

The Analysis on the Research Hotspot and Trend of Think Tanks of Chinese University Libraries

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Abstract

To objectively reflect the relevant situation of researches on think tank service of Chinese university libraries, this paper uses CNKI Database as the retrieval source, the bibliometric analysis method, and CiteSpace, a citation network analysis tool, to make quantitative analysis on the literature data of researches on the think tank service of university libraries; draw the knowledge map of literature authors, organization distribution, keyword co-occurrence, research hotspot distribution, etc.; objectively and comprehensively analyzes the hot topics and cutting-edge trends of researches on the think tank service of libraries, the research includes the following aspects: First, the status quo and orientation of the existing university library think tanks in China; second, it is recommended to carry out research on policy support and system guarantee for university library think tank services; third, integrate big data technology is merged into the construction of university libraries think tanks; fourth, the transformation of library and information institutions to new types of think tanks, including the transformation of knowledge services, disciplinary services, and characteristic think tanks, in order to provide reference for researches and practical work of think tank service of libraries in China.

Keywords

University Libraries, Think Tank Service, CiteSpace, Knowledge Map

1. Introduction

Think tank, *i.e.* brain trust and thinking bank, is a relatively stable and independent organization or institution composed of experts in different fields, which provides policy consulting services. Under the background of big data of infor-

mation exchange, guided by the concept of collaborative innovation, with strategic issues and public policies as the main research objects, with the purpose of building service networks and making the public policy decisions, think tank is one of the measurement standards of national soft power and international competitiveness [1]. The Decision of the Central Committee of the Communist Party of China on Several Major Issues about Comprehensively Deepening *Reform* clearly proposes to "strengthen the construction of new think tanks with Chinese characteristics, and establish and improve the decision-making consulting system". It can be seen that the construction and development of think tanks have become an important part of the national development strategy. The National Outline of Mid-and-long-term Education Reform and Development Plan from 2010 to 2020 clearly states that colleges and universities should actively participate in decision-making consulting, actively make forward-looking and strategic researches, and give full play to the role of think tanks. As an important part of education, think tank of university libraries is an important force for building a new type of think tank with Chinese characteristics [2]. University libraries have been playing an important role in the development of information resources, participation in social education, provision of literature resources, etc. It can be seen that the role of university libraries and that of think tank have a natural connection. Therefore, university libraries' participation in the construction and service of think tanks is not only the need of their own business development, but also the important manifestation of participation in university management and exercising of the function of social service. Think tank service enriches the service content of university libraries and provides development opportunities for transformation and upgrading of libraries. The domestic and foreign scholars mostly focus on the connotation, functions and operation modes of university libraries. In order to accurately grasp the development trend of think tanks of university libraries and promote the researches on think tanks of libraries, CiteSpace, information visualization software, is adopted in this study to research the development trend of think tank of Chinese university libraries and make the visual analysis. Through this research, we can summarize the knowledge base, research hotspots, research frontier and development context of researches on think tanks of Chinese university libraries, which has important theoretical and practical value for building a new type of think tank with Chinese characteristics.

2. Data Sources and Research Methods

In order to ensure the comprehensiveness and reliability of the original data, the author took CNKI Full-text Database as the research data source, selected "Journal Search" in CNKI, and set the search conditions as "subject = university libraries" and "think tank", "title = university libraries" and "think tank", and "keyword = university libraries" and "think tank". A total of 292 literatures (the retrieval date was February 23rd, 2020) were found. The literature data of 2020

was ignored because it was not complete data of the whole year; 286 valid literatures were obtained after data of 2020 and irrelevant literatures were excluded; and literature title, author, literature source, keywords, abstract and other data were exported as a text file of Refworks format and transcoded, forming a sample database.

CiteSpace is information visualization analysis software developed by Chen Chaomei's team of Drexel University based on Jave programming language [3]. Based on CiteSpace5.4.R3 analysis tool, this paper analyzes authors, organizations and co-occurrence clusters of subjects and keywords of the literatures in the field of think tank service of Chinese university libraries searched from CNKI Database; obtains the main research authors, important research institutions, research hotspots and research evolution paths in this field; and displays them with analysis map.

3. Literature-Related Statistics and Analysis on Knowledge Map

3.1. Statistics of Time and Quantity Distribution of Literatures

Based on the literature data derived from CNKI Full-text Database, the author drew the chronological distribution map of the number of papers published about researches on the think tank service of university libraries with Excel (see **Figure 1**). **Figure 1** clearly shows the change of the number of literatures published over time. The research on the think tank service of university libraries started in 2010. The number of papers published was relatively small in the five years from 2010 to 2015, and there were only 17 papers in total, which showed that the academic circle's attention to the research on the think tank service of university libraries was not high at this stage and the researches in this field were still in its infancy. 2016-2018 is a fast rising period for researches on the think tank service of papers published quickly increased to 82 in 2018, indicating that the scientific circle began to pay high attention to this field. In 2019, the rising trend of the number of papers published slowed down, and the number of papers published reached 93, which was the peak in this field.

3.2. Distribution of Authors of Literatures

By setting Node Types as Author and running CiteSpace, the author co-occurrence knowledge map of researches on the think tank service of university libraries was obtained (see **Figure 2**). From the picture, we can find that the network of the whole map is scattered. There are only 11 lines between the author nodes, which is at a low level. This shows that there is less cooperation between authors in this research field, and the cooperation is small-scale cooperation between two people. Most of the authors researched independently. At the same time, the top 10 high-yield core authors and the number of papers published by them CiteSpace were counted by CiteSpace (see Table 1).







Figure 2. Co-occurrence map of authors of literatures about think tanks of university libraries.

Table 1.	Тор	10	authors	who	have	published	the	most	papers	about	think	tanks	of	uni-
versity li	brarie	es.												

No.	Author	Number of papers published
1	Zhao Xueyan	10
2	Peng Yan	6
3	Zhang Xu	5
4	Huang Changwei	4
5	Zhang Dongmei	3
6	Pu Linlin	3
7	Cao Jian	2
8	Dai Ying	2
9	Lian Lijun	2
10	Wan Wenjuan	2

By setting Node Types as Institution and running CiteSpace, the institution co-occurrence knowledge map of research literatures about the think tank service of libraries was obtained, as shown in **Figure 3**.

Cite Space, v. 5.4.R3 (64-bit) March 27, 2019 4:22:02 PM GMT+08:00 WoS: C:USers\space\Desktop\cnkidate\data Timespan: 2010-2019 (Slice Length=1) Selection Criteria: Top 50 per slice, LRF=3.0, Network: N=28, E=3 (Density=0.0079) Largest CC: 2 (7%) Nodes Labeled: 1.0% Pruning: Pathfinder 甘肃政法大学图书馆 吉林大学图书馆 LRF=3.0, LBY=8, e=2.0 南京大学信息管理学院 上海交通大学图书馆 湖北大学图书馆 辽宁师惹大学 长春中医蓟大学图书馆 吉林大学管理学院 安徽建筑大学 合肥工业大学 北京科技大学图书馆广西师范大学图书馆 泉州师范学院图书馆 首都医科大学图书馆 河北对外经留职业学院 浙江金融职业学院 首都医科大学卫生管理与教育学院四川工商学院 徐州医科大学图书馆 黑龙江大学信息管理学院 哈尔滨商业大学图书馆 墨龙江工程学院图书馆 长春大学 北京大学信息管理系 黑龙江工程学院 华北理工大学图书馆陕西国际商贸学院图书馆

Figure 3. Distribution map of research institutions of the think tank service of libraries.

The nodes in the map represent the research institutions, the size of the nodes represents the number of papers published by the institution, and the line between the nodes represents the cooperative research of the institutions [4]. It can be found from the map that there are 28 nodes in total, all of which are research institutions which have published papers for more than 2 times, but there are only 3 lines between the nodes. This indicates that the research in this field has been widely concerned by academic groups, but most of them are independent researches and there is a lack of cooperation between institutions. At the same time, the top 10 research institutions which have published the most papers are listed (see **Table 2**). Among them, Library of Harbin University of Commerce has published 16 papers, which is the research institution publishing the most papers. Library of Heilongjiang Institute of Technology has published 6 papers, Library of Xuzhou Medical University has published 5 papers, and Library of North China University of Science and Technology has published 4 papers.

3.3. Analysis on Keywords of Literatures

The keywords of literatures are their labels of knowledge and information and the summarization of their full text. Through the knowledge co-occurrence analysis and cluster analysis of literature keywords, we can grasp the overall situation of researches on the think tank service of university libraries more quickly and deeply.

3.3.1. Keyword Co-Occurrence Analysis

First, the literature data in CNKI Database was imported into CiteSpace for conversion and processing. Second, the time span of analysis was set as 2010-2019 by Time Slicing, Years Per Slice was selected as 1, Node Types was set as Keywords, Pathfinder and Pruning Sliced Networks algorithm was used, other options were set as default, and CiteSpace was run, so as generate the keyword co-occurrence knowledge map of the think tank service of libraries (see **Figure 4**). Each round

No.	Author	Number of papers published
1	Library of Harbin University of Commerce	16
2	Library of Heilongjiang Institute of Technology	6
3	Library of Xuzhou Medical University	5
4	Library of North China University of Science and Technology	4
5	School of Management, Jilin University	3
6	Library of Jilin University	3
7	Library of Quanzhou Normal University	2
8	School of Information Management, Heilongjiang University	2
9	Library of University of Science and Technology Beijing	2
10	Library of Hubei University	2

Table 2. Top 10 institutions which have published the most papers about think tanks of university libraries.

Cite Space, v. 5.4.R3 (64-bit) March 27, 2019 11:22:26 PM GMT+08:00 WoS': C:Users\space/Desktop\onkidate\data Timespan: 2010-2019 (Slice Length=1) Selection Criteria: Top 50 per slice, LRF=3.0, LBY=8, e=2.0 Network: N=32, E=11 (Density=0.0519)

43 (87%)

Nodes Labeled Pruning: MST





node in the map represents a keyword, the size of the round node represents the frequency of occurrence of keyword, and the thickness of the line between nodes represents the co-occurrence frequency coefficient of keywords. In the keyword knowledge co-occurrence map of the think tank service of libraries, it can be found that the map generates 49 nodes and 65 lines and the density is 0.0553. Combined with node size, thickness of line and density, it shows that the research field of the think tank service of university libraries has a high concentration, and an academic research network which has begun to take shape has been formed. In addition, the node size of keywords such as "think tank", "university libraries", "think tank service" and "think tank construction" is big, and they are located in the center of the map.

The frequency of occurrence of keyword reflects the hotspot in this research field, and the betweenness centrality of keyword indicates the number of information flows between the keywords it controls and the degree of control over resources of the whole network [5]. Statistics were made on the keywords in the map, and the keywords were ranked according to the frequency of occurrence and betweenness centrality of keywords. The top 10 keywords with the highest frequency and centrality were obtained respectively, as shown in **Table 3** and **Table 4**.

No.	Frequency	Keyword	Year
1	182	University libraries	2014
2	103	Think tank	2015
3	47	Think tank service	2016
4	40	Library	2016
5	31	Think tank construction	2016
6	28	Think tanks of universities	2016
7	15	New type of think tanks	2018
8	14	Information service	2016
9	12	Knowledge service	2017
10	11	Colleges and universities	2018

Table 3. Top 10 keywords with the highest frequency.

Table 4. Top 10 keywords with the highest betweenness centrality.

No.	Centrality	Keyword	Year
1	0.61	Library	2016
2	0.41	University libraries	2014
3	0.38	Think tank service	2016
4	0.31	Think tank	2015
5	0.24	Think tank construction	2016
6	0.22	Information service	2016
7	0.21	Colleges and universities	2018
8	0.21	Discipline service	2018
9	0.21	Big data	2017
10	0.15	New type of think tanks	2018

Through the summary and analysis of **Table 3** and **Table 4**, it can be found that the keywords in the two tables are different and have a high degree of similarity. In total, there are 8 keywords with high frequency and betweenness centrality, including university libraries, think tank, think tank service, library, think tank construction, university think tanks, new type of think tanks and colleges and universities. These keywords are the important nodes in the whole research network of the think tank service of university libraries. The research work in this field focuses on these keywords.

3.3.2. Keyword Cluster Analysis

The thresholds C, CC and CCC in CiteSpace were set as (2, 2, 20) and (4, 3, 20), respectively, and the "clustering" analysis was selected, so as to generate the keyword clustering knowledge map (see **Figure 5**). Among them, Modularity and Silhouette are two important indicators of network modularity. The module value Modularity is used to measure the extent to which a network can be divided into independent modules. When the value is between 0 and 1, the larger the value is, the more independent the modules in the network are. Usually the value should be greater than 0.3. The average contour value Silhouette is used to evaluate the uncertainty of clustering nature, and the value is between -1 and 1. The closer the value is to 1, the more independent the module is. Generally, the value should be greater than 0.5 [6].

As shown in **Figure 5**, the module value Modularity is 0.6037, which is greater than 0.3, and the average contour value Silhouette is 0.5927, which is greater than 0.5. It shows that the clustering structure of the academic network is reasonable, there is a certain relationship between the modules in the network and have they a high degree of independence. In this analysis, 6 keywords cluster labels were derived, including "colleges and universities", "university think tanks", "service mode", "decision-making consulting", "service innovation" and "discipline service". The above six labels show the research focus of scholars on the think tank service of university libraries at this stage.

3.4. Hotspot and Frontier Analysis

3.4.1. Analysis on Hot Topics

Based on the keyword clustering knowledge map, "Cluster Explorer" was selected in the menu bar of "Clusters" to get the keyword co-occurrence network clustering form (see **Table 5**). The chart shows the top five keywords in each cluster according to their frequency. These keywords represent the research direction that scholars pay more attention to in this cluster.

1) In the research on the positioning of the think tank service of university libraries, the co-occurrence identifiers include concept of think tank, double first-class, social service, knowledge service, intelligent service, etc. The research focuses in this area include the improvement path of content, mode and service ability of university library service. Generally, university libraries use their own resources to serve think tanks, so as to realize the extension of the service ability



Figure 5. Keywords cluster knowledge map of the think tank service of university libraries.

Table 5. Keyword co-occurrence network clustering form.

Cluster ID	Size	Top Terms
0	10	Library, colleges and universities, concept of think tank, construction, overview
1	9	University think tanks, service, university libraries, think tank service, library service
2	8	New type of think tank, knowledge service, service mode, socialized service, think tanks of university libraries
3	6	Think tank, information service, double first-class construction, SWOT analysis, decision-making consulting
4	6	Think tank construction, service innovation, big data, double first-class, reference consulting service
5	4	Discipline service, double first-class, local university libraries, information support, data service

of university libraries; or university libraries make the service transformation, directly play the function of think tanks, and participate in the development and construction of think tank projects as independent institutions.

2) In the research on the service mode of university libraries, the co-occurrence identifiers include knowledge service, service mode, discipline service, decision-making consulting, reference consulting service, information support and data service. It is the core competitiveness of the library to develop an effective service model for the construction of think tank. How to develop information products according to their own characteristics and how to make academic exploration in the innovative use of their own information resources are the core issues in the field of researches on the think tank service of university libraries.

3.4.2. Analysis on Research Frontier

The node type "Keyword" was selected, the term type was set as "Burstness", Ci-

teSpace was run, the time zone chart of research frontier of the think tank service of university libraries was generated (see Figure 6), and four suddenly changed keywords were detected (see Table 6).

First, we can see the development trend of research frontier of the think tank service of university libraries from 2010 to 2019 through the time zone chart of research frontier. 2010-2014 is the beginning of researches in this field. As a new concept, "think tank" began to be introduced into the work of university libraries. In this period, the researches focused on the construction and functioning of knowledge base of university libraries for the purpose of the think tank service. Since 2015, the researches on the think tank service of university libraries entered a period of explosive growth, because the promulgation of Opinions on Strengthening the Construction of a New Type of Think Tanks with Chinese Characteristics defined the "think tank" and emphasized the importance of completing the decision-making consulting work and building a new type of think tanks with Chinese characteristics, which made the term "think tank" become a hot topic of academic research immediately. From 2015 to 2016, the number of keywords increased sharply, mainly including "concept of think tank", "construction of think tank", "service innovation" and "knowledge service". Through induction and analysis, it can be found that at this stage the researches focused on university libraries' exploration and innovation of the think tank service mode. The third stage is the stable growth period since 2018, during which "new type of think tanks", "discipline service", "local university think tanks" and other keywords emerged. It indicates that the frontier hotspot in this period has turned to researches on how university libraries could make full use of their own resource advantages to provide information support to think tanks. The last keyword of time zone is function positioning. The development direction

Table 6. Keywords with the strongest citation bursts.

Keywords	Year	Strength	Begin	End
University libraries	2010	3.1948	2014	2015





of university libraries in the new era is clear service positioning. When participating in the construction of think tank, we must combine our own advantages to effectively provide services to universities, society and enterprises.

There are several common translations of suddenly changed keywords, such as sudden change, burst and surge. It basically means that the value of a variable changes a lot in the short term. From **Table 6**, it can be found that the suddenly changed keyword about research on think tanks of university libraries is "university libraries", which indicates that experts and scholars in the academic circle began to pay attention to the think tank service of university libraries from 2014 to 2015. In the future the exploration on the construction of think tanks of university libraries will be the most cutting-edge hotspot in this research field.

Through the above analysis, we can see that the research of university library think tank is just beginning, and the theoretical and practical experience is still immature. The literature review also confirms this point, the existing research focuses on how to build a good university think tank as well as the introduction and comparison of foreign experience, the empirical research is less. Based on this, the trends of the research on the think tank of university library in China are as follows: First, the research on the development and orientation of the think tank of university library in China is an urgent problem for the research of the think tank of university; second, information technology Integration into the construction of university think tanks, such as how the university library think tanks use new technologies to analyze big education data; third, continue to draw lessons from the experience of foreign education think tanks, especially those in the United States, where the think tanks originated How to effectively serve the experience of the development of educational science; fourth, it is to discuss the localization development mode of the university think tank in China, that is the research on the construction path of the university library think tank with Chinese characteristics.

4. Summary and Prospect

From the perspective of bibliometrics and visual analysis, the author analyzed the construction of think tanks of university libraries, and learned that the attention on think tanks of Chinese university libraries was gradually increasing but there were still some problems, which were summarized as follows: 1) Seen from the number and distribution of papers, the number of research papers about think tanks of Chinese university libraries is less than 300. The literature quality is generally not high, the core journals only account for a small proportion, and the citation rate is not high. At present, the research content of university think tanks focuses on the discussion about the theoretical content of think tank construction, service system, information service, etc. There are few research literatures about the practice of think tank construction, which shows that there is a lack of leading figures, academic core groups and professional and influential research achievements with a high academic value in this field. 2) Seen from the

distribution of authors and institutions, there is a lack of highly influential and high-level researchers and teams in this field perhaps for the following reasons. First, think tanks in colleges and universities started late. Second, the distribution of researchers in this field is relatively scattered, and there is a lack of atmosphere and environment for cooperation. 3) Seen from high-frequency keywords and time-space distribution of university libraries, the researches on think tanks of Chinese university libraries can be divided into two directions: First, the construction of think tanks, including the construction of information services, think tank platform, talent training and other aspects; second, the transformation to a new type of think tanks, including the transformation of knowledge service, disciplinary service, characteristic think tanks and other aspects [7].

Through the analysis on the above knowledge map, the author thinks that in the future the think tank service of libraries can be further studied from the following aspects.

Firstly, expansion of the research on the service content of think tanks of university libraries: at present, the service of the library think-tank in China is more focused on the development and management of literature information resources and decision-making reference consulting. The content of the service is limited, and the deeper content is not involved. In the follow-up research work, we should not only deepen the research on the existing service content, but also combine the libraries' advantages and explore innovation in the service content of think tanks, such as the propaganda of think tanks, professional training of think tank personnel and evaluation of think tank achievements.

Secondly, from the knowledge co-occurrence map of this research, it can be found that the current focus of researches in this field is the internal construction of libraries and there is a lack of thinking about external factors affecting the think tank service of libraries. Whether a library can give full play to the supporting function of think tank construction depends not only on funds, talents and technologies, but also on the support of the decision-making level. Therefore, for the think tank service of university libraries, the researches on policy support and system guarantee should be one of the focuses of future research.

Thirdly, under the background of "Internet+," we attach importance to the application of big data technology in the service innovation of library think tank. On the basis of strengthening the construction of special features database, various types of libraries should also consider how to use the thinking and technology of "Internet+" to innovate the existing service mode of library think-tank, such as constructing data for think-tank service Open platform or information sharing alliance, etc.

Fourthly, the feasibility analysis and research on the transformation of library and information institutions to think tanks should be made. In the process of think tank service, libraries should strive to realize the transformation from library and information institutions to think tank research institutions, which is a qualitative leap for university library and information institutions in the process of literature and information services. However, at present most of the researches on the functional transformation of institutions are based on theoretical achievements, and lack practical successful transformation cases and specific scheme design. Therefore, it is an important direction of future research in this field to combine theory with practice and provide the feasible transformation implementation plan.

Fund Project

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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