

CASE STUDIES-FROM LIBRARY TO KNOWLEDGE CENTER

“Information stream” refers to library business flow or operational management system basing on the collection that mainly comprises the two components: technical services and user services. Technical services include resource acquisition, cataloguing, and preservation; user services include book circulation, reading, reference, and retrieval; and a library automation system integrates the literature streams.

Libraries and library resources are no longer the only channels for users to obtain information in a highly developed information-based society. The users’ focus is no longer on how they can obtain information from library resources. Instead, their focus is on how they can mine the desired knowledge accurately and quickly from the massive amounts of information. They also focus on how to use the mined or obtained knowledge to build their knowledge systems for their learning and research. In this context, libraries have functionally evolved into knowledge service centers, which provide knowledge as contents, commit to knowledge innovation, and are centered on the knowledge demands of users. Library management has gradually transformed into a knowledge management system which is based on the “knowledge stream” system, rather than “literature stream.” The “knowledge stream” refers to library business flow or operational management system that consists of knowledge acquisition, knowledge mining and organization, knowledge applications, and innovation services. The system reintegrates human resources and optimizes business processes.

Knowledge services and knowledge management have been deeply recognized in the academic library environment. In terms of application, knowledge management is mainly limited to service areas such as information services, technical services, administrative services, decision-making services, etc. However, this kind of limited application of the knowledge management is lacking in business flows and institutions. This contributes to a bottleneck period of library developments.

Peking University Library is one of China’s top-notch academic libraries. In recent years, the Library has redefined its role as a service center for learning, teaching, knowledge, and culture. The Library focused its management around the knowledge stream system. Accordingly, Peking University Library has also restructured its organization and re-set its staff positions. Taking the Library as a case study, this paper discusses the innovative applications of knowledge management in the organizational restructuring of libraries.

Library knowledge management oriented toward knowledge services

In simple terms, knowledge management consists of passing the right knowledge to the right people at the right time. Furthermore, knowledge management has the functions of making tacit knowledge explicit by systemizing the massive amounts of knowledge and collectivizing personal knowledge. The goal is to create value-added knowledge, satisfy users' knowledge demands, achieve knowledge innovations, and improve the core competitiveness of an organization .

From an information and data perspective, knowledge management is also a discipline that promotes an integrated approach to identifying, capturing, evaluating, retrieving, and sharing all of an institution's information assets. These assets may include databases, communities and user information, policies, procedures, expertise and experiences.

USER KNOWLEDGE MANAGEMENT

User knowledge management refers to the process of acquiring, integrating, organizing, sharing, and using the knowledge desired by users, available from users, and about users. "Knowledge desired by users" refers to the users' knowledge demand and is the service content provided by a library. "Knowledge available from users" is the users' feedback about the library services. "Knowledge about users" includes the users' personal information, history about their use of library services, users' behavior records, types of smart terminals they use, user locations, time, and real-time scenarios (for example, current active tasks).

User knowledge forms the basis for analysis of user demand and provision of knowledge services.

User knowledge is mainly available in the following stages:

Knowledge acquisition stage: Users search, locate, and acquire knowledge from the massive amounts of information and data. The sources users search includes various statistical data, dynamic information, exposition and analysis information, and internal knowledge structures. The user knowledge sought at this stage is mainly users' information needs.

Knowledge organization stage:

After users have identified and analyzed the acquired knowledge, they summarize and organize it by topic. Thus, they generate preliminary knowledge products such as theme reports, dynamic tracking services, special-topic databases, and discipline databases. The user knowledge acquired at this stage includes not only the users' knowledge demand, but also the users' ability to organize knowledge.

Knowledge innovation stage:

User's professional knowledge is integrated into the knowledge organization services. The integration results in value-added and innovative products. New knowledge is generated during this stage. The value-added and innovative knowledge products include thematic analysis, project results, industry forecasts, evaluation reports, and strengths-weaknesses-opportunities-threats (SWOT) analysis reports. The user knowledge acquired at this stage mainly includes the user's knowledge demand, innovation ability, and knowledge product level.

user knowledge management refers to the process of acquiring, integrating, sharing, and using the user knowledge generated at the stages of knowledge acquisition, knowledge organization, and knowledge innovation. The intention is to turn tacit user knowledge into explicit knowledge, which is an integral part of the library knowledge system.

Libraries will accurately understand the users and their demands through user knowledge management. As a result, this will increase novelty, accuracy, and convenience of user services. It will also improve the efficiency of users' knowledge innovation.

INTERNAL KNOWLEDGE MANAGEMENT BY LIBRARIES

Internal knowledge management by libraries focuses on changes and adjustments to business processes. In the past few years, it mainly involved the acquisition and cataloguing, management of books and periodicals, circulation service, information service and library integrated system in the traditional sense.

Nowadays, it emphasizes the development of a mechanism for knowledge base, specifically developing a work process for creating, acquiring, processing, preserving, spreading, and applying knowledge. Such knowledge management involves carrying out all-around and whole-process management of knowledge organization, knowledge facilities, knowledge assets, knowledge activities, and knowledge librarians in respect of knowledge streams. Moreover, it turns tacit knowledge into explicit knowledge. It also allocates and uses library resources reasonably and allows librarians and library staff to play to their optimal efficiency to attain the purpose of service innovation.

Library knowledge management oriented toward knowledge services

The two common features below are shared by user knowledge management and libraries' internal knowledge management:

1.Human orientation: This feature emphasizes user demand, scientific management of human resources, value mining of librarians (knowledge-based staff), implementation of abilities, and team and culture building.

2. The knowledge stream system is centered on knowledge and based on a knowledge lifecycle. The knowledge lifecycle comprises the steps of knowledge acquisition, knowledge organization, knowledge analysis, knowledge distribution, knowledge application, knowledge innovation, knowledge preservation, inception of the half-life period and knowledge outdateding.

Libraries are essentially service organizations. Therefore, the aim of library knowledge management is oriented toward knowledge services. Knowledge services are fundamental for enhancing the core competitiveness of libraries. Specifically, knowledge services are the acquisition, rearrangement, organization, and analysis of knowledge in a problem-focused way according to the discipline requirements of students and scholars. New knowledge services are created during the service process. Knowledge services differ from the traditional information services, which provide massive amounts of library collection and information resources to be selected or processed by users as needed. Knowledge services are a type of in-depth services and are personalized, professionalized, knowledge based, interactive, and content oriented. The fruits of knowledge services are mostly embodied in the form of knowledge products, including consultation and creation of analysis reports, evaluation reports, dynamic monitoring reports, development forecast reports, topic databases, and discipline portals.

To build a library knowledge management system oriented toward knowledge services, it is necessary to combine external user knowledge management and internal knowledge management by libraries, and to find integrating points between users and knowledge streams. The intention is to provide library services to meet users' needs and improve the knowledge services provided by libraries.

For academic libraries, business and organizational restructuring in libraries is an effective means to attain this purpose.

A case study: Innovative application of knowledge management in organizational restructuring

Business restructuring based on knowledge streams in Peking University Library

Over many years, China's academic libraries have actively provided knowledge services and tried to transform themselves into knowledge service centers, but the effect of their efforts is not obvious. Although the direction of their efforts is very clear, they have not made appropriate adjustments in organizational structure, human resources, and infrastructure. In other words, they pay attention to user knowledge management, but ignore the internal knowledge management of the library. When these two are not effectively integrated, a bottleneck will be

created to prevent library services from effectively transforming into knowledge services. Therefore, they cannot successfully turn libraries' tacit knowledge into explicit knowledge. To overcome this bottleneck and make a breakthrough, Peking University Library launched organizational and business restructuring in June 2015. In comparison with the previous organizational structure and business operations based on literature streams (for example, the Acquisition, Cataloguing, Circulation, Information Service, Rare Book, Special Collection, System, and Administrative departments), this organizational restructuring was based on knowledge streams and centered on user services. As a result, it gave birth to seven Centers: the Resource Development Center, Learning Support Center, Research Support Center, Information Technology and Data Center, Special Resource Center, Chinese Rare Book Library, and Administration Center.

This organizational restructuring focuses on humans, i.e. users, and the knowledge lifecycle. The Library tries to find the common ground between users and the Library in the knowledge streams, to position the library services to meet users' increasing demand. [Table 1](#) describes the organizational structure, staff teams, target users and business scope in respect to user services.

Table 1. User service departments and teams in Peking University Library.

Department	Target user and business scope	Leading team
Learning Support Center	<p>Target users: mainly undergraduate students and junior graduate students</p> <p>Business Scope: providing all-around learning services for the users, including:</p> <ul style="list-style-type: none"> • Circulation of books, periodicals, terminals and devices; • Reserved-books and e-reserves; • Innovation and creator services; • Thesis and paper writing guide; • Multimedia services; • Interlibrary loan and document delivery services; • Learning-oriented information literacy education, such as new-orientation, and School Open Day; • Electronic resource services; • General reference services; <p>etc.</p>	<p>(1) Interlibrary loan and document delivery service team;</p> <p>(2) User service publicity and promotion team (including social media operation and maintenance).</p>
Research Support Center	<p>Target users: faculty and senior graduate students</p> <p>Business Scope: Providing all-around research services for the users, including:</p> <ul style="list-style-type: none"> • Subject services; • Research project consultation; 	<p>(1) Subject librarian team;</p> <p>(2) Research data service team;</p> <p>(3) Information literacy team.</p>

Department	Target user and business scope	Leading team
	<ul style="list-style-type: none"> • Sci-tech novelty search; • Citation retrieval for research evaluation; • Patent and intellectual property services; • Competitive intelligence services; • Analyses of scientific research trends; • Applications of scientific research tools; • Decision-making support; • Research data support services; • Information literacy education; • Virtual reference services; <p>etc.</p>	

Taking the above user service Centers as an example, the business restructuring of Peking University Library shows the innovative application of library knowledge management towards knowledge services and its two features :

1.Human orientation. From a human perspective, i.e. focusing on users, this organizational restructuring is in line with the philosophy of human orientation. The Learning Support Center is dedicated to provide learning services for undergraduate and junior graduate students, and the Research Support Center is dedicated to provide research services for faculty and senior graduate students. As a result, the users' requirements and user information can be concentrated due to the common features they share. Moreover, the librarians' services are focused and efficient. The user knowledge management and internal library knowledge management are closely integrated in this way. All of these changes have enhanced the quality level and benefits of user services.

2.The knowledge stream system is centered on knowledge and based on a knowledge lifecycle. From a perspective of the knowledge lifecycle, the learning support services are mainly concentrated on the stages of knowledge acquisition, knowledge distribution, and knowledge application. The research support services are mainly concentrated on the stages of knowledge organization, knowledge analysis, and knowledge innovation. Along with the services provided by other Centers, the Library just constitutes a complete knowledge stream system.

From the perspective of knowledge management application, the business restructuring of the Peking University Library has successfully retired the old organizational structure and work procedures. Moreover, the restructuring has given birth to a new mechanism that integrates user knowledge management with the Library internal knowledge management. The Library has committed to turning tacit knowledge into explicit knowledge. In sum, the library has made

a great breakthrough in its business scope, work procedures, human resource development, and team building.

Innovative development of knowledge services after organizational restructuring

Over the four years since the business restructuring, librarians and library staff have fully played their roles, user services have been gradually adjusted and transformed, and multiple innovative developments have been achieved. These are exemplified by the research support services.

Based on the lifecycles of scientific researches, research support services are the supporting knowledge services provided for the scientific researches of universities, enterprises, and other social institutions through various research infrastructures and related measures, with a view to satisfying knowledge and information needs in different research stages. Research support services are mainly intended for faculty, graduate students, scientific researchers, and scientific research managers of universities and colleges, as well as for the related personnel of enterprises. Peking University Library mainly provides the following research support services: scientific research support services, decision-making support services, research data support services, scholarly publishing services, intellectual property rights and patent information services, information literacy services, reference services, and others.

Most importantly, since Peking University Library launched organizational restructuring, a supporting platform for research support services has gradually formed, and knowledge services have been able to develop sustainably.

Functionally, the Research Support Center further comprises groups as described in [Table 2](#).

Table 2. Job description for Research Support Center of Peking University Library.

Business group	Job description	Post setting
Subject service group	Assigning subject librarian teams to the four academic divisions of Peking University (Science, Information and Engineering, Humanities, and Social Science), appointing subject service leaders and subject librarians, recruiting librarians with appropriate discipline background and reference experience, thus forming the subject service team, and providing all-around innovative subject services (including the integration of discipline resources, improvement of disciplinary information literacy, and support of	Four subject service leaders; Subject librarians; an interdepartmental discipline service team.

ROHINI COLLEGE OF ENGINEERING AND TECHNOLOGY

Business group	Job description	Post setting
	disciplinary scientific research), to create a new format of discipline services.	
Information literacy group	Expanding the existing information literacy system to incorporate information literacy education into the teaching appraisal systems of Peking University, and thus developing a complete information literacy education system that covers a wide range and a whole process: for example, from entrance to graduation, from students to faculty, and from the general area to specific disciplines and even specific courses. In conjunction with subject services, deepen the embedded information literacy services and incorporate digital literacy, media literacy, and data literacy into the information literacy system.	One information literacy leader; an interdepartmental information literacy team.
Scientific research support group	Providing fundamental scientific research support services (including citation retrieval for research evaluation, project consultation, and sci-tech novelty retrieval) constantly and efficiently; providing patent novelty retrieval and intellectual property services, and supporting the transformation of Peking University's scientific research achievements. Tracking discipline forefront information and analyzing discipline trends, thus providing decision-making support for disciplinary development. Providing information services regarding disciplinary competitiveness and strategic analysis. Providing all-around support for discipline evaluation. Developing a library-oriented general method and index system for scientific research and decision-making support.	One leader; a few librarians
Research data service group	In conjunction with related departments (for example, the Information Technology and Data Center), acquiring, preserving, and processing data of different disciplines, and providing data services; mining and analyzing discipline user data, thoroughly understanding the information and knowledge demands of different discipline users, and tracking their dynamic change, so as to provide decision-making support for various services (including discipline services), resource development, and development of the library. Developing whole-process research data support services; Assisting and leading the	One leader; a few librarians; an interdepartmental research data service team.

ROHINI COLLEGE OF ENGINEERING AND TECHNOLOGY

Business group	Job description	Post setting
	users to acquire, analyze, manage, and share scientific data (especially the use and management of open data); Strengthening the work in data literacy, data analysis, data normalization, and quality control.	