Migration Practice of the Next-Generation Library Service Platform Alma: A Case Study of Beijing Normal University Library (Postprint)

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Abstract

[Purpose/Significance] Based on the project practice of Beijing Normal University Library's migration from the automated integrated management system Aleph500 to the next-generation library services platform Alma, this paper provides a detailed introduction to the implementation challenges and process of the migration project, analyzes the project's characteristics in conjunction with existing research findings, summarizes the practical patterns of the project, and offers practical experience for other libraries undertaking similar work.

[Method/Process] Using the literature research method, this study investigates overseas library cases of Alma system migration, and based on the project practice of Beijing Normal University Library's migration to the Alma system, introduces the three main stages of project implementation and analyzes the characteristics of project implementation.

[Results/Conclusion] During the practice of the Alma migration project, Beijing Normal University Library exhibited considerably different results in time allocation across major completion stages compared to the cases investigated in the literature, due to numerous special circumstances in both external system conditions and internal application aspects. Simultaneously, during the project process, library system technical personnel undertook the organization and communication responsibilities of the project team, and business librarians related to electronic resource management also made certain contributions.

Full Text

Preamble

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Next-Generation Library Service Platform Alma Migration Practice—Taking

Beijing Normal University Library as an Example

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Abstract

[**Purpose/Significance**] Based on the migration project of Beijing Normal University Library from the integrated library system Aleph500 to the next-generation library service platform Alma, this paper provides a detailed introduction to the implementation challenges and processes of the migration project. Combined with existing research findings, it analyzes the project characteristics, summarizes practical patterns, and offers experiential guidance for other libraries undertaking similar work.

[**Method/Process**] Using literature review methods, this study investigated Alma system migration cases in foreign libraries. Based on the practical implementation of Alma system migration at Beijing Normal University Library, it introduces the three main phases of project implementation and analyzes the characteristics of project execution.

[**Result/Conclusion**] During the Alma migration project at Beijing Normal University Library, numerous special circumstances existed in both external system conditions and internal applications, resulting in a significantly different time allocation across the main completion phases compared to cases found in literature reviews. Additionally, library system technical staff assumed responsibility for project team organization and communication, while business librarians related to electronic resource management also made notable contributions.

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Since the 1980s, most libraries have relied on automated integrated library systems (ILS) to manage print resource operations, including acquisition, cataloging, circulation, public catalog retrieval, and periodical management. In recent years, with the rapid increase in electronic and digital resources and evolving user demands, traditional library automation systems have struggled to fully meet libraries' changing needs. Both libraries and system vendors have continuously attempted to reconfigure or develop integrated management systems, expecting new products to smoothly and efficiently handle print, electronic, and digital collections while integrating new technologies to provide enhanced functionality for users.

1. Practice and Research Status

As libraries have gradually deepened their understanding of next-generation systems and vendor products have matured, an increasing number of libraries have transitioned to next-generation system applications. According to a survey by American automation expert Marshall Breeding, "over 50% of libraries are considering migrating to a new generation system" [1]. As of July 2018, Ex Libris' next-generation system product Alma had reached 901 implemented users worldwide [2], with six users in mainland China: The Chinese University of Hong Kong (Shenzhen), Institute of High Energy Physics (Chinese Academy of Sciences), Beijing Normal University, Tsinghua University, Southern University of Science and Technology, and Shenzhen MSU-BIT University. Alma users in Hong Kong, Macao, and Taiwan include eight members of The Joint University Librarians Advisory Committee (JULAC) in Hong Kong (The Chinese University of Hong Kong, City University of Hong Kong, Education University of Hong Kong, Hong Kong Baptist University, Hong Kong Polytechnic University, Hong Kong University of Science and Technology, Lingnan University, and University of Hong Kong), plus National Kaohsiung University of Science and Technology, National Taiwan University, and Macau University of Science and Technology.

Literature review reveals numerous research achievements on next-generation library service platforms, most focusing on functional introductions or comparative analyses of next-generation systems, with fewer studies examining advantages and challenges, or considering inter-library collaboration and cloud platform applications as important conditions for library internationalization. Since this paper is based on the Alma migration practice at Beijing Normal University Library, literature review focused primarily on Alma migration case studies.

American Northwestern University Library technologist Frank Cervone, who has served as lead systems engineer on multiple migration projects, published an article in 2007 discussing considerations for integrated library system migration [3]. System migration is a time-consuming and labor-intensive task. His research elaborates on three main phases: system selection, migration implementation, and production stabilization. Based on multiple project experiences, he suggests libraries should allocate approximately 32% of project time to system selection, 48% to migration implementation, and 20% to production stabilization. Additionally, vendor selection is crucial, and establishing functional working groups early in the project is essential for success.

Curtin University Library in Australia officially adopted Ex Libris' Alma as its next-generation library service platform in 2012 and completed migration and went live in February 2014 after five months, becoming the tenth Alma user in Oceania. The library aimed to refine internal business workflows and mechanisms for the Alma system within 12 months of going live, and believed Alma's application in handling electronic resources, particularly in collaboration with publishers and other vendors, had already brought direct benefits to the library [4].

Central Washington University Library, in cooperation with the ORBIS Cascade Alliance and Ex Libris, completed migration from the Millennium system (Innovative Interfaces' integrated library system) to Alma/Primo over nearly two years, with approximately 18 months of actual work. The migration process involved three important phases: data cleanup and preparation, data migration testing and training, and system switching and functional improvement. The data cleanup and preparation phase was the longest at 12 months, while staff spent the most time during the data migration testing and training phase, accounting for half of their weekly workload. System librarians and electronic resource management librarians contributed numerous problem tickets during the migration process, playing critical roles. The main issues addressed during system migration included electronic resources, PRIMO, acquisition, cataloging, and circulation [5].

The Norwegian BIBSYS Library System Consortium completed migration to the next-generation library service platform Alma in December 2015. Researchers primarily studied the consortium's selection and procurement experience for the next-generation platform and discussed implementation and migration work through case studies, proposing that post-migration, cloud platform applications are important conditions for library internationalization [6].

From these cases and studies, the next-generation library service platform migration process can generally be divided into three phases: preparation, implementation, and stabilization, with varying proportions of time allocated to each phase. For the Alma platform, electronic resource module migration and application play a critical role throughout the process.

However, Alma provides system support to libraries in various countries through a cloud service model. Whether smooth system migration and application implementation can be achieved for different language countries, particularly considering the many differences between Chinese and Western countries in cataloging, business processes, norms, and network environments, remains a question. This paper analyzes the project implementation process and characteristics of Beijing Normal University Library's Alma platform migration to reflect Alma's actual application effectiveness in China and provide reference for domestic peers in next-generation library service platform selection and implementation.

2. Overview and Needs Analysis of Beijing Normal University Library

Beijing Normal University Library holds diverse collection types, including print, electronic, and digital resources. By the end of 2017, the library housed 4.987 million print items including Chinese and foreign books, journals, and dissertations, introduced 327 Chinese and foreign electronic databases of various types, and maintained nearly 20TB of digital resources [7]. In terms of system applications, the library introduced Ex Libris' integrated library system Aleph500 in 2000 and deployed Ex Libris' resource discovery system Primo in

2012 to provide one-stop search and access services for faculty and students.

Due to dispersed management of various collection resources and inconsistent business processes, particularly with the rapid development of electronic and digital resources and increasing user demands in recent years, traditional library automation systems could no longer meet the library's deepening development needs. Therefore, Beijing Normal University Library hoped to change this situation through next-generation library service platform application, achieving unified management of various resources and flexible configuration of business processes to meet the library's development requirements.

Beijing Normal University Library had used the Aleph500 integrated library system for approximately 16 years, accumulating rich system application experience while developing extensive local functions and integrating with numerous third-party systems in the original system. Consequently, migrating these local functions and system integrations became key requirements and technical challenges in this project.

Regarding local functions, main requirements stemmed from the library's local customized application of cataloging standards and norms, involving functions such as automatic call number generation in specific fields according to library cataloging norms, automatic Chinese pinyin generation, statistical analysis based on custom fields, and CALIS union cataloging. These locally extended functional requirements are essential for library business operations and common needs among Chinese users, representing critical requirements for Alma platform localization in China.

Regarding system integration, main requirements involved interfacing with a series of third-party function-related systems. While systems based on standard protocols such as unified authentication and self-service borrowing could be integrated through parameter configuration, other library application systems including patron data synchronization, self-service payment, graduation clearance systems, and mobile libraries required data integration and system interfacing through program development using open interfaces provided by the Alma platform. System integration work involved multiple application services of the library, requiring participation from multiple units and employing various technical implementation methods, thus becoming the main technical challenge among key requirements.

3. Main Migration Implementation Process at Beijing Normal University Library

Beijing Normal University Library began investigating next-generation library service platforms in December 2014. In April 2015, the library established an internal Alma preliminary work group to begin preliminary understanding and learning of the Alma platform, subsequently completing Chinese interface translation review and system process testing in cooperation with Ex Libris. In February 2016, the library completed project justification for next-generation system construction, and after bidding, selected Alma as its next-generation system. In November 2016, Beijing Normal University Library formally signed the Alma platform contract with Ex Libris.

The Alma migration project at Beijing Normal University Library officially began implementation on January 12, 2017. The overall project implementation was handled by Ex Libris Software Technology Development (Beijing) Co., Ltd. (hereinafter referred to as "the Company"), with the library's specific work coordination and implementation led by the system technology department and participated in by all business departments. After nine months, the project was completed and went live on September 28 of the same year. Concurrently, the Primo system was upgraded to a new interface version in this project, transitioning from local deployment to cloud platform application and going live simultaneously with the Alma platform to serve users. On July 18, 2018, Beijing Normal University Library and the Company held a system service support handover meeting, marking the completion of the system migration implementation phase.

The Alma migration project implementation process at Beijing Normal University Library can be divided into three phases over 18 months:

Phase 1: Preparation and Data Cleanup (January 12, 2017–June 24, 2017)
Phase 2: Test Loading and Training (June 25, 2017–September 4, 2017)
Phase 3: System Switching and Post-Improvement (September 5, 2017–July 18, 2018)

Key milestones for each phase are shown in Table 1 .

3.1 Phase 1: Preparation and Data Cleanup (January 12, 2017–June 24, 2017)

3.1.1 Project Preparation—Team Formation On January 12, 2017, Beijing Normal University Library and the Company jointly held the project kickoff meeting, marking the official launch of the Alma migration project. To ensure smooth system migration, the library established an Alma system project implementation team based on the preliminary work group, drawing key staff from all business departments to promote implementation. The core implementation team comprised 13 members, led by the library's technology deputy director as team leader and the resource development deputy director as deputy leader. Core team members assumed responsibility for technology, resources, and services respectively, with the technical lead conducting daily communication with the Company's project manager.

After team formation, the primary task was completing Alma basic and extended training through training videos provided in the Company's knowledge documentation center to understand system operations and functional details of business processes.

3.1.2 Business, Data, and Function Review The business, data, and function review process primarily involved comprehensive sorting of current business processes, data conditions, and system functional requirements. Combined with learning of Alma platform processes and functions, the library analyzed implementation pathways for its business processes on the Alma platform, summarized accumulated data issues and solutions, and determined functional migration plans.

Business processes involved the entire lifecycle of acquisition, cataloging, and circulation services for various print, electronic, and digital resources. After reviewing business processes, the library needed to fully utilize the sandbox testing environment provided by the Company to define, test, and adjust its business processes in the system. Alma platform's business process definition can be achieved through functions such as forms, operation departments, workflows, and batch processing tasks. During testing, the library needed to continuously adjust or even restructure existing business processes based on configuration and test results in the Alma platform to align with the system architecture and functional design objectives.

Migration project data primarily included acquisition, bibliographic, and holdings data for all library resources, as well as patron data and circulation data for services. This data mainly originated from the integrated library management system, electronic resource management system, unified resource discovery system, and special collection database system previously used by the library. On one hand, the library needed to review data issues in accordance with Alma platform data migration requirements; on the other hand, it needed to adjust non-compliant data and address important data issues before migration implementation to maximize effectiveness and accuracy. Notably, Alma platform migration projects do not include historical circulation data, requiring libraries to separately process this historical data and develop query functions for users in other systems.

Functional review work primarily focused on locally extended functions and third-party system integrations developed during automated management system application. Through inspection and review, combined with Alma platform architecture, the library compiled a functional migration list and determined functional implementation priorities. Since local extended functional requirements are basically common needs among Chinese users, and technical implementation must comply with Alma cloud platform's overall system development framework, related functional implementation work was primarily handled by the Company and prioritized in its product development plan. Library third-party system integration work was led by the library, with the Company, other system vendors, and university units jointly negotiating technical solutions and completing program implementation and system testing. For functions that could not be migrated to Alma, the library still needed to research alternative solutions using other intermediate systems.

3.1.3 Data Cleaning and System Parameter Preparation In system migration implementation, data and system parameters are two crucial migration elements. Data cleaning involves addressing identified data issues one by one, including quality optimization of acquisition and bibliographic data, holdings data changes due to location name adjustments, patron data type adjustments, and removal of invalid data. Libraries need to negotiate data processing and adjustment solutions that meet business norms and Alma platform requirements with the Company, which then completes batch processing. Although data migration work is not the most difficult aspect during implementation, it is a critical component. The accuracy and completeness of data migration directly determine system migration success. Additionally, due to years of accumulation, libraries have very large volumes of various resource and service data, inevitably containing many specific issues requiring repeated verification and confirmation of data processing solutions. Data cleaning ensures smooth data loading and effective results while also resolving long-standing data issues accumulated through extended system use.

System parameter configuration represents the concrete manifestation of business process definition during project implementation. Only parameter configurations suitable for library business characteristics and system architecture can ensure smooth and efficient business operations on the platform. Key system parameters include basic library information, location parameters, workflow forms, cataloging norms, service policies, batch processing workflows, and other management parameters. In Alma platform migration projects, these parameters, once confirmed by the library, are ultimately reflected in various forms within the project implementation documentation, including system implementation forms, migration forms, configuration forms, and cataloging custom field forms. Parameter configuration work during system implementation is completed by the Company, with library technical staff gaining partial system parameter configuration permissions after passing system administrator certification exams.

3.2 Phase 2: Test Loading and Training (June 25, 2017–September 4, 2017)

3.2.1 Test Data Loading and Verification Test data loading was completed by the Company headquarters after confirmation by Beijing Normal University Library. Following data loading, both the Company and the library conducted internal data verification and submitted data verification reports.

3.2.2 Initiation and Completion of Major Third-Party System Integration Beijing Normal University Library's original Aleph500 system served as the core business system, seamlessly integrated with numerous third-party systems. Based on the previously reviewed third-party system integration function list and 上线优先级排序 (online priority ranking), the library actively studied Alma platform's API interfaces, contacted relevant system vendors and campus units to discuss integration technical solutions, and jointly completed technical development, testing, and adjustment to confirm final integration results. Major third-party system integration work completed before going live included unified authentication, patron data synchronization, RFID self-service borrowing system, self-service payment system, CD-ROM system, mobile library system, and CALIS unified authentication system integration. For access control and seat selection system authentication, the library adjusted implementation plans based on the campus one-card system and data conditions, decoupling them from Alma system authentication.

3.2.3 Primo System Related Work The library primarily completed migration of Primo discovery system data and configuration parameters from the local system to the cloud platform; tested search effectiveness of Primo Central and third-party system data in the cloud-based Primo sandbox environment; completed configuration migration from Primo sandbox to production environment; loaded complete data in the production environment, tested and adjusted the Primo production environment interface and functions; and configured regular data harvesting tasks.

3.3 Phase 3: System Switching and Post-Improvement (September 5, 2017–July 18, 2018)

3.3.1 System Switching After completing pre-switch testing, the library and Company implemented the formal system switch. The library successively stopped and restarted acquisition/cataloging services and circulation services. After all data was confirmed, the library completed Primo system data release work, officially switching from the original local Primo system to the cloud platform Primo system. Subsequently, the library's Alma system fully opened all businesses, completing the Alma and Primo system transition, and Alma system officially went live.

3.3.2 Post-Migration Problem Handling and Function Improvement After Alma and Primo systems officially went live, the library began comprehensive application and adaptation to the new platform, exploring and testing new functions, developing new businesses and services, and continued communicating with the Company to address problems and improve functions. On July 18, 2018, the library and Company jointly held a service support handover meeting, marking the completion of system migration implementation phase work.

3.3.3 Ticket Submission Throughout Implementation From project initiation to completion, the library submitted 164 problem tickets to the Company, including 146 resolved tickets and 18 pending tickets. As shown in Table 3 , system librarians contributed the most tickets, accounting for approximately 76.22% of the total, while business librarians submitted 12.20% of tickets. Notably, among the 20 tickets submitted by business librarians, 16 were submitted by librarians responsible for electronic resource cataloging.

As shown in Table 4 , apart from general Primo and Alma issues, electronic resource problem tickets were the most numerous, related to the library's actual electronic resource management situation. Before implementing Alma, Beijing Normal University Library had not found a suitable electronic resource management system, thus electronic resource process management was basically manual. One of the project's goals was to fully utilize Alma's unified process management to systematically manage and apply electronic resource acquisition, cataloging, and service workflows, improving work efficiency and effectiveness. Meanwhile, electronic resource management-related business librarians also made certain contributions during project implementation, similar to foreign practice cases.

4. Characteristics of Alma Migration Project Implementation at Beijing Normal University Library

4.1 Main Phases and Duration of System Migration

From the Alma migration project implementation process at Beijing Normal University Library, the entire process lasted approximately 18 months, primarily divided into three phases: preparation and data cleanup, test loading and training, and system switching and post-improvement. These three phases lasted 5 months, 3 months, and 10 months respectively, with the third phase occupying the most time and the second phase the least—presenting results different from those of relevant American research and practice cases mentioned above. The authors analyze that this is related to specific circumstances of Alma implementation in China. On one hand, during Beijing Normal University Library's first implementation phase, Alma's China data center was completed in May 2017 and began operation in June, thus the library's test data loading process was delayed two months from the original plan, extending the first phase. On the other hand, Beijing Normal University Library was the first mainland Chinese university user to migrate from Aleph500 to Alma, with numerous local application requirements. Ex Libris needed to complete a series of requirement verification, implementation, and testing processes for Chinese users' specific functional needs, creating difficulties for the library's overall project implementation. Particularly after system switching in the third phase, some system functions remained in development and communication, thus extending the post-switch improvement time. Additionally, Tsinghua University Library was also implementing Alma migration simultaneously, and Ex Libris had insufficient implementation staff, which also contributed to the longer overall project duration.

4.2 Role and Function of System Technical Staff

Throughout project implementation, library system technical staff served as primary project leaders, advancing work implementation and overall progress control. The library's project team leader was the technical deputy director, and the project liaison was the technology department director. Technical staff not only focused on system technology issues but also assumed more team organization responsibilities, actively collaborating and communicating with business departments, the Company, and relevant units to drive project progress, complete problem feedback and tracking, and implement all project aspects. As shown in Table 3, system technical staff submitted the highest proportion of tickets during project implementation, playing a critical role.

Furthermore, during post-project improvement, system technical staff also assumed more bridging and communication work between internal business staff and external Company and system cloud platform. In addition to normal system application and technical support work, Beijing Normal University Library's system technical staff communicated more closely with internal business personnel. When application problems occurred, they needed to communicate closely with business departments to understand and analyze problem causes, feed back problems to the Company through tickets, and conduct follow-up tracking and testing feedback. They also helped business personnel understand system processes and promoted application of new system functions through operational training. Simultaneously, system technical staff closely monitored Alma and Primo system cloud platform development roadmaps, understood monthly system updates and problem fixes, and promptly translated and shared the latest functional documents with internal business staff. They actively followed functional demands of international Alma peers and participated in cloud platform function improvements based on 本校读者需求与应用情况 (campus user needs and application conditions).

The role and function of Beijing Normal University Library's system technical staff in the Alma implementation project, serving as a bridge closely connecting internal business staff applications with external Company and system cloud platform development progress, corroborates American Central Washington University Library Professor Fu Ping's research conclusion that system librarians' roles are "shifting toward people and organization-related skills" when providing technical support for next-generation library service platform applications [8]. Additionally, similar to foreign practice cases, Beijing Normal University Library's electronic resource management-related business librarians also made certain contributions during project implementation.

After project completion, library applications also need gradual adaptation and deepening. In future work, the library will continue exploring and researching in-depth Alma and Primo platform applications, actively communicating with domestic and international Alma and Primo peer users to enhance unified resource management and service levels, providing more comprehensive information resource services for faculty and students.

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Author Contributions

Liu Bin: Conceived research questions, proposed paper structure, reviewed and revised the paper.
Huang Jing: Conducted literature review and wrote paper content.

The Migration Practice of the Next-Generation Library Service Platform Alma—Taking Beijing Normal University Library as an Example

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Abstract: [Purpose/significance] Based on the migration project of Beijing Normal University Library from integrated library system Aleph500 to the next-generation library service platform Alma, this paper describes the implementation phases, personnel input, time arrangement, key nodes, and key work of the migration project, analyzes the project implementation characteristics based on literature review results, and summarizes project patterns to provide experience for other libraries completing related work. [Method/process] Using literature review methods, this paper investigates Alma system migration cases in foreign libraries. Based on the Alma system migration project practice at Beijing Normal University Library, it introduces three main implementation phases and analyzes project implementation characteristics. [Result/conclusion] During the Alma migration project, Beijing Normal University Library encountered many special situations in both external system conditions and internal applications,

resulting in different time allocation across main completion phases compared to literature review cases. Meanwhile, library system technical staff undertook project team organization and communication work, and business librarians related to electronic resource management also made contributions.

Keywords: next-generation library service platform, Ex Libris Alma, system migration, Beijing Normal University Library

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