is directed, such as a physical entity or a conceptual problem to be studied. *Instruments*, or *tools*, are the mediating tools used to achieve the objective of the activity; these may be material tools (e.g., physical artifacts) or symbolic tools (e.g., language and signs). The *community* consists of actors who share the same object of activity. The interactions of the subject and the community are regulated by *rules*, which include formal laws, institutional regulations, cultural norms, and other socially established constraints. Finally, the relationship between the subject and the community is mediated by the *division of labor*, which refers both to the allocation of tasks and to the distribution of social roles, authority, and status within the activity system (W. Zhou, 2020).

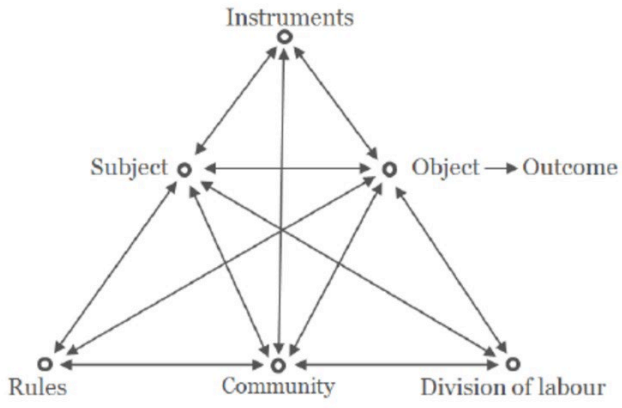


**Figure 3. Engeström's Model of Activity Theory**

Activity theory holds that these six components are themselves products of historical and cultural development, and that the relationships among them are therefore dynamic rather than static. The framework emphasizes the analysis of activity processes over time. In addition, activity theory

views internal contradictions within an activity system as the primary driving force for change and development (Engestrom, 2000). For this reason, the approach has attracted considerable attention across disciplines such as social science, management studies, and communication studies.

In the LIS field, Zhou (2020) provides a systematic review of the application of activity theory and discusses its contributions to research on information literacy, information systems, and information behavior. In his subsequent work, the author applies activity theory to analyze the contradictions among different elements within the activity system of China's Rural Library Project, demonstrating how these tensions shape the project's construction and development and further explaining why rural information initiatives in China often face challenges of inefficiency and sustainability (W. Zhou, 2024).

Consistent with the holistic analytical perspective of practice theory, activity theory emphasizes the analysis of activity processes over time. It therefore provides a useful framework for examining the overall process through which digital technologies are adopted and implemented in public libraries and for identifying the different actors involved in this process. Activity theory enables a systematic analysis of the relational structures and interactions among these actors, thereby helping to uncover the mechanisms through which differences emerge in the development of digital technologies in public libraries in China and the US. Figure 4 presents the operationalization of Engeström's model in this study. It should be noted that not all relationships represented by the arrows in the original model will necessarily be examined or reflected in this research. The relational structure of the model will be refined and updated based on the empirical data collected in the course of the study.

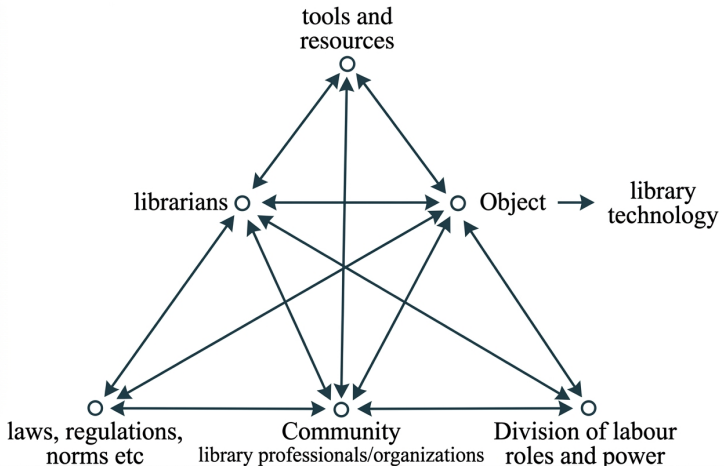


**Figure 4. The Research's Operationalization of Engeström's Model**

### *2.5 Political economy perspectives in library studies*

Political economy is defined as "a current of study that analyses the reciprocal influences among economic, social, and political factors and their impact on how activities are regulated in

different institutional contexts" (Lor, 2019). Lor further argues that, when applied to LIS, a political economy perspective highlights that the distribution of information resources, technologies, and services is fundamentally shaped by the interplay of political and economic forces.

As representative cases of socialist and capitalist systems, China and the US exhibit substantial differences in their political institutions and economic structures. In addition to this, there is the language difference. All this has given rise to distinct communities of scholarship. From a political perspective, in the US context, democracy is widely regarded as a foundational principle of society. Public libraries, which developed alongside the expansion of democratic institutions in the latter half of the nineteenth century, have long been associated with functions such as providing spaces for public discourse, facilitating access to information, serving as community hubs, and promoting information literacy among citizens (Krummel, 1999). From the perspective of civic republicanism, scholars have argued that libraries contribute to the cultivation of informed and actively engaged citizens, thereby supporting the functioning of democratic governance (Buschman, 2024). The digital environment has introduced new dynamics into this relationship. On the one hand, digital technologies, particularly the internet, have expanded opportunities for information access and civic participation. On the other hand, they have introduced new forms of digital inequality that challenge the equity of democratic processes. The rise of digital media has also transformed modes of political participation. Kranich (2001) argues that in this context, libraries must adapt to changing media environments by helping the public access political information and develop media literacy, thereby sustaining effective democratic engagement. In addition, the provision of public Internet access in libraries serves as an important institutional mechanism for mitigating the digital divide and promoting information equity.

In contrast, discussions of public library development in China have long emphasized the principle of equitable and universal service provision. This framework highlights the importance of establishing a comprehensive network of public library facilities to ensure that all members of society can conveniently access library services. The notion of universal service provision refers to the goal that all citizens can access public library services within reasonable geographic proximity, often operationalized through planning concepts (Han, 2016). Although this framework is not explicitly framed in terms of democracy, its underlying normative orientation shares important similarities with democratic ideals in Western contexts. Both emphasize the role of public libraries in promoting equitable access to information and enabling individuals to participate more fully in social life. In this sense, equitable and universal service provision can be understood as a functionally analogous approach to addressing issues of access and inclusion, albeit grounded in a different political and institutional context. To achieve this objective, China has implemented a series of nationwide library development initiatives since 1949. The largest of these is the Rural Library Program. The program was piloted in selected western regions in 2005 and expanded nationwide in 2007. By 2012, more than 600,000 reading rooms had been

established across nearly all villages (Pan & Chen, 2019). However, recent studies have raised concerns regarding the utilization rates and long-term sustainability of these facilities (Tian, 2013).

One distinction in comparative studies of Chinese and US libraries is the contrast between "top-down" and "bottom-up" approaches (Yu & Yu, 2013). In a comparative study of academic libraries in China and the US, Wang et al. (2013) argue that the development of instructional services (or information literacy services) in the US is primarily driven by internal professional needs and sustained through librarians' ongoing reflection on practice. In contrast, Chinese libraries are often guided by top-level initiatives aimed at adopting international models, with implementation largely propelled by government policies. While this distinction reflects part of differences in political and institutional contexts, it may not fully represent the diversity of public library development in either country. Therefore, this study will further examine how political factors shape the development of public libraries in a more nuanced manner.

Within the LIS literature, studies explicitly examining libraries from the perspective of capitalism and socialism remain relatively limited. Martin (1998) argues that the development of libraries is closely intertwined with the evolution of capitalist economies, particularly through the expansion of the information industry as a major sector of economic activity. Within this context, libraries are increasingly shaped by technological innovation, capital investment, and market-oriented efficiency, which influence both their organizational structures and service models. In the Chinese context, Tan (1994) notes that, although information has increasingly been recognized as an economically valuable resource and libraries have been encouraged to enhance efficiency, selectively develop collections, and expand information services, libraries continue to be guided by their role as public cultural institutions. Building on this contrast, this study will further examine how changes in economic policies over time have influenced the development of libraries, particularly the adoption and implementation of digital technologies, in different historical contexts.

## 3 Research plan and methods

This study adopts a comparative research design informed by the classic four-step approach (Adick, 2018; Lor, 2019), which conceptualizes comparison as a sequential process of description, contextual interpretation, systematic juxtaposition, and hypothesis-driven analysis. Guided by this framework, the study first constructs a descriptive account of the development of digital technologies in public libraries in China and the US. It then situates these developments within their broader socio-political, economic, and cultural contexts in order to interpret the underlying factors shaping technological trajectories in each country. Through the systematic juxtaposition of the two cases, the study seeks to identify both similarities and differences, and to develop empirically grounded explanations for these patterns.

This study will review and analyze representative academic journals in the field of digital technologies in libraries in both countries to identify overarching patterns and characteristics.

The study will also select one public library in each country as a representative case for in-depth analysis. This section outlines the study scope, units of analysis, and methods of data collection and analysis for both the journal review and the case studies, as well as the overall research timeline, and the equipment required for the study.

## *3.1 Journal review*

### *3.1.1 Study scope and unit of analysis*

The purpose of the journal review is to build the histories of digital technology development in public libraries in the two countries. Specifically, this section will select four representative articles from the selected journals in each decade. Systematic literature review and content analysis will be conducted to periodize the development trajectory and identify the key characteristics of each stage. The journal review will focus on the Public-Access Computer Systems Review (PACS Review), The Journal of Library Automation (JOLA), and the journal's later incarnation, Information Technology and Libraries (ITL). The Chinese-language journals selected for analysis are Computer and Library (CAL) and its renamed successor, New Technology of Library and Information Service (NTLIS).

#### *3.1.1.1 Description of the journal*

*JOLA* is a quarterly journal published by Information Science and Automation Division (ISAD) of the American Library Association (ALA). ISAD changed its name to Library and Information Technology Association LITA in 1977. In its initial announcement, *JOLA* claimed that they would "publish original contributions in all fields of research and development in library automation including interlibrary communications, in research in information sciences directly related to library activities, and in the history and teaching of these subjects. (American Library Association, 1968)" *JOLA* published from 1968 to 1981 and was renamed *ITL* in 1982. Thes scope of *ITL* covers "all facets of information technology within diverse library environments to offer a comprehensive exploration of the evolving landscape of technology in libraries and related domains (*About the Journal*, n.d.)." The journal has continued publication under its new title to the present.

*PACS Review* was founded in 1989 by Charles W. Bailey, Jr., who served as editor-in-chief from 1989 to 1996. Pat Ensor and Thomas C. Wilson assumed the role of editors in January 1997. The journal was published by the University of Houston Libraries. The first volume of the journal appeared in 1990. It was established with the aim of addressing a series of questions that were still uncertain at that time, such as how electronic journals should be structured, how readers would respond to electronic publishing formats, whether traditional print publishing practices could be applied in electronic environments, and whether electronic formats could support serious scholarly communication. The journal focused on the application of end-user computing systems in library environments, with particular attention to electronic scholarly publishing, digital libraries, and computing technologies related to web access and public services (Ensor & Wilson, 1997). *PACS Review* was published from 1990 to 1998.

*NTLIS* is a Chinese academic journal sponsored by the National Science Library of the Chinese Academy of Sciences. It was founded in 1980 under the original title *CAL* and was renamed *NTLIS* in 1985. In 2017, the journal was renamed *Data Analysis and Knowledge Discovery*, shifting its focus toward research on data mining and knowledge analysis, so the articles after this time will be excluded.

*3.1.1.2 Justification of journal choice*

The three journals were all established with an explicit focus on library automation or information technologies in libraries, which aligns directly with the research focus of this study.

*JOLA* was one of the earliest scholarly journals dedicated to library automation, publishing research on automated cataloging systems, interlibrary communication networks, and early information retrieval technologies. After it was renamed *ITL*, the journal retained its technology-oriented focus while expanding its coverage to include a wider range of emerging technologies applied in libraries. *PACS Review* focused on public-access computing and networked information services, a key development in the digital transformation of libraries during the Internet era. *NTLIS* served as the first and one of the primary Chinese academic venues for research on computer applications and digital technologies in libraries.

In terms of publication coverage, the two US journals span the period from 1968 to 2025, while the Chinese journal covers the period from 1980 to 2017. Together, they encompass several major stages of technological development in libraries in both countries. They therefore provide longitudinal evidence of technological change, enabling this study to trace how discussions of digital technologies in libraries have evolved over time.

**Table 3. Publication Coverage Years of the Selected Journals**

| | **Name (# of papers)** | **1960s** | **1970s** | **1980s** | **1990s** | **2000s** | **2010s** | **2020s** |
|---|---|---|---|---|---|---|---|---|
| **US** | JOLA (243) | 1968 —— | —— | —— 1981 | | | | |
| | ITL (1104) | | | 1982 —— | —— | —— | —— | —— now |
| | PACS Review (101) | | | | 1990-1998 | | | |
| **China** | CAL (231) | | | 1980-1985 | | | | |
| | NTLIS (1935) | | | 1985 —— | —— | —— | —— 2016 | |

In addition, JOLA/ITL was published by a sub-division of the American Library Association, the primary professional organization representing libraries in the US. NTLIS was sponsored by the National Science Library of the Chinese Academy of Sciences, one of the most prominent research institutions in China's information science community. Because of their institutional affiliations, these journals have served as important platforms for scholarly discussion on technological change in libraries, which further enhances their representativeness for this study.

### *3.1.2 Data collection*

Data collection will involve recording bibliographic information, including the title, author(s), and year of publication for each article available in the online archives of the selected journals. The study will first review the titles and abstracts of all articles and organize them by year of publication. From each ten-year period, four representative articles will be selected from different journals. For these selected articles, additional variables will be coded, including article type, the geographic location of the research, the primary research theme, and key technologies mentioned.

Editorials, announcements, news items, meeting records, and book reviews will be excluded. For journals other than NTLIS, the base dataset will include all remaining research articles after these exclusions. Due to the large volume of publications in NTLIS, which are over 5,000 articles, this study will further limit the sample by selecting only those articles whose titles explicitly include the term “library.” The final number of articles selected from each journal is presented in Table 3.

Each article will be recorded as a single entry in a structured datasheet created using Microsoft Excel. The dataset will serve as the basis for subsequent data management, filtering, and statistical analysis.

### *3.1.3 Data analysis*

Data analysis will employ qualitative content analysis. The study will summarize and compare temporal patterns in journal publications in the two countries, with particular attention to changes over time in the locations of reported cases and the information technologies emphasized in the articles. Findings from this part will help test Hypothesis 1, which posits that the development of digital technologies in public libraries has followed a broadly similar trajectory in both countries, moving from early library automation toward more widely integrated digital technologies, as well as Hypothesis 2, which posits that, despite this shared trajectory, the historical development and current implementation of digital technologies in public libraries differ between the two countries. Hypothesis 3 will not be addressed in this journal review, as it requires in-depth empirical evidence and will instead be examined through the subsequent case study analysis.

## *3.2 Case study*

### *3.2.1 Study scope and unit of analysis*

In-depth case studies of individual libraries enable the collection of richer, more longitudinal data, allowing not only the identification of descriptive patterns but also the explanation of underlying mechanisms. This study will select one public library in each country as a representative case for in-depth analysis. In the US, the case library will be the Urbana Free Library, while in China, the case library will be the Suzhou Library. The main library and its branch libraries will be examined as an integrated system.

The case study will trace the historical introduction and development of digital technologies in these two libraries and analyze the factors influencing major decisions. The following subsections will present each case in terms of: (1) the demographic context of the city in which the library is located; (2) the basic characteristics of the library; and (3) the rationale for selecting the library as a case.

*3.2.1.1 Urbana and the Urbana Free Library*

*3.2.1.1.1 Description of the city*

Urbana is located in Champaign County, Illinois. Table 4 presents selected demographic characteristics of the community, based on data from the U.S. Census Bureau retrieved in February 2026 (*Census Bureau Data*, n.d.). Overall educational attainment in the area is high, with the proportion of residents aged 25 or older holding a bachelor's degree or higher exceeding the national average. This pattern is largely attributable to Urbana's position as one of the twin cities that host the main campus of the University of Illinois. Urbana exhibits considerable cultural diversity. Although white residents remain the largest group, their proportion is lower than the national figure. The proportions of Black or African American and Asian residents are comparatively higher, whereas the proportion of Latino residents is lower than the national average. The population ages five and older speak a language other than English at home is also slightly above the national percentage.

**Table 4. Demographic Characteristic of Urbana**

| **Demographic Characteristic** | **Urbana** | **United States** |
|---|---|---|
| Population | 38,336 | 331,449,281 |
| Bachelor's degree or higher (%) | 58.4 | 36.2 |
| White (%) | 51.6 | 61.6 |
| Black or African American (%) | 18.9 | 12.4 |
| Asian (%) | 18.3 | 6.0 |
| Latino (%) | 8.5 | 18.7 |
| Two races or more (%) | 7.4 | 10.2 |
| Speak a foreign language at home (%) | 24.3 | 22.5 |

*3.2.1.1.2 Description of the library*

The Urbana Free Library was established in 1984 and is located in central Illinois, serving mainly the residents of the City of Urbana. The library is governed by a Board of Trustees appointed by the Mayor and confirmed by the City Council. Its operating hours are 9:00 a.m. to 9:00 p.m. from Monday to Thursday, 9:00 a.m. to 6:00 p.m. on Friday and Saturday, and 1:00 p.m. to 5:00 p.m. on Sunday. The library can be characterized as a medium-sized public library. Its main building is approximately 50,000 square feet and was originally constructed in 1918 and was expanded in 1975 and 2005 (*Bids and RFPs | Urbana Free Library*, n.d.). Their vision is "to nurture growth by sparking curiosity and fostering a sense of belonging." Their mission is

“encouraging learning and enriching lives by providing access to diverse resources and programs.” (*About | Urbana Free Library*, n.d.)

The library provides free Internet access. Patrons may connect to Wi-Fi using their own mobile devices or use public computers available on-site. The library’s computer center is located on the second floor with a reference desk in this area. Patrons can see the reference desk and the computers immediately when they come up the stairs. Library cardholders can log in directly using their card numbers, while non-cardholders may obtain a guest pass from the reference desk without the need to present identification. The computer center is equipped with 29 computers, including six workstations without Internet access, two express Internet workstations, nineteen full-service workstations, and one accessible full-service Internet workstation equipped with a large display and assistive technologies (Rodgers, 2010). In addition, the computer center provides access to printers, scanners, and fax machines.

*3.2.1.1.3 Justification of case choice*

In terms of case representativeness, the Urbana Free Library is among the early adopters of digital technology in public libraries in the US. As early as 1982, the library collaborated with the city government on a project to develop a government documents indexing system using computer technology and Computer Output Microfilm (COM) (J. O. Brown & Schlipe, 1982). In 1984, the library collaborated with the University of Illinois to offer the first off-campus public-access terminal connected to UIUC Library Computer System online catalog (*Urbana Free Library - Champaign-Urbana - LocalWiki*, n.d.). The library continues to place strong emphasis on the internet access and technology assistance services. In its Technology Plan (2025–2026) (*Planning Documents | Urbana Free Library*, n.d.), the library articulates the following technology vision statement:

> The Urbana Free Library (TUFL) is committed to using technology to improve the quality, scope, and efficiency of Library services. The Library will continually review and adopt new technology to improve the Library experience of patrons, increase access to information, and enhance employees’ ability to perform their duties.

In terms of research feasibility, the researcher is affiliated with the School of Information Sciences at the University of Illinois Urbana-Champaign, which has an established collaborative relationship with the Urbana Free Library. This affiliation facilitates institutional access and supports the development of trust with library staff. In addition, the researcher has already conducted preliminary fieldwork at the library. Through consultation with the library’s archives, it was confirmed that historical annual reports are available for research purposes. The researcher has also been in contact with former library director Frederick A. Schlipf, who has expressed strong support for this study and can facilitate access to relevant interviewees for subsequent stages of data collection.

*3.2.1.2 Suzhou and the Suzhou Library*

*3.2.1.2.1 Description of the city*

Suzhou is located in Jiangsu Province, in the eastern part of China within the Yangtze River Delta region. Table 5 presents selected demographic characteristics of the city in comparison with national figures from China, based on data from the Seventh National Census in 2020 (*Major Figures on 2020 Population Census of China [in Chinese]*, n.d.), the Suzhou Statistical Yearbook 2025 (*Suzhou Statistical Yearbook [in Chinese]*, n.d.), and the National Bureau of Statistics (*National Data*, n.d.). Suzhou has a substantially higher proportion of urban population, which is consistent with the city's relatively strong economic development. Suzhou also reports higher education-related figures, including a higher percentage of students in schools and a higher proportion of residents with junior college education and above. Regarding ethnic composition, the proportion of minority nationalities in Suzhou is markedly lower than the national figure, indicating a predominantly Han Chinese population structure. With regard to age structure, Suzhou has lower proportions of population aged 0-14 and aged 65 and above, while the proportion aged 15-64 is higher than the national level.

**Table 5. Demographic Characteristic of Suzhou**

| **Demographic Characteristic** | **Suzhou** | **China** |
|---|---|---|
| Population | 7,949,100 | 140,828,000 |
| Urban population (%) | 82.7 | 63.9 |
| Number of students in schools (%) | 24.2 | 18.8 |
| Junior college and above (%)* | 22.5 | 15.5 |
| Minority nationalities (%)* | 1.0 | 8.9 |
| Aged 0-14 (%)* | 13.6 | 18.0 |
| Aged 15-64 (%)* | 74.0 | 68.6 |
| Aged 65 and over (%)* | 12.4 | 13.5 |

Note: Data marked with * are derived from the Seventh National Census (2020), so the national population used as the denominator is also based on 2020 figures. The data presented in the first three rows are from 2025.

3.2.1.2.2 Description of the library

Suzhou Library, established in 1914, is one of the earliest public libraries in China. It currently operates two main physical facilities: the Renmin Road Library and the Suzhou Library North Branch. The Renmin Road Library, located at 858 Renmin Road, occupies a site area of 16,000 square meters with a total floor area of 25,000 square meters and is designed as a modern library integrated with traditional garden aesthetics. The Suzhou Library North Branch, located at 2383 Guangji North Road, has a total floor area of 45,600 square meters. The building comprises seven levels, including one underground floor and six above-ground floors (*Introduction | Suzhou Library [in Chinese]*, n.d.).

In recent years, Suzhou Library has focused on building a citywide public library service system. This system operates under unified resource development and standardized service provision. At present, the system includes two central facilities, 100 branch libraries, 147 community-based book delivery points for online borrowing (including 74 self-service stations), and two mobile library vehicles. The mission of Suzhou Library is "to draw on advanced international experience, to strive toward leading domestic standards, and to build a modern library system that aligns with Suzhou's socio-economic development and meets the growing cultural needs of its citizens." (*Mission | Suzhou Library [in Chinese]*, n.d.)

*3.2.1.2.3 Justification of case choice*

In terms of case representativeness, Suzhou Library places strong emphasis on digital technology development. In its 2025 Annual Work Plan, a number of technology-related initiatives are identified as key priorities, including the development and application of AI-based systems such as AI management systems, AI-powered book recommendation, AI consultation services, and AI-driven virtual agents (*2025 Annual Work Plan | Suzhou Library [in Chinese]*, n.d.).

In terms of research feasibility, Suzhou Library is located in the researcher's home region, making it readily accessible for fieldwork. In addition, the local dialect is similar to that of the researcher, which facilitates communication with library staff and users.

### *3.2.2 Data collection*

Data for the case studies will be collected through participatory observation, documentary research on sources like published literature and institutional documents, and interviews with current and former library staff.

*3.2.2.1 Participatory observation*

The primary purpose of field observation is to examine the current application of digital technologies in the library. The guiding questions include:

(1) What types of digital facilities are provided by the library?
(2) Are these facilities functioning properly, and how is the user experience? (The researcher will both observe patrons' use of the service and engage with the technologies as a patron.)
(3) How are problems encountered during use addressed?

As the researcher will adopt the role of a patron during participatory observation, the focus of this stage will primarily be on patron facing technologies. The researcher will seek to integrate naturally into the library environment and will use the library on a regular basis, at least weekly during the fieldwork period. Technologies primarily used by library staff will be examined through subsequent documentary research and interviews. On-site observation will also help generate entry points for later stages of the study, as the development of technological services is typically shaped by identifiable trajectories. To document the observations, the researcher will

carry a notebook for rapid note-taking during site visits. At the end of each day, the notes will be reviewed and systematically recorded in digital form. Informal interviews will be conducted to supplement the observational data, and verbal consent will be obtained prior to recording relevant information.

#### *3.2.2.2 Documentary research*

The purpose of documentary research is to construct the historical trajectory of digital technology development in the library on a year-by-year basis and to identify key technologies, services, and critical events across different stages. Findings from documentary research will also be used to triangulate and cross-validate evidence obtained from interviews.

This study draws on two types of documentary sources. The first consists of published literature, including local newspapers and media coverage of the library, relevant scholarly publications, and publicly available policy documents issued by governmental agencies. The second comprises institutional documents, referring to archival materials held within the library, particularly annual reports and statistical records. The accessibility of internal archival materials will be discussed with the library in advance. Any sensitive or restricted information will be appropriately anonymized or redacted in accordance with institutional requirements.

#### *3.2.2.3 Interviews*

This study will conduct semi-structured interviews with current or former library staff and possible others at the selected case libraries. The interviews are designed to complement documentary research by providing in-depth explanations of the same key aspects of digital technology development, including the adoption of specific technologies and services, the motivations behind these decisions, the institutional and contextual factors involved, the intended objectives, the actual outcomes, and the challenges encountered. While documentary sources provide a longitudinal and institutional perspective, interviews will offer insights into the decision-making processes, lived experiences, and interpretations of key actors involved in these developments.

Participants will also be invited to recommend colleagues or collaborators who have relevant knowledge of particular technologies or services provided in the libraries, thereby enabling data collection through a snowball sampling approach. The study aims to conduct at least 30 interviews in total, with a minimum of 15 participants from each country. The final number may be adjusted depending on data saturation and field conditions. An interview guide is provided in the Appendix. All interviews will be audio-recorded and transcribed with the informed consent of the participants.

### ***3.2.3 Data analysis***

Data collected through the three mentioned sources will be transcribed into textual records and analyzed in an integrated manner. These data sources will be triangulated to examine the three hypotheses proposed in this study. Among them, documentary research and interview data will

primarily be used to address Hypothesis 3, which posits that different structural and institutional factors have shaped the development of digital technologies in public libraries in the two countries, and that different sets of actors have played key roles in this process.

This study will employ content analysis as the primary analytical method. Based on the theoretical framework developed in the literature review, the factors influencing the application of digital technologies in libraries can be broadly categorized into six dimensions: technological, social, historical (corresponding to the concept of habitus in practice theory), political (particularly the role of democratic governance), economic, and institutional factors. In addition, activity theory will be applied to analyze how different actors interact within the development process and the roles they play in shaping the trajectory of digital technology adoption in public libraries.

### *3.3 Timeline*

The study will be carried out according to the following timeline:

| | |
|---|---|
| April 1 to May 6, 2026 (in the US) | Communicate with the Urbana Free Library regarding the case study and obtain permission to access archival materials |
| | Submit documents for IRB and present proposal to committee |
| May 7 to mid-June, 2026 (in China) | Conduct the journal review while awaiting IRB approval |
| | Communicate with the selected Chinese Library regarding the case study and obtain permission to access archival materials |
| Mid-June to mid-August, 2026 (in China) | Collect data in China, including several site visits to the selected Chinese Library and interviews with relevant librarians; data analysis will proceed concurrently |
| Fall 2026 (in the US) | Collect data in the US, including several site visits to the Urbana Free Library and interviews with relevant librarians; data analysis will proceed concurrently |
| Winter and Spring 2027 (in the US) | Complete the full draft of the dissertation |
| Summer 2027 (in the US) | Successfully defend the dissertation |

### *3.4 Equipment*

This study will use the following equipment to support data collection, recording, and storage throughout the research process. These tools will facilitate field observation, documentation, interview recording, and data management while ensuring the accuracy and security of research materials:

(1) Personal laptop computer
(2) Smartphone with camera function
(3) USB flash drive
(4) Voice recorder and its accompanying transcription software
(5) Microsoft Office Suite (e.g., Excel and Word)

## Reference


2025 年度工作计划|苏州图书馆. (n.d.). Retrieved March 17, 2026, from https://www.szlib.com/gwgk.html?articeid=51479. [*2025 Annual Work Plan | Suzhou Library*. (n.d.). Retrieved March 17, 2026. In Chinese]

*About | Urbana Free Library*. (n.d.). Retrieved March 17, 2026, from https://urbanafreelibrary.org/about-us

*About the Journal*. (n.d.). Retrieved January 20, 2026, from https://ital.corejournals.org/index.php/ital/about

Adick, C. (2018). Bereday and Hilker: Origins of the 'four steps of comparison' model. *Comparative Education*, *54*(1), 35–48. https://doi.org/10.1080/03050068.2017.1396088

Agar, J. (2020). What is technology? *Annals of Science*, *77*(3), 377–382. https://doi.org/10.1080/00033790.2019.1672788

American Library Association. (1968). JOURNAL OF LIBRARY AUTOMATION. *College & Research Libraries News*, *29*(1), 9a–9a. https://doi.org/10.5860/crln.29.1.09a

Arnott, P. D., & Richards, D. E. (1985). Using the IBM Personal Computer for Library Instruction. *Reference Services Review*, *13*(1), 69–72. https://doi.org/10.1108/eb048894

Audunson, R., Aabø, S., Blomgren, R., Evjen, S., Jochumsen, H., Larsen, H., Rasmussen, C. H., Vårheim, A., Johnston, J., & Koizumi, M. (2019). Public libraries as an infrastructure for a sustainable public sphere: A comprehensive review of research. *Journal of Documentation*, *75*(4), 773–790. https://doi.org/10.1108/JD-10-2018-0157

Bailey, C. W. (1989). Public-Access Computer Systems: The Next Generation of Library Automation Systems. *Information Technology and Libraries*, *8*(2), 178.

Beaubien, D. M., Primack, A. L., & Seale, C. (1991). Introduction. *Library Trends*, *40*(1), 1–5.

Bertot, J., & Palmer, K. (n.d.). *U.S. Public Libraries Provide Access to Computers, the Internet, and Technology Training*. Bill & Melinda Gates Foundation. Retrieved May 3, 2024, from https://www.gatesfoundation.org/ideas/media-center/press-releases/2005/06/support-needed-for-library-technology

*Bids and RFPs | Urbana Free Library*. (n.d.). Retrieved March 17, 2026, from https://urbanafreelibrary.org/about-us/bids-rfps

Bourdieu, P. (2010). *Outline of a theory of practice* (Nachdr.). Cambridge Univ. Press.

Brown, J. O., & Schlipe, F. A. (1982). The use of microfiche and com indexes to improve municipal document control. *Government Publications Review*, *9*(4), 289–310. https://doi.org/10.1016/0277-9390(82)90059-0

Brown, L. M. (2019). What is technology. In *Diverse Learning Opportunities Through Technology-Based Curriculum Design* (pp. 16–40). IGI Global Scientific Publishing.

Brown-Syed, C. (2011). *Parents of Invention: The Development of Library Automation Systems in the Late 20th Century: The Development of Library Automation Systems in the Late 20th Century*. ABC-CLIO, LLC. http://ebookcentral.proquest.com/lib/uiuc/detail.action?docID=714247

Buschman, J. (2024). Equal Respect: The Civic Engagement Libraries (Already) Perform for Democracy. *The Library Quarterly*, *94*(1), 101–116. https://doi.org/10.1086/727817

Cambridge English Dictionary. (n.d.-a). *Digital*. Retrieved February 9, 2026, from https://dictionary.cambridge.org/us/dictionary/english/digital

Cambridge English Dictionary. (n.d.-b). *Technology*. Retrieved February 9, 2026, from https://dictionary.cambridge.org/us/dictionary/english/technology#google_vignette

*Capitalism vs. Socialism: An Overview | Political Science | Research Starters | EBSCO Research*. (n.d.). EBSCO. Retrieved March 30, 2026, from https://www.ebsco.com

*Census Bureau Data*. (n.d.). Retrieved August 19, 2025, from https://data.census.gov/

陈定权. (2016). ILAS 三十年(1985-2015):发展历程与未来走向. 图书馆论坛, 36 (06), 34-42+26. [Chen, D. (2016). Thirty Years of ILAS (1985–2015): Development Trajectory and Future Directions. *Library Tribune*, *36*(6), 34–42. In Chinese.]

陈胜利. (2015). 公共数字文化资源建设的宏大实践——全国文化信息资源共享工程资源建设的现状与发展. 图书馆杂志, 34 (11), 4-12. [Chen, S. (2015). The Grand Practice of Public Digital Cultural Resource Development: The Current Status and Development of the National Cultural Information Resources Sharing Project. *Library Journal*, *34*(11), 4–12. In Chinese.]

Da Silva, J. P. S., Rodrigues, D. C., & Sobrinho, M. V. (2025). Analysis of Asymmetrical Power Relations in Digital Public Services in the Brazilian Amazon Region. *Communications of the Association for Information Systems*, *57*(1), 30–52. https://doi.org/10.17705/1CAIS.05702

Daniels, H. (Ed.). (2010). *Activity theory in practice: Promoting learning across boundaries and agencies* (Repr). Routledge.

邓爱东.(2011).中美公共图书馆未成年人服务比较研究.图书馆理论与实践,(04),40-43+91. [Deng, A. (2011). A Comparative Study of Youth Services in Public Libraries in China and the United States. *Library Theory and Practice*, (4), 40–91. In Chinese]

Dewey, P. R. (1983). Public Access to Microcomputers: Thoughts From the North-Pulaski Experience. *Reference Services Review*, *11*(3), 21–24. https://doi.org/10.1108/eb048816

Engestrom, Y. (2000). Activity theory as a framework for analyzing and redesigning work. *Ergonomics*, *43*(7), 960–974. https://doi.org/10.1080/001401300409143

Ensor, P., & Wilson, T. (1997). Public-Access Computer Systems Review: Testing the Promise. *The Journal of Electronic Publishing*, *3*(1). https://doi.org/10.3998/3336451.0003.106

Goldhor, H. (1963, July). Foreward. *Proceedings of the 1963 Clinic on Library Applications of Data Processing*. The 1963 Clinic on Library Applications of Data Processing.

Gould, E., & Gomez, R. (2010). New challenges for libraries in the information age: A comparative study of ICT in public libraries in 25 countries. *Information Development*, *26*(2), 166–176. https://doi.org/10.1177/0266666910367739

郭英.(2012).中美公共图书馆志愿者服务现状之比较研究.图书馆理论与实践,(08),53-56. [Guo, Y. (2012). A Comparative Study of Volunteer Services in Public Libraries in China and the United States. *Library Theory and Practice*, (8), 53–56. In Chinese]

Haider, S. (2025, November 23). *Glossary of Library & Information Science*. https://www.librarianshipstudies.com/2015/04/glossary-of-library-information-science.html

韩永进.(2016). 中国图书馆事业发展报告农村图书馆卷.国家图书馆出版社. [Han, Y. (2016). *Blue book on the development of libraries in China: Rural libraries*. National Library of China Publishing House. In Chinese]

介绍|苏州图书馆.(n.d.). Retrieved March 17, 2026, from https://www.szlib.com/stgk.html. [*Introduction | Suzhou Library*. (n.d.). Retrieved March 17, 2026, from https://www.szlib.com/stgk.html. In Chinese]

Jaeger, P. T., McClure, C. R., & Bertot, J. C. (2005). The E-rate Program and Libraries and Library Consortia, 2000-2004: Trends and Issues. *Information Technology and Libraries*, *24*(2), 57–67. https://doi.org/10.6017/ital.v24i2.3366

姜颖.(2011).我国移动图书馆服务现状及发展对策——中美移动图书馆服务的比较分析.图书馆建设,(12),75-78. [Jiang, Y. (2011). The Current Situation and Development Strategies of Mobile Library Services in China: A Comparative Analysis of Mobile Library Services in China and the United States. *Library Development*, (12), 75–78. In Chinese]

Juergens, B. (1979). Staff Training Aspects of Circulation System Implementation. *The Journal of Library Automation*, *12*(3), 203–208.

Julien, D. (1985). Expanding Service: Public Access Microcomputers. *Wilson Library Bulletin*, *59*(6), 381–385.

Kahn, P. W. (2025). What Is Democracy? *Public Humanities*, *1*, e16. https://doi.org/10.1017/pub.2024.17

Kilgour, F. G. (1970). History of library computerization. *Journal of Library Automation*, *3*(03), 218–229.

Kountz, J. C. (1968). Cost Comparison of Computer Versus Manual Catalog Maintenance. *The Journal of Library Automation*, *1*(3), 159–177.

Kountz, J. C. (1972). BIBLIOS Revisited. *The Journal of Library Automation*, *5*(2), 63–86.

Kranich, N. C. (2001). *Libraries and democracy: The cornerstones of liberty*. American library association.

Krummel, D. W. (1999). Fiat lux, fiat latebra: A celebration of historical library functions. *Occasional Papers*, *209*.

Kusack, J. M., & Bowers, J. S. (1982). Public Microcomputers in Public Libraries. *Library Journal*, *107*(20), 2137. (7473082).

Lenstra, N., & Mathiasson, M. H. (2020). Free and for all? A comparative study of programs with user fees in North American and Danish public libraries. *Library Management*, *41*(2/3), 103–115. https://doi.org/10.1108/LM-08-2019-0053

李嘉琳.(1999).中美图书馆自动化发展比较研究.图书情报工作,(01),32-36. [Li, J. (1999). A Comparative Study of Library Automation Development in China and the United States. *Library and Information Service*, (1), 32–36. In Chinese]

Library, A. L. A. (2025, February 20). *LibGuides: Definition of a Library: General Definition*. https://libguides.ala.org/library-definition/general

林丁香. (2008). 基于 ILAS II 2.0 开发的图书馆手机短信服务. 内蒙古科技与经济, (19), 157-158. [Lin, D. (2008). Library SMS Services Developed Based on ILAS II 2.0. *Inner Mongolia Science Technology & Economy*, (19), 157–158. In Chinese]

Lo, P., Ho, K. K. W., Allard, B., Horng, S.-C., & Liu, Y. (2019). Reading the city via the public central library in the sociocultural context: A comparative study between the Hong Kong Central Library, Shanghai Library and Taipei Public Library. *Journal of Librarianship and Information Science*, *51*(2), 458–472. https://doi.org/10.1177/0961000617742448

Lor, P. J. (2014). Revitalizing comparative library and information science: Theory and metatheory. *Journal of Documentation*, *70*(1), 25–51. https://doi.org/10.1108/JD-10-2012-0129

Lor, P. J. (2019). *International and comparative librarianship: Concepts and methods for global studies*. De Gruyter.

马捷,倪颖 & 耿寒冰.(2020).中美公共图书馆面向特殊人群服务比较研究.图书馆学研究,(03),72-82. [Ni, Y., & Geng, H. (2020). A Comparative Study of Services for Special Populations in Public Libraries in China and the United States. *Library Science Research*, (3), 72–82. In Chinese]

2020 年第 7 次全国人口普查主要数据.(n.d.). Retrieved February 2, 2026, from https://www.stats.gov.cn/sj/pcsj/rkpc/d7c/202111/P020211126523667366751.pdf. [*Major figures on 2020 population census of China*. (n.d.). Retrieved February 2, 2026, from https://www.stats.gov.cn/sj/pcsj/rkpc/d7c/202111/P020211126523667366751.pdf. In Chinese]

Malinconico, S. M., & Rizzolo, J. A. (1973). The New York Public Library Automated Book Catalog Subsystem. *The Journal of Library Automation*, *6*(1), 3–36.

Martin, L. (1998). *Enrichment: A History of the Public Library in the United States in the Twentieth Century*. Scarecrow Press.

使命愿景|苏州图书馆. (n.d.). Retrieved March 17, 2026, from https://www.szlib.com/gwgk.html?id=0. [*Mission | Suzhou Library*. (n.d.). Retrieved March 17, 2026, from https://www.szlib.com/gwgk.html?id=0. In Chinese]

Morris, L. R. (1984). The history of computer use in libraries based on bibliographic inferences. *Journal of Information Science*, *9*(3), 129–132. https://doi.org/10.1177/016555158400900307

*National data*. (n.d.). Retrieved February 2, 2026, from https://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0Q0501&sj=2024

中国人大网. (2018 年 11 月 5 日). 中华人民共和国公共图书馆法. http://www.npc.gov.cn/zgrdw/npc/xinwen/2018-11/05/content_2065662.htm. [National People's Congress website. (2018, November 5). *The Public Library Law of the People's Republic of China.* In Chinese]

Noh, Y. (2019). A comparative study of public libraries' contribution to digital inclusion in Korea and the United States. *Journal of Librarianship and Information Science*, *51*(1), 59–77. https://doi.org/10.1177/0961000616668571

潘炜 & 陈庚. (2019). 农家书屋困局及其技术突破路径——来自 21 个省份 282 个行政村的调查. 图书馆论坛, 39 (06), 98-106. [Pan, W., & Chen, G. (2019). Research on the development dilemma and technological path of rural libraries in China: A survey of 282 administrative villages in 21 provinces. *Library Tribune*, *39*(06), 98–106. In Chinese]

彭亚飞.(2012).国内外高校图书馆社交网络应用比较研究.图书馆学研究,(17),79-81. [Peng, Y. (2012). A Comparative Study of Social Network Applications in University Libraries at Home and Abroad. *Library Science Research*, (17), 79–81. In Chinese]

*Planning Documents | Urbana Free Library*. (n.d.). Retrieved March 17, 2026, from https://urbanafreelibrary.org/node/224

Rayward, W. B. (2002). A history of computer applications in libraries: Prolegomena. *IEEE Annals of the History of Computing*, *24*(2), 4–15. https://doi.org/10.1109/MAHC.2002.1010066

Riaz, M. (1992). *Library Automation*. Atlantic Publishers & Distri.

Rodgers, S. R. (2010). *Technology Access and Training in Public Libraries: A pilot study of technology assistance to patrons of the Urbana Free Library*. https://hdl.handle.net/2142/14994

Saffady, W. (1974). A Computer Output Microfilm Serials List for Patron Use. *Information Technology and Libraries*, *7*(4), 263–266. https://doi.org/10.6017/ital.v7i4.8957
Saffady, W. (1989). Library Automation: An Overview. *Library Trends*, *37*(3), 269–281.
沈迪飞. (2016). 我所亲历的图书馆技术变革(1974-1998). 图书馆论坛, 36 (09), 52-61. [Shen, D. (2016). The Library Technology Transformation I Personally Experienced (1974–1998). *Library Tribune*, *36*(9), 52–61. In Chinese]
Specht, J. (1980). Patron use of an online circulation system in known-item searching. *Journal of the American Society for Information Science*, *31*(5), 335–346. https://doi.org/10.1002/asi.4630310505
苏靖靖 & 刘昆雄.(2013).中美公共图书馆均等化服务比较研究.图书馆理论与实践,(05),27-30. [Su, J., & Liu, K. (2013). A Comparative Study of Equalization Services in Public Libraries in China and the United States. *Library Theory and Practice*, (5), 27–30. In Chinese]
孙承鉴, 申晓娟 & 刘刚. (2006). 我国数字图书馆发展十年回顾——综述. 数字图书馆论坛, (01), 1-13. [Sun, C., Shen, X., & Liu, G. (2006). A Ten-Year Review of the Development of Digital Libraries in China: A Survey. *Digital Library Forum*, (1), 1–13. In Chinese]
苏州统计年鉴. (n.d.). Retrieved February 2, 2026, from https://tjj.suzhou.gov.cn/sztjj/tjnj/2025/2025/zk/indexce.htm. [*Suzhou statistical yearbook*. (n.d.). Retrieved February 2, 2026, from https://tjj.suzhou.gov.cn/sztjj/tjnj/2025/2025/zk/indexce.htm. In Chinese]
谭祥金. (1994). 图书馆与市场经济. 中国图书馆学报, (01), 26-32. [Tan, X. (1994). Libraries and the Market Economy. *Journal of Library Science in China*, (1), 26–32. In Chinese]
Tian, R. (2013). Farmers' reading rooms and information and communications technology in rural areas of Beijing. *Library Trends*, *62*(1), 95–104. https://doi.org/10.1353/lib.2013.0030
*Urbana Free Library—Champaign-Urbana—LocalWiki*. (n.d.). Retrieved March 24, 2026, from https://localwiki.org/cu/Urbana_Free_Library?utm_source=chatgpt.com
Vaidya, R., & Myers, M. D. (2021). Symbolic practices and power asymmetries in ICT4D projects: The case of an Indian Agricultural Marketing Board. *Journal of Information Technology*, *36*(1), 2–15. https://doi.org/10.1177/0268396220964813
Vakkari, P., Aabø, S., Audunson, R., Huysmans, F., & Oomes, M. (2014). Perceived outcomes of public libraries in Finland, Norway and the Netherlands. *Journal of Documentation*, *70*(5), 927–944. https://doi.org/10.1108/JD-06-2013-0072
王丹.(2019).中美公共图书馆阅读推广活动调查与比较研究——基于活动数据的内容分析.图书馆工作与研究,(11),112-120. [Wang, D. (2019). A Comparative Study of Reading Promotion Activities in Public Libraries in China and the United States: A Content Analysis Based on Activity Data. *Library Work and Study*, (11), 112–120. In Chinese]
Wang, H., Latham, B., & Pettway Vann, C. (2013). Conclusion: A comparative analysis of US and Chinese academic libraries. In *Academic Libraries in the US and China* (pp. 231–250). Elsevier. https://doi.org/10.1016/B978-1-84334-691-3.50007-X
王军.(2022).中美公共图书馆健康信息服务多维比较研究.数字图书馆论坛,(03),32-39. [Wang, J. (2022). A Multidimensional Comparative Study of Health Information Services in Public Libraries in China and the United States. *Digital Library Forum*, (3), 32–39. In Chinese]

Widdersheim, M. M., Koizumi, M., & Larsen, H. (2021). Cultural policy, the public sphere, and public libraries: A comparison of Norwegian, American, and Japanese models. *International Journal of Cultural Policy*, *27*(3), 358–376. https://doi.org/10.1080/10286632.2020.1751142

Williams, K. (2013a). Introduction. *Library Trends*, *62*(1), 1–12. https://doi.org/10.1353/lib.2013.0020

Williams, K. (2013b). *The historical origins of Chicago's public computing library* [Unpublished manuscript].

吴宇琳.(2015).国内外公共图书馆弱势群体服务策略比较研究.图书馆建设,(07),60-64. [Wu, Y. (2015). A Comparative Study of Service Strategies for Vulnerable Groups in Public Libraries at Home and Abroad. *Library Development*, (7), 60–64. In Chinese]

Xiao, Z. (2003). The Impact of Foreign Library Automation Systems on China after WTO Accession [in Chinese]. *Library Science Research*, (1), 24–28. https://doi.org/10.15941/j.cnki.issn1001-0424.2003.01.006

肖卓. (2003). 入世后国外图书馆自动化系统对我国的冲击. 图书馆学研究, (01), 24-28+31. [Yan, L. (2013). A Comparative Analysis of Library APP Mobile Services at Home and Abroad. *Information and Documentation Services*, (6), 85–88. In Chinese]

Yu, L. (2011). The divided views of the information and digital divides: A call for integrative theories of information inequality. *Journal of Information Science*, *37*(6), 660–679. https://doi.org/10.1177/0165551511426246

于良芝,李晓新,朱艳华 & 刘煜蔷.(2007).公共图书馆的使命与服务:基于内容分析法的国内外比较研究.图书馆论坛,(06),21-28. [Yu, L., Li, X., Zhu, Y., & Liu, Y. (2007). The Mission and Services of Public Libraries: A Comparative Study at Home and Abroad Based on Content Analysis. *Library Tribune*, (6), 21–28. In Chinese]

Yu, L., & Yu, B. (2013). The top-down approach to providing ICT access to rural communities in China: Opportunities for community informatics. *Library Trends*, *62*(1), 34–62. https://doi.org/10.1353/lib.2013.0024

袁红军.(2017).中美公共图书馆数字参考咨询服务比较分析.现代情报,37(10),87-92. [Yuan, H. (2017). A Comparative Analysis of Digital Reference Services in Public Libraries in China and the United States. *Journal of Modern Information*, *37*(10), 87–92. In Chinese]

张春红, 唐勇 & 肖珑. (2011). 我国数字图书馆研究十年发展回顾. 大学图书馆学报, 29 (04), 18-24. [Zhang, C., Tang, Y., & Xiao, L. (2011). A Ten-Year Review of Digital Library Research in China. *Journal of Academic Libraries*, *29*(4), 18–24. In Chinese]

张姣,李柯 & 盛兴军.(2017).国内外高校图书馆移动阅读服务比较研究.现代情报,37(02),83-88+107. [Zhang, J., Li, K., & Sheng, X. (2017). A Comparative Study of Mobile Reading Services in University Libraries at Home and Abroad. *Journal of Modern Information*, *37*(2), 83–107. In Chinese]

张璐 & 王若佳.(2020).中美公共图书馆微博服务比较研究.图书馆,(01),72-79. [Zhang, L., & Wang, R. (2020). A Comparative Study of Weibo Services in Public Libraries in China and the United States. *Library*, (1), 72–79. In Chinese]

赵晓玲. (2003). 图书馆信息资源整合和 ILAS II 20 系统. 图书馆论坛, (02), 56-57+139. [Zhao, X. (2003). Library Information Resource Integration and the ILAS II 2.0 System. *Library Tribune*, (2), 56–57. In Chinese]

周泰冰 & 刘文云.(2010).我国公共图书馆数字参考咨询服务比较分析.情报理论与实践,33(12),84-87. [Zhou, T., & Liu, W. (2010). A Comparative Analysis of Digital

Reference Services in Public Libraries in China. *Information Studies: Theory & Application*, *33*(12), 84–87. In Chinese]

周文博. (2020). 活动理论及其在图书馆情报学领域的应用. 情报学报, 39 (03), 274-283. [Zhou, W. (2020). Activity Theory and Its Application in Library and Information Science. *Journal of the China Society for Scientific and Technical Information*, *39*(3), 274–283. In Chinese]

Zhou, W. (2024). Activity Theory Study of China's Rural Book House Project: Two Dialectical Dynamic Mechanisms. *International Journal of Librarianship*, *9*(1), 3–26. https://doi.org/10.23974/ijol.2024.vol9.1.312

## Appendices

Interview Guide

Opening

Thank you for participating in this interview. This interview aims to understand how digital technologies have developed in public libraries. The interview will take about 30–60 minutes. With your permission, the interview will be audio-recorded. You may skip any question or stop at any time.

General Information

1. Could you briefly describe your tenure at the library and the major technological or service transitions that occurred during that period?
2. What's your experience of working with digital technologies in the library?
3. How do you understand the role of technology in a public library context? How would you define library technology?

Library Automation

4. What kind of library automation systems is your library using?
5. When did your library first adopt library automation systems? What motivated its initial adoption of them?
   (possible influences: library associations and conferences; universities; economics; government policies; cultural practices; friends/family; colleges at other libraries)
6. What specific types of systems have been implemented in your library?
7. How did automation affect staff roles, workflows, or services in your library?

Public Access Computing and Digital Services

8. When did your library first begin offering public access computers or internet access? What community needs or other contexts promoted these services?
9. Did your library make any change on public access computers provided and related services?
10. How does the community evaluate the digital services in your library?

11. What might be the future plans for your library's digital service design?

Other libraries

12. Do you think your library a typical "U.S. public library"/ "Chinese public library"? In your view, in what ways is your library representative of broader U.S./Chinese public library technology trends?
13. Can you remember any library that gives you a deep impression in terms of their tech use or digital services?

Other resources

14. Are there archival materials at your library that document decisions about automation, public computing, or technology-related policy discussions?
15. Are there any elsewhere articles, papers, or documents that may have relation to the library technology?
16. Are there former staff members, trustees, or community partners you would suggest I speak with?