

How Open Data Movement Drives Digital Scholarship Services in Chinese University Libraries? An Environmental Scanning

Yingying Han¹, Tong Lai² and Lihong Zhou²

¹School of Information Sciences, University of Illinois at Urbana-Champaign, US
yh17@illinois.edu

²School of Information Management, Wuhan University, People's Republic of China
amelialtt@163.com, l.zhou@whu.edu.cn

Abstract. This study aims to identify factors affecting Digital Scholarship Services (DSS) in Chinese university libraries in the context of global open data movement. Firstly, the study adopted an inductive literature analysis approach combined with PEST analysis. The analysis pointed to 14 factors that would influence the DSS under four categories: political factors, economic factors, educational factors and technical factors. Secondly, an exploratory case study was adopted, at which 11 librarians at Shanghai Jiao-tong University Library were interviewed using semi-structured interview questions. Further conceptualisation pointed to 11 factors that will have an effect on the Chinese university libraries, among which 4 have been proposed as core factors. This poster is of interests to not only library and information academics, but also to librarians and open data professionals.

Keywords: Open Data, University Libraries, Digital Scholarship Services (DSS), PEST model.

1. Introduction

“Digital Scholarship” is defined as any scholarly activity that makes extensive use of one or more of the new possibilities for teaching and research opened up by the unique affordances of digital media, specifically, including new forms of collaboration, new forms of publication, as well as new methods for visualizing and analyzing data [1]. Influenced by the open data movement and Web 2.0, great changes have taken place in the academic behavior researchers, and new digital academic practices such as open publishing and scientific data management have gradually emerged [2,3].

Digital scholarship services (DSS) have been widely developed in academic library. It has been discussed that DSS in academic libraries can effectively connect scientists, digital technologies and research projects [4, 5, 6].

In China, some libraries, such as the National Science Library and Tsinghua University Library have started building institutional repositories. Shanghai Jiao-tong Univer-

sity Library also offer knowledge management services, such as research topic selection and analysis services. However, the provision of DSS in China's university is very unsystematic and fragmented [7].

The government and the other funding agents have realized the values of open research data. In 2011, a policy issued by the National Science Foundation (NSF) required the funded researchers to submit data management plans with the detailed open access scheme of academic papers, original data, and sample information [8]. In order to help researchers to adapt to the new academic environment, DSS becomes significantly important in academic libraries [9].

Nevertheless, DSS development in China is not considered as successful while the relationship between open data movement and university library services is still unclear. This poster reports on one of the very early research studies, which aimed to conducting a macro-environmental scanning for DSS in China's university libraries.

2. Research Methods and Processes

2.1 Research Objectives

The following research questions are formulated:

- How open data movement facilitate DSS in China university libraries?
- What are the relationships between different affecting factors?

2.1 Research Design

Critical Literature Review. Three types of literature were retrieved and analysed: academic articles, economic reports, and government policies. Since this study mainly focuses on the DSS in China, those articles, reports, and policies in English were excluded.

At first, three most often used academic databases in China, CNKI, Wanfang, and CQVIP were systematically searched in October in 2017, using a search strategy presented below:

- Title = ("open data" or "open resources" or "open environment" or "open information") and Title = "library"

The keywords were searched in Chinese but were translated into English for paper purpose here. All the articles were carefully screened and the screening process is shown in the following Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) flow diagram.

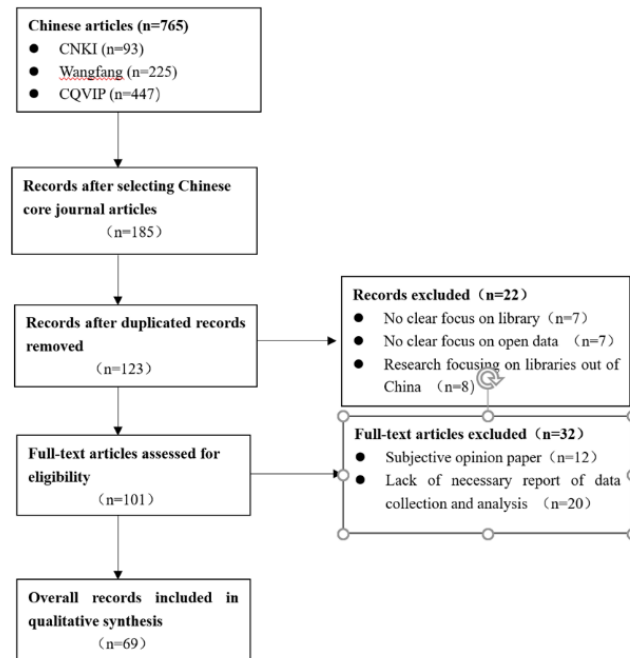


Fig. 1. Process of literature selection using a PRISMA Flow Diagram

Secondly, government policies were searched on the National Development and Reform Commission of People’s Republic of China webpage¹ and Shanghai Government webpage². Ultimately, 18 policies with keywords “open data” or “open information” or “open resources” or “open environment” were collected, including 14 national-level policies and 4 policies issued by the Shanghai Government.

Thirdly, economic reports with keywords “open data” or “open information” or “open resources” or “open environment” in title were searched and collected. There were 4 reports searched from China Academy of Information and Communications Technology webpage³ and AliResearch webpage⁴.

Finally, we included 69 articles, 18 policy documents and 4 economic reports. PEST analysis approach was adopted when analyzing the literature. PEST (political, economic, social-cultural, and technical) is a widely adopted tool while carrying out environmental scanning. The literature review pointed to 14 factors as shown in Table 1.

¹ <http://www.ndrc.gov.cn/>

² <http://www.shanghai.gov.cn/>

³ <http://www.caict.ac.cn/>

⁴ <http://www.aliresearch.com/>

Table 1. Tentative factors emerged from the literature review

Themes	Influence factors
Political factors	Digitization policies issued by Chinese government
	Standards for digitized resources sharing issued by the Chinese government
	Open data movement in developed countries
	Open data movement in China
Economic factors	The development of digital economy in China
	The development of the sharing economy in China
	Economic benefits brought by open data movement to the libraries
Educational factors	Open education movement in China, for example, MOOC
	Open science movement in China
	Change in scholarly communication methods among Chinese scholars
	Change in Chinese academic appraisal system
Technical factors	Storage technology
	Data security technology
	Data integration technology

As suggested by King and Horrocks (2010) [10], the tentative factors in Table 1 could be a very useful theoretical basis for the data collection and analysis in case study. Specifically, Table 1 was used for two purposes: (1) designing semi-structured interview question scripts; and (2) as a starting point for the analysis of interview data collected in the field.

Case Study. Shanghai Jiao-tong University (SHJTU) Library was employed as the case study. SHJTH library offers one of the best library services in China and has won the first prize in the National Innovative University Library Services Competition in 2015 and in 2016.

Data Collections and Analysis. 11 librarians from SHJTU Library were approached and interviewed using open-ended questions. Librarians were arranged into 4 groups according to the department they were working for. Each group interview lasted from 40 minutes to 60 minutes. All interviews were conducted in January 2018. The basic interview information and participants' information were illustrated in Table 2:

Table 2. Participants information and interview information

Number of Participants	Department	Duration of interview
1	Department of Administration	40 minutes
4	Department of Collection and Catalog Management	59 minutes
2	Department of Techniques and Platform Supports	48 minutes
4	Department of Scholar and Research Services	55 minutes

3. Research Findings

3.1 Political Factors

Mandatory Open Access Policy by Government. . Though some open access policies have been issued by the government, this study shows these policies have not substantially promoted the development of DSS in Chinese university libraries. The researchers are not responding to the issued policies actively because policies are not mandatory. A librarian said, “In some foreign countries, the research data in publications must be shared if scholars want to get funds, while there are no such policies in China.” (interview 11).

Incentive Open Access policy by government. The government’s incentive OA policy and the library-sponsored OA initiative, such as “Guidelines for the Rapid Sharing of Scientific Papers in the Internet Age” promoted the formation and promotion of two digital scholarship services at the SHJTU library, which are OA resource services and institutional repository services.

“From the view of management, we will take the government’s emphasis on open work into account in the daily work. At this stage, this work may be more integrated with the construction of the institutional repository and it can make academic achievements in our school publicly obtained. We have been thinking about this work and have begun to do something” (Interview 11).

3.2 Economic Factors

Digital Economy Development in China. With the development of the digital economy, decision-making and management in enterprises increasingly rely on data, which also promotes DSS development. In the interview, a librarian claimed that Alibaba’s Sesame Credit service is planning to cooperate with the SHJTU Library, in order to optimize current services.

“We also hope to introduce Ma Yun’s Alipay model to our library services. The students no longer need ID cards, but they can borrow a book using his account in Ali company if they have a good credit records in the company database.” (Interview 1)

Revenue Generating of Open Access Resources. As revealed by the interview informants, the revenue-generating model of OA resources is an important driven-factor for DSS in university libraries. However, the OA resources are in so low quality that it is difficult for a library to really save money from their budgets using OA resources.

“We have listed a lot of free databases before. The links will be invalid very soon. We cannot employ these unstable resources to offer services.” (Interview 5).

3.3 Education Factors

Open Access Policies in Chinese Universities. DSS development in university libraries requires OA policies. “The library may be responsible for the formulation of the policy content, but ultimately, the implementation of the policy should be approved by administrative departments, such as a school’s Research Institute.” (Interview 1)

Academic Evaluation System in China. The transformation of China’s academic evaluation system could facilitate DSS in university libraries, because “library need to offer services, which could help the researchers get promoted.” (Interview 1)

However, current system mainly examines the “quantity of publications” (Interview 4) and their works’ “cited frequency” (Interview 5). “What the faculty care most are when the paper can be published, what journals can be published on. Whether the paper is OA does not really matter because it has nothing to do with their career development.” (Interview 6).

Open Educational Resources Movement. An increasing number of OA academic resources are driving DSS transformation. The SHJTU Library was planning to embed some frequently used OA resources into their library webpage, since “teachers and students are more concerned about open resources, such as the SCI hub, an OA platform many people are using” (Interview 11).

“If the library only offers purchased academic resources, the teachers’ academic requirements cannot be totally met sometimes. If they want to search for OA resources, which are scattered on different platform, they will have to spend much extra time on that. (Interview 4).

Open educational resources, such as the popularization of MOOC, also promotes DSS providing. “MOOC is being made by departments in our school, the library has keep working on a reference book system, and we plan to link it to school MOOC curriculums” (Interview 6).

Researchers’ Willingness to Open and Share Academic Resources. The higher sharing willingness of researchers will enhance DSS. However, at present, researchers in China still lack motivations to share research results. Some Chinese scholars are having “serious academic fraud” (Interview 7). “The data in some papers may not be derived from real experiments” (Interview 5). “Regarding some disciplines, such as materials science, academic achievements can be directly converted into patents and bring benefits to researchers” (Interview 6). Researchers “are reluctant to share their own research results” (Interviews 7, 8), which also leads to the library’s “cancellation of its original plan of the scientific research service management platform”.

Social Media and Scholar Communication. The emerging behavior of researchers using social media to publish academic information has exerted an impact on DSS. Academic resources on social platforms “are a supplement to library resources, and we

may find journal articles that we haven't purchased" (Interview 5). Librarians take it as their duty to integrate academic resources distributed on social networking sites because "researchers will cost less time if we have done that" (Interview 5).

3.4 Technical Factors: Data Harvest and Integration.

Data harvesting has great benefits for DSS development. University libraries are trying to harvest "OA resources" (Interview 6), but the OA resources are "too scattered" (Interview 6), "lack of standardization" (Interview 5). "Data harvesting techniques can help technical librarians with collecting relevant data." (Interview 6).

Harvesting open data of commercial companies is also necessary. "Some commercial book companies, like Amazon, Dangdang, have API for book covers and bibliographic information. If cataloging department figures out the needs for these data, we can use some programming to harvest these resources and integrate them into our catalog (Interview 7).

University libraries "need to trace university faculties' studies, build a connection between existing open resources and professors' studies" (Interview 7). "Cross-database search technology" (Interview 8) and "semantic relevance technology" (Interview 7) can help researchers better acquiring the resources.

4. Discussion

Though with a plethora of driving factors, the Chinese university libraries failed to offer systematic DSS. The findings were further conceptualised to understand the relationships among the factors. Four factors have been further identified as core factors, which have greater influence on the development of DSS in Chinese universities.

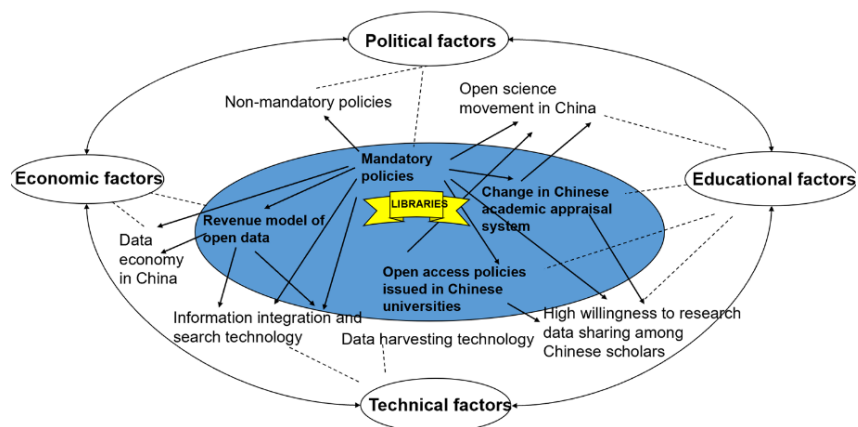


Fig. 2. Model of emerging factors, relationships and themes.

Government policies have been playing a significant role in a Chinese university library's decision-making process. Though Chinese government has realized the value of research data, influential mandatory policies facilitating OA of research data are lacking. Some universities libraries have made OA policies in order to build a university repository, but our study has found that the implementation of those non-mandatory library policies have been facing challenges because of the hierarchical nature of university.

With the lack of policies from the government and fund agents, Chinese researchers don't currently have strong motivations to publish their research data and papers freely online. The faculty promotion criteria have stress much on the number of the publications. How much the papers or research data have been viewed online have little or no influence in the promotion process.

Finally, how much could open access research resources save money on a tight budget in the university library? This is a question to be investigated in the future study. It is found in this study that due to the lack a revenue model, the university libraries are also lacking of motivations of collecting, integrating, and publishing open access research resources.

Thus, four factors have been illustrated in Figure 2 as core factors facilitating the DSS offered in Chinese university libraries: mandatory policies from the government, non-mandatory policies from the university, academic promotion criterial, and a revenue model.

5. Conclusion

Adopting inductive literature analysis approach and case study approach, this study has pointed to 11 factors that will have an effect on DSS in Chinese university libraries, among which 4 have been proposed as core factors. In the future study, the researchers will further propose strategies for Chinese university libraries to offer high-quality DSS.

References

1. About digital scholarship, <http://www.lib.washington.edu/digitalscholarship/about>, last accessed 2019/09/20.
2. Scanlon E.: Scholarship in the digital age: Open educational resources, publication and public engagement, *British Journal of Educational Technology* 45(1):12–23 (2014).
3. Schmiede R.: Upgrading academic scholarship: challenges and chances of the digital age. *Library Hi Tech* 27(4):624–633 (2009).
4. Wexelbaum R.: Assessing safe spaces for digital scholarship in the library, *Libres: Library & Information Science Research Electronic Journal* 26(1):14–30 (2016).
5. Working Together or Apart: Promoting the Next Generation of Digital Scholarship, <https://www.neh.gov/divisions/odh/grant-news/working-together-or-apart-promoting-the-next-generation-digital-scholarship>, last accessed 2019/09/20.
6. Montoya R D.: Boundary objects/boundary staff: supporting digital scholarship in academic libraries, *Journal of Academic Librarianship* 43:216–223 (2017).

7. Zhou, L. H, Huang, R. H, Zijlstra, T: Towards Digital Scholarship Services in China's University Libraries. *The Electronic Library* 37(1): 108-126 (2019).
8. Dissemination and Sharing of Research Results, <https://www.nsf.gov/bfa/dias/policy/dmp.jsp>, last accessed 2019/09/20.
9. Wu J Z.: Re-discussion of ten hot topics in the development of librarianship, *Journal of Library Science in China* 43(7): 4-17 (2017). (in Chinese)
10. King, N., Horrocks, C.: *Interviews in qualitative research*. Sage, London (2010).