Research Status and Prospects of FOLIO as China's Next-Generation Library Service Platform: A Postprint

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Abstract

With the continuous deepening of concepts such as open data, open access, and smart libraries, the business and service content of contemporary libraries are undergoing constant transformation, placing library systems at a critical juncture for transformation and upgrading. Owing to its characteristics of openness and extensibility, FOLIO has emerged as a highly anticipated, novel next-generation library services platform. This article systematically reviews domestic theoretical research related to FOLIO as its research focus, and introduces and analyzes its practical explorations within China. Based on this foundation, recommendations are proposed for the localization of FOLIO in China: future libraries should correctly comprehend their own role positioning, establish new product and technical standards, construct a developer alliance for the services platform, and undertake subsequent research and development in integration with smart cities and smart campuses.

Full Text

Preamble

Title: Research Status and Prospects of China's Next-Generation Library Service Platform: FOLIO

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Abstract: With the continuous development of concepts such as open source data, open access, and smart libraries, the business and service content of today's libraries are undergoing constant changes, marking a crucial window period for library system transformation and upgrading. FOLIO, characterized by its openness and scalability, has emerged as a highly anticipated and innovative next-generation library service platform. This article systematically

reviews relevant theoretical research in China, using FOLIO as the research subject, and provides analysis of its practical exploration domestically. Based on this review, recommendations are proposed for the localization of FOLIO in China, emphasizing that future libraries should correctly recognize their role positioning, establish new product technology standards, build service platform developer alliances, and integrate with smart cities and smart campuses for subsequent research and development.

Keywords: Smart library; Next-generation library service platform; FOLIO

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1. Theoretical Research on China's Next-Generation Library Service Platform FOLIO

Using CNKI as the primary data source, this study conducted a thematic search with "FOLIO" as the keyword, limiting the discipline scope to library and information science. The search yielded 53 valid documents as of 2022, including 45 journal papers. Notably, Shanghai Library published 11 papers in a single year, demonstrating particularly prominent research output. The number of FOLIO-related research papers has shown a significant upward trend since 2017, when the Open Library Foundation was established to promote library open-source projects. A research institution cluster has essentially formed, centered around Shanghai Library, Peking University, and Xiamen University, with Shanghai Library's research achievements being the most outstanding.

Existing research primarily focuses on FOLIO's system architecture, platform positioning, application system construction content, development methods, deployment modes, and service modules involving interface interaction, resource collaborative construction, service optimization management, and user data management. The specific research content is mainly concentrated in several aspects:

Research on FOLIO's Development History, Ecological Model, and Related Concepts: Studies have introduced FOLIO's background, development history, and characteristics such as cloud-native architecture. Researchers have analyzed the advantages of FOLIO's openness, extensibility, and its feasibility for domestic implementation. Zhang Chunjing et al. introduced FOLIO as a model for next-generation library service platforms, noting that it can help libraries reduce overall operational costs while providing prospects for its domestic development. Zhou Gang et al. examined FOLIO's community-driven ecological model, where libraries integrate into the FOLIO ecosystem from perspectives of technology promotion and role transformation. Xue Weishuang et al. studied how FOLIO can assist university libraries in developing systematic, personalized, and value-co-creative smart services.

Research on Business Architecture and Related Technologies: Current research systematically analyzes FOLIO's microservices architecture and its im-

plementation technologies, including OKAPI, Maven, Vert.X, RESTful, RAML, and Stripes. Xiao Li et al. provided detailed analysis of FOLIO's microservices architecture, while Wang Wenqing et al. thoroughly analyzed and introduced FOLIO as a new-generation library service platform based on microservices architecture. Zhang Yun pointed out that libraries should clarify their roles in platform construction and usage, and He Ke conducted user requirement analysis and module function design based on actual library workflows. Wang Chunqu and Shan Zhen respectively introduced and studied FOLIO from the perspectives of integrating library platform metadata and reorganizing library business processes.

Research on Development Paths and Related Applications: Existing studies have introduced and predicted FOLIO's development paths and localization strategies in China. Liu Suqing believes that existing service platforms should be transitional products, and the domestic library community should independently innovate to develop open service platforms suitable for China's national conditions. Xiao Li et al. proposed that FOLIO construction should emphasize user-centered community cooperation. Xie Rong et al. noted that traditional library systems can no longer cover all business operations, and FOLIO represents the future development direction of library systems. Cao Qi suggested that domestic library and information institutions should conduct personalized customization and secondary development when adopting FOLIO systems. Zhou Bin analyzed FOLIO's advantages and advanced concepts, proposing that domestic libraries should actively follow FOLIO developments. Ye Renjie et al. used the application practice at Shenzhen University Library as an example, while Wang Haoxian et al. used Peking University Library's stack book call number system as a case study, demonstrating FOLIO's technical advantages such as single responsibility, architectural independence, and lightweight communication.

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2. Practical Exploration of China's Next-Generation Library Service Platform FOLIO

Although the library community has not yet formed a consensus on FOLIO research and practice, many university libraries have begun to re-evaluate their management systems and plan to adopt new-generation library platforms. Practical exploration started relatively late, but some institutions have begun independently developing localized applications.

2.1 University Library Initiatives

Since the birth of the FOLIO platform, Peking University Library has been the pioneer in exploring FOLIO's microservices architecture to develop circulation systems and localize modules. Shanghai Jiao Tong University Library, Tongji University Library, Shanghai University Library, and Chongqing Normal University have also jointly committed to FOLIO's localization construction in

China, connecting their own system functions as FOLIO modules to build a new-generation library service platform. Other libraries, including Beijing Normal University Library and Tsinghua University Library, have also conducted relevant practical research and successively joined the CALIS Cloud Horizon Alliance.

CALIS began attempting to collaborate with EBSCO on next-generation library systems in 2010, but the cooperation was not extensive. These explorations represent brave attempts to independently build China's next-generation library service platform. CALIS's vision is to create a community alliance that integrates resources from libraries, information technology industries, and other stakeholders, exploring new mechanisms for collaborative innovation and development among university libraries.

2.2 Public Library Efforts

The public library that first attempted to explore FOLIO localization applications is Shanghai Library. In 2021, Shanghai Library promoted the establishment of the Shanghai regional community alliance, becoming the only domestic public library member of the FOLIO community. Shanghai Library has conducted partial localization of the FOLIO interface and successfully implemented functional modules such as smart spaces, opening corresponding reader services. In June 2021, the Shanghai Library Society co-hosted the "IT4L2021 Library Frontier Technology Forum," where invited guests introduced the Cloud Horizon smart library service platform.

2.3 Software Vendor Promotion

Domestic library software vendors have launched new-generation library management systems such as VIP and Huiwen Smart Library Service Platform. These products are developing well under the promotion of large software developers. However, developer community members have hardly participated in the construction of these platforms, making it difficult to form a large-scale library industry application market domestically. As the Cloud Horizon platform and alliance have rapidly grown over the past two years, commercial companies related to library systems have joined the FOLIO wave. Several software developers, including Beijing Changxiang Zhixing and Shanghai Yifadi, have successively joined the Cloud Horizon Alliance development community, responsible for developing and maintaining community platforms and product suites, and providing operation and maintenance services.

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3. Future Research on China's Next-Generation Library Service Platform FOLIO

Correctly Understanding the Library's Role in New Platform Development and Application

The future of libraries is open, and FOLIO's open-source collaborative spirit fully aligns with the library community's development philosophy of open access and knowledge sharing. In the ubiquitous network environment, new academic ecosystems are becoming increasingly complex, and the cycle of renewal is accelerating. Libraries should correctly recognize the importance of their role in this context. Domestic libraries need a new-generation management service platform with independent intellectual property rights. FOLIO's goal is not simply to combine all data into a large database for readers to search, but to transform the advantages of massive data resources from various sources into more personalized service advantages.

Library application system development and operation have traditionally been conducted through project outsourcing, leaving libraries with almost no say in system design and module selection. Libraries are not only system users but also participants and leaders in system design and development. They should strengthen product awareness and actively participate in the entire R&D process and application practice of FOLIO projects, from requirement analysis to acceptance and usage. Currently, domestic research on FOLIO practice is in a learning and exploration stage, with multiple national and provincial-level projects already underway.

Establishing New Product Technology Standards to Protect Library and User Interests

At present, the cooperation and collaborative innovation between libraries, software developers, and content providers remain weak links. Although various efforts have been made, the true domestic implementation of FOLIO still faces many difficulties. The product positioning, operation models, and other aspects of the entire next-generation library service platform system have not yet been standardized and unified, and a library service platform with truly independent property rights has not been built.

The library community should establish a new set of system platform standards and specifications to guide the development of various applications, ensuring unified and standardized access and operation management. This includes organizing library industry experts to continuously conduct research and development on new-generation library service platforms, and regularly releasing research reports to the public. Each library should also pay attention to protecting the information security of library collection data and user data, which involves large amounts of author intellectual property rights and reader personal privacy. With the frequent occurrence of author rights protection incidents and personal information leakage events, protecting reader privacy is an important task that libraries must adhere to in the long term and an important factor when selecting service platforms. An increasing number of libraries with high security requirements are choosing to store data on private clouds to ensure data security.

Integrating with Smart Cities and Smart Campuses to Provide Com-

prehensive Library Services

With the proposal of concepts such as smart cities and smart campuses, smart libraries have emerged as an inevitable choice for libraries to achieve sustainable development and a new development concept facing the future. A healthy and sustainable open-source library service platform is an important foundation and technical support for smart library construction. FOLIO's independent yet closely integrated application modules can fully achieve resource discovery, management, and sharing in smart libraries, and the series of intelligent services brought by FOLIO will become the core competitiveness of smart libraries in the future.

The construction of library service platforms in both public and university libraries should be closely integrated with smart city and smart campus development, breaking down barriers between online and offline services, developing and integrating various types of smart resources, optimizing library business management processes, and providing readers with comprehensive, high-quality services through smart interactive platforms.

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4. Conclusion

As concepts of ubiquitous networks and smart services deepen, future libraries will inevitably become more open and human-centered, and the industry will certainly see more open-source projects. The construction of next-generation library service platforms like FOLIO has no unified paradigm. Transforming mindsets, building service platform developer alliances, and achieving localized R&D and application are the paths forward.

The next-generation library system is not merely a technical system but also a concept and a new model supporting library business innovation and future library development. Currently, domestically developed smart library service platforms by software suppliers support both public and private clouds, allowing libraries to choose based on their actual circumstances. However, some libraries using foreign platforms are overly dependent on software developers for system updates and service expansion, greatly losing their own voice in platform selection.

We look forward to the early deployment of a library-led, open, customizable, and personalized system platform—this is what the current new-generation library service platform should be.

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