The Competitive Advantage Model of China's "Double First-Class" University Libraries from Knowledge-Based Dynamic Capabilities

Xue Jingjing and Wongvanichtawee Chalermkiat
Siam University, Thailand
Corresponding Authors, E-mail: 327009144@qq.com

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Abstract

This research aims to explore the competitive advantage model of China's "Double First-Class" university libraries through the lens of knowledge-based dynamic capabilities, with service innovation as a mediating factor. The study employs a mixed research method. A quantitative approach involved collecting 420 valid questionnaires from these university libraries, with data analyzed using SPSS and AMOS to construct a structural equation model. Additionally, qualitative research was conducted through in-depth interviews with 9 key informants, including department directors and deputy directors from these libraries. These interviews provided valuable insights into how knowledge-based dynamic capabilities can enhance the competitive advantage of university libraries and supported the quantitative data analysis. The research results indicate that knowledge-based dynamic capabilities significantly influence the competitive advantage model of university libraries via service innovation. The main contribution of this study is the development of a reference competitive advantage model for university libraries, aimed at better enhancing their competitive position.

Keywords: Knowledge-based dynamic capabilities; Service innovation; Competitive advantage; China's "Double first-class" university libraries.

Introduction

In today's information economy, knowledge is the most active and decisive production factor, which can improve organizations' production and innovation capabilities. Therefore, knowledge can help organizations create more value and maintain the continuity of competitive advantage in dynamic competition.

For a long time, universities have been regarded as non-competitive organizations compared with enterprises. However, universities began to compete in resources, funding, employment, and other aspects with the further development of higher education. The competition's goal is generally to obtain and create better conditions for self-development. The result of competition is generally a loss of advantage or a rise in competitive position.

To strengthen the construction of China's university system and create a group of Chinese elite universities and a group of disciplines with global influence, the "Double First-Class University Plan" in 2015 began implementation in 2017. China's State Council issued the "Overall Plan for Coordinating and Promoting the Construction of World-Class Universities and First-Class Disciplines" in 2015, highlighting the main tasks of the "Double First-Class" construction of China's future universities (Zhang, 2017). The "Double First-Class Universities" selection dimensions include competitive selection, expert evaluation, government assessment, and dynamic screening (B. Chen et al., 2024; Deqiang, 2022). The "Double First-Class" construction, different from the "211" and "985" lifelong systems (See

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Figure 1), is dynamic in a five-year cycle so that it will inject new development vitality into more universities (Yang et al., 2019).

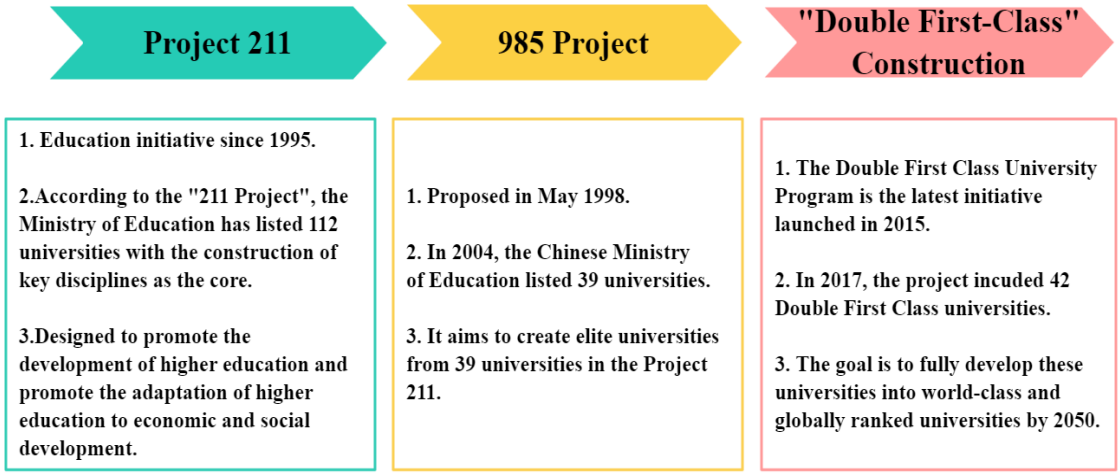


Figure 1 The University Education Plan Implemented by The Ministry of Education

The content of the “Double First-Class” construction includes building a first-class university teaching staff, cultivating first-class innovative talents, improving the level of innovation ability in scientific research, inheriting the excellent traditional culture of innovation, and promoting the efficient and powerful transformation of research results (Education, 2015). However, these “Double First-Class” construction tasks are closely related to the competitive advantages of universities themselves. As the cultural foundation and basic facilities for developing universities, the library has also faced new opportunities and challenges. The university library's self-positioning, development goal, and competitive advantage will directly affect whether the university can become a “Double First-Class” university or enter the “Double First-Class” discipline echelon.

However, the university library needs more dynamic knowledge, technology, and resources to gain competitive advantages. Then, the university library must break the original fixed mode, effectively mobilize its enthusiasm for innovative reading services, and promote its competitive advantage in knowledge-based dynamic capabilities.

Research Objective

According to relevant literature, knowledge-based dynamic capabilities were applied in manufacturing, healthcare, and green energy industries (Beuter Júnior et al., 2019; K. Faccin et al., 2019; Ismail, 2024). In particular, knowledge-based dynamic capabilities have nothing to do with the competitive advantage model for university libraries. This study aims to develop a competitive advantage model for university libraries from knowledge-based dynamic capabilities through service innovation (Suifan et al., 2021).

1. To investigate the factors of knowledge-based dynamic capabilities through service innovation on university libraries' competitive advantage.
2. To reveal the effect of knowledge-based dynamic capabilities through service innovation factors on university libraries' competitive advantage.
3. To develop a competitive advantage model for university libraries from knowledge-based dynamic capabilities through service innovation.

Scope of Research

According to the research's needs, this study mainly focuses on increasing China's university libraries' competitive advantage from knowledge-based dynamic capabilities. Therefore, the research scope is the following three aspects:

1. To create a conceptual framework, this study will collect data from the website of the Steering Committee of the Higher Education Library, the homepage of each university library, and literature.

2. This study will be designed for “Double First-Class” university libraries in China. There were 42 double first-class university libraries (for more than five years) in 2022, which will involve collecting and analyzing quantitative data.

3. Regarding methodology, the study will use mixed analysis methods. The in-depth interview will select 9 representative university library leaders and managers as key informants for in-depth interviews.

Literature Review

In terms of literature review, this study analyzes the literature on knowledge-based dynamic capabilities (Suifan et al., 2021), service innovation, and competitive advantage through the literature on metrology (Lin & Chen, 2017). It summarizes the previous research.

Knowledge-Based Dynamic Capabilities (KBDC)

The study of knowledge-based dynamic capabilities originated from the dynamic capabilities theory proposed by Teece (Denford, 2013; Teece et al., 1997; Zotoo et al., 2021). Knowledge and knowledge-creation practice were understood as the essential elements of organizational survival and used as an important variable to explain the differences in corporate performance (Faccin et al., 2019; Migdadi, 2022). Knowledge-based dynamic capabilities refer to the ability of organizations to use knowledge process capabilities to build high-level dynamic capabilities and thus gain competitive advantages (Ismail, 2024; Kaur, 2019; Li et al., 2023; Suifan et al., 2021).

Based on the definition of knowledge management and dynamic capabilities in the previous section of this paper, knowledge-based dynamic capabilities can be defined as "the capability of organizations to absorb, integrate, share, protect and innovate knowledge resources, perceive, adjust, apply and create change."

Based on knowledge management and dynamic capabilities (Shan et al., 2019), this study defines knowledge-based dynamic capabilities as " the operating capability of organizations to absorb, integrate, share, protect and innovate knowledge resources to perceive, adjust, apply and create change. " Therefore, its dimensions are visible. These are knowledge absorptive capability (KAC), knowledge integration capability (KIC), knowledge sharing capability (KSC) (Han, 2019), knowledge protection capability (KPC), and knowledge innovation capability (KIN).

Service Innovation (SI)

Service innovation is to realize the new demand for service objects, enhance service quality, and create new market value through the change of production factors and the change of the relationship between production factors (Kindström et al., 2013).

Throughout the relevant research on the library’s service innovation, we find that scholars mainly study library service innovation from the perspectives of technology and service platform innovation, resource organization form innovation, organizational culture innovation, and multiple innovation integration (Goddard, 2020). The concept, content, and

system of university library service innovation have been updated with the background of the times. Therefore, service innovation is divided into incremental service innovation (ISN) and radical service innovation (RSN)(X. Chen et al., 2024).

Competitive Advantage (CA)

The knowledge-based competitive advantage theory is based on resource and capability theory development, and many researchers pay more attention to it. Generally speaking, competitive advantage is defined as one or a group of resources or capabilities that enable enterprises to compete (Adama et al., 2024). The concept of competitive advantage reflects the organization's pursuit of maintaining its competitive advantage and situation, but different theoretical backgrounds give different connotations to competitive advantage. The dynamic competitive advantage based on knowledge can allow the company to conduct business more efficiently (Nayak et al., 2023). Therefore, organizations enhance their competitive advantages through knowledge acquisition, integration, sharing, protection, and innovation.

Competitive Advantage Model for University Library (CAM)

The competitive advantage model for university library originates from the competitive advantage model of business (Edgar, 2022). Therefore, the factors that affect university libraries' competitive advantage model mainly include resources, service, space, talent, and technical advantages (Zhang, 2008).

This theoretical research's conceptual framework is based on the definition, laying the foundation for the subsequent hypothesis and the following data analysis. Based on the related research results, this study assumes that knowledge-based dynamic capabilities can enhance the competitive advantage of university libraries through service innovation. Therefore, this study attempts to put forward the five dimensions of knowledge-based dynamic capabilities of university libraries as independent variables, service innovation as a mediating variable, and competitive advantage model for university library as dependent variables. In summary, we can get this study's hypothesis, as shown in Figure 2.

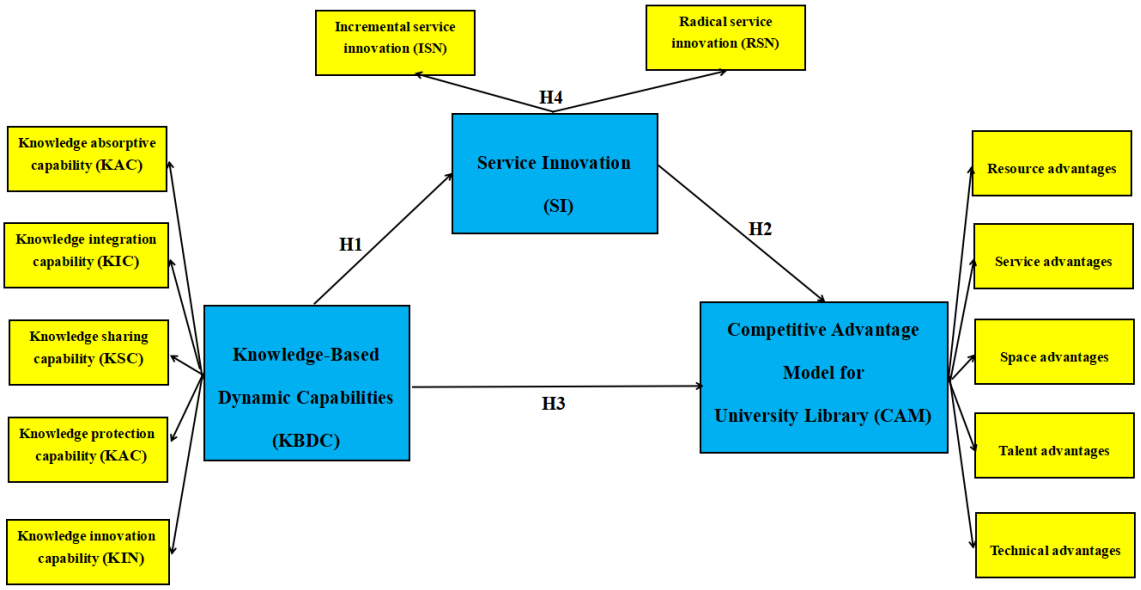


Figure 2 Research Framework

H1: Knowledge-based dynamic capabilities have a positive impact on service innovation.

H2: Service innovation positively impacts the competitive advantage model for university library.

H3: Knowledge-based dynamic capabilities positively impact the competitive advantage model for university library.

H4: Knowledge-based dynamic capabilities have a positive impact on the competitive advantage model for university library through service innovation

Research Methodology

This research will adopt a mixed research method to construct a model to enhance university libraries' competitive advantage. Firstly, the process used quantitative research through the collection of questionnaires and structural equation models. Then, a qualitative study was conducted, mainly conducting in-depth interviews with library managers or library department managers of China's "Double First-Class" universities and analyzing the interview content.

Questionnaire

According to China's official website of the Ministry of Education（http://www.moe.gov.cn/）, there were 42 "Double First-Class" universities in China in 2017. However, the construction of "Double First-Class" is a dynamic process. On February 14, 2022, China's second round of "Double First-Class" universities reached 147, including 42 universities in the first round. In other words, these 42 universities have been on the "Double First-Class" construction list for more than five years. Therefore, the research object is 42 of China's "Double First-Class" university libraries.

For the sample size for quantitative research, among the 42 libraries, the research plan is to obtain at least 10 questionnaires in each library. Through the 42 "Double First-Class" university library staff statistics, the total number of librarians in this study is 4829, so the sample size of this study should be more than 400.

Considering the actual situation of "Double First-Class" university libraries in China, this study mainly draws on the projects proposed by Vaneet Kaur (2019) to measure knowledge-based dynamic capabilities in selecting measurement scales for specific dimensions. It revises the scale to obtain this paper's knowledge-based dynamic capabilities scale.

Robinson used The Likert five-level scale to measure the knowledge-based dynamic capabilities of the organization (Robinson, 2024). The score was from 1 to 5 points. The higher the score, the stronger the agreement (Drempetic et al., 2020).

This online survey uses the Questionnaire Star professional survey website (https://www.wjx.cn/) to release the "Competitive Advantage Model of China's "Double First-Class" University Libraries Based on Knowledge Dynamic Capabilities." 439 questionnaires were distributed in this survey, and 420 valid questionnaires were recovered, with the questionnaire validity rate being 95.67%.

This study tested and analyzed the theoretical assumptions with the help of SPSS26.0 software and AMOS 23.0 for reliability, validity, and person correlation and confirmatory factor analysis. The first step is to test the reliability and validity of the questionnaire data. The

next step is to perform structural equation modeling when the reliability and validity tests are qualified.

In-depth Interview

Then, regarding selecting key informants for qualitative research, this study will choose 9 from 42 “Double First-Class” university libraries. These 9 interviewees should be the library director, deputy director, or department director.

Research Results

The Result of Quantitative Analysis

According to the result, most respondents who participated in the questionnaire survey were women, accounting for 85.71%. Regarding age distribution, the number of people aged 36-45 is the largest, with 186 people, accounting for 44.29%, followed by the number of people aged 46-55, with 138 people, accounting for 32.86%. In terms of management level, the number of lower managers is the largest, with 272 people, accounting for 64.76%, followed by middle managers, with 104 people, accounting for 24.76%, and the number of senior managers is the smallest, with 44 people, accounting for 10.48%. These could ensure the validity and reliability of the questionnaire.

This study uses Pearson correlation analysis of SPSS 26.0 to conduct correlation analysis on the dimensions of each variable. The correlation coefficient describes the relationship and direction of correlation between two variables. However, the correlation coefficient cannot accurately indicate the degree of correlation between two variables.

Table 1 Results of Pearson's Correlation Analysis for Each Dimension

	KAC	KIC	KSC	KPC	KIN	ISN	RSI	CAM
KAC	1							
KIC	0.335**	1						
KSC	0.370**	0.233**	1					
KPC	0.341**	0.444**	0.235**	1				
KIN	0.437**	0.478**	0.418**	0.324**	1			
ISN	0.262**	0.510**	0.185**	0.402**	0.376**	1		
RSI	0.337**	0.446**	0.385**	0.415**	0.383**	0.616**	1	
CAM	0.469**	0.519**	0.445**	0.448**	0.513**	0.517**	0.626**	1

* $p<0.05$ ** $p<0.01$

In the correlation analysis of variables in Table 1, the correlation analysis between knowledge absorptive capability (KAC), knowledge integration capability (KIC), knowledge sharing capability (KSC), knowledge protection capability (KPC), and knowledge innovation capability (KIN), incremental service innovation (ISN), radical service innovation (RSI), and the competitive advantage model for university library (CAM) is carried out. The results show that the correlation coefficients of all variables are distributed between 0.233-0.626. The result indicates that there is a positive correlation between variables.

Table 2 The Result of the Reliability and Validity Analysis

Dimension	Item	Standard Load Factor	AVE	Cronbach α	CR	KMO
KAC	KAC1	0.762	0.625	0.908	0.909	0.910
	KAC2	0.739				
	KAC3	0.828				
	KAC4	0.809				
	KAC5	0.763				
	KAC6	0.838				
KIC	KIC1	0.768	0.627	0.892	0.894	0.888
	KIC2	0.805				
	KIC3	0.775				
	KIC4	0.840				
	KIC5	0.770				
KSC	KSC1	0.819	0.630	0.894	0.895	0.874
	KSC2	0.730				
	KSC3	0.760				
	KSC4	0.818				
	KSC5	0.835				
KPC	KPC1	0.737	0.594	0.879	0.880	0.872
	KPC2	0.772				
	KPC3	0.779				
	KPC4	0.771				
	KPC5	0.794				
KIN	KIN1	0.810	0.625	0.892	0.893	0.884
	KIN2	0.818				
	KIN3	0.800				
	KIN4	0.735				
	KIN5	0.788				
ISN	ISN1	0.852	0.692	0.918	0.918	0.894
	ISN2	0.814				
	ISN3	0.839				
	ISN4	0.813				
	ISN5	0.840				
RSI	RSI1	0.872	0.710	0.924	0.924	0.896
	RSI2	0.855				
	RSI3	0.804				
	RSI4	0.852				
	RSI5	0.826				
CAM	CAM1	0.807	0.621	0.929	0.929	0.939
	CAM2	0.811				
	CAM3	0.764				
	CAM4	0.762				
	CAM5	0.752				
	CAM6	0.803				
	CAM7	0.810				
	CAM8	0.791				

In Table 2, we can know the results of the reliability and validity analysis. Knowledge absorptive capability (KAC), knowledge integration capability (KIC), knowledge sharing capability (KSC), knowledge protection capability (KPC), and knowledge innovation capability (KIN), the Cronbach Alpha values of the above five dimensions are 0.908, 0.892, 0.894, 0.879 and 0.892. The reliability values of each dimension are above 0.7. Therefore, it can be seen that the reliability of each dimension is reasonable.

According to the analysis results, Knowledge absorptive capability (KAC), knowledge integration capability (KIC), knowledge sharing capability (KSC), knowledge protection capability (KPC), and knowledge innovation capability (KIN), the average variance extracted (AVE) of the above the five dimensions are 0.625, 0.627, 0.630, 0.594 and 0.625, all greater than 0.5. Meanwhile, the combined reliability (CR) of the five dimensions above are 0.909, 0.894, 0.895, 0.880, and 0.893, all greater than 0.7. The KMO coefficients of different dimensions are all above 0.7.

Table 3 The Result of Model Fitness Analysis

Inspection Index	Test Result of Independent Variables	Test Result of Mediating Variable	Test Result of Dependent Variable
Model Fit Indices			
$\chi 2$/df	2.487	2.518	3.249
GFI	0.889	0.961	0.964
Value-Added Adaptation Statistics			
IFI	0.936	0.984	0.980
TLI	0.928	0.979	0.971
CFI	0.936	0.984	0.979
Parsimonious Fit Statistics			
PNFI	0.798	0.736	0.693
PGFI	0.732	0.594	0.536

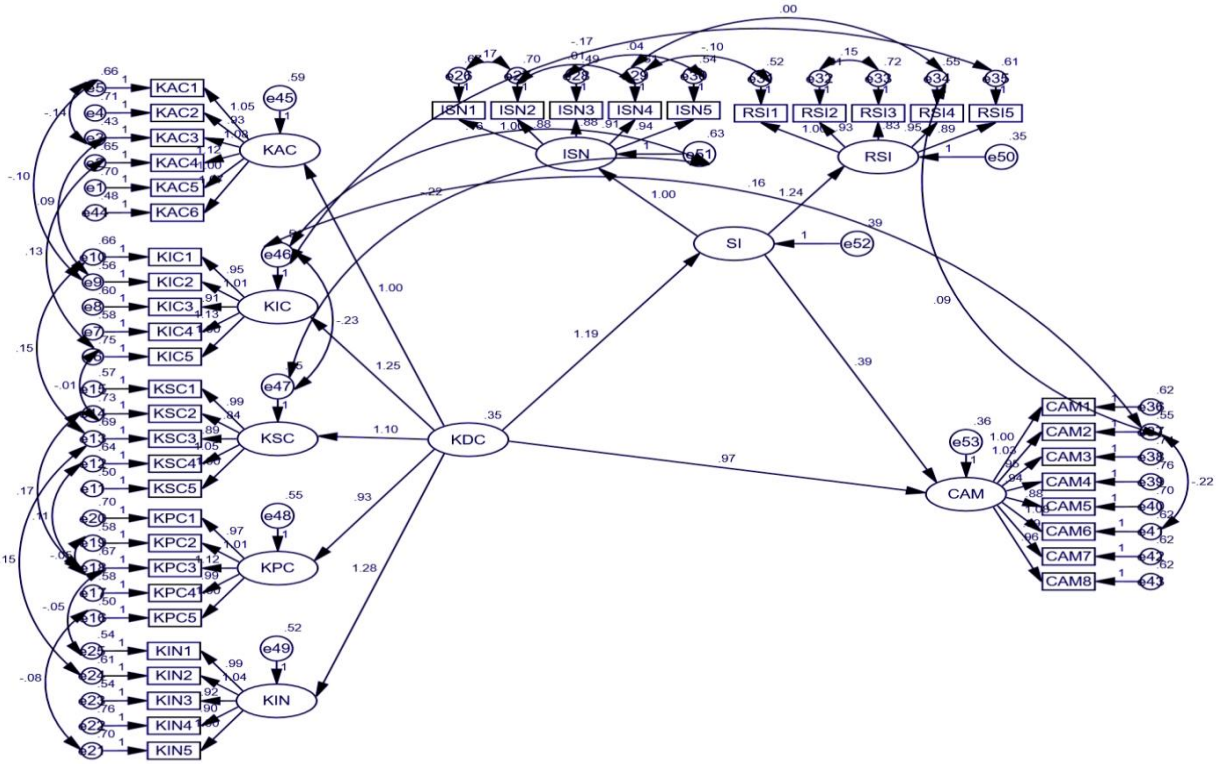
According to Table 3, after analyzing the fitting indicators of the independent variables, it can be seen that the **$\chi 2/df$** value of the independent variables' model in this study is 2.487, the value of the remaining adaptation indicators GFI (Goodness of Fit Index) is 0.889, the value of IFI (Incremental Fit Index) is 0.936, the value of TLI (Tucker-Lewis Index) is 0.928, the value of CFI (Comparative Fit Index) is 0.936, the value of PNFI (Partial National Product per Capita) is 0.798. The PGFI (Parsimony Goodness of Fit Index) is 0.732. Therefore, the model fit of independent variables is good.

Then, it can be seen that the **$\chi 2/df$** value of the mediating variable's model in this study is 2.518, the value of the remaining adaptation indicators GFI is 0.961, the value of IFI is 0.984, the value of TLI is 0.979, the value of CFI is 0.984, the value of PNFI is 0.736, and the PGFI is 0.594. Therefore, the model fit of the mediating variable is good.

It can be seen that the **$\chi 2/df$** value of the dependent variable's model in this study is 3.249, the value of the remaining adaptation indicators GFI is 0.964, the value of IFI is 0.980, the value of TLI is 0.971, the value of CFI is 0.979, the value of PNFI is 0.694, and the PGFI is 0.536. Therefore, the model fit of the mediating variable is good.

Table 4 Path Coefficient Analysis of Variables

			Non-standardized Estimate	S.E.	C.R.	Standardized Estimate
Service innovation	<--	Knowledge-based dynamic capabilities	1.237	.150	8.255	.771
Knowledge absorptive capability	<--	Knowledge-based dynamic capabilities	1.000			.614
Knowledge integration capability	<--	Knowledge-based dynamic capabilities	1.207	.137	8.778	.693
Knowledge sharing capability	<--	Knowledge-based dynamic capabilities	.983	.125	7.839	.548
Knowledge protection capability	<--	Knowledge-based dynamic capabilities	.937	.114	8.215	.609
Knowledge innovation capability	<--	Knowledge-based dynamic capabilities	1.262	.141	8.955	.714
Incremental service innovation	<--	Service innovation	1.000			.762
Radical service innovation	<--	Service innovation	1.195	.097	12.375	.883
Competitive Advantages Model for University Library	<--	Service innovation	.344	.095	3.613	.309
Competitive Advantages Model for University Library	<--	Knowledge-based dynamic capabilities	1.034	.178	5.793	.579



Chi-square=2111.978, DF=867, Chi-square/DF=2.436, GFI=0.828, IFI=0.909, AGFI=0.804, TLI=0.900, CFI=0.908

Figure 3 The Modified Structural Equation Model

H1: Knowledge-based dynamic capabilities have a positive impact on service innovation (Accepted Hypothesis)**.**

This hypothesis explains the relationship between knowledge-based dynamic capabilities and service innovation. As is shown in Table 4 and Figure 3, the Non-standardized Estimate value between knowledge-based dynamic capabilities and service innovation is 0.344 (S.E.=0.150, C.R.= 8.255), and the Standardized Estimate value is 0.771. Therefore, knowledge-based dynamic capabilities have a positive impact on service innovation.

H2: Service innovation has a positive impact on the competitive advantage model for university library (Accepted Hypothesis).

This hypothesis explains the relationship between service innovation and the competitive advantage model for university library. As is shown in Table 4 and Figure 3, the Non- non-standardized Estimate value between the service innovation and competitive advantage model for the university library is 0.344 (S.E.=0.095, C.R.=3.613), and the Standardized Estimate value is 0.309. Therefore, service innovation has a positive impact on the competitive advantage model for university library**.**

H3: Knowledge-based dynamic capabilities have a positive impact on the competitive advantage model for university library (Accepted Hypothesis).

This hypothesis explains the relationship between knowledge-based dynamic capabilities and the competitive advantage model for university library. As is shown in Table 4 and Figure 3, the Non-standardized Estimate value between knowledge-based dynamic capabilities and the competitive advantage model for the university library is 1.034

(S.E.=0.178, C.R.=5.793), and the Standardized Estimate value is 0.579. Therefore, knowledge-based dynamic capabilities have a positive impact on the competitive advantage model for university library**.**

H4: Knowledge-based dynamic capabilities have a positive impact on the competitive advantage model for university library through service innovation (Accepted Hypothesis).

This hypothesis explains the relationship between knowledge-based dynamic capabilities, service innovation, and the competitive advantage model for university library; as shown in Table 4 and Figure 3, knowledge-based dynamic capabilities positively affect service innovation, and service innovation affects the competitive advantage model for university library. Therefore, knowledge-based dynamic capabilities have a positive impact on the competitive advantage model for university library through service innovation.

The Result of Qualitative Analysis

This study mainly aimed to achieve three goals during the in-depth interview process. The first purpose is to verify the statistical analysis results of the university library competitive advantage model scale based on knowledge-based dynamic capabilities, form a mutual response between quantitative and qualitative evaluation conclusions, and further improve the reliability of the research conclusions; the second is to explain the particular phenomena presented by the quantitative evaluation results and the essential issues reflected, see the essence through the phenomenon, analyze the problems and find the causes, and provide a scientific basis for formulating effective responses and policies; the third is to supplement the content not mentioned in the quantitative evaluation results to form a more scientific and comprehensive research conclusion.

This study interviewed 9 department directors from different university libraries with rich experience in library development and management. Among the interviewees, 6 are women, and 3 are men, ranging in age from 35 to 55. This study uses word cloud analysis to analyze the interview content. See Figures 4.

Figure 4 The Word Cloud of Interview Content on The Competitive Advantage of University Library

Discussion

1. What are the factors of knowledge-based dynamic capabilities and service innovation that affects the competitive advantage of China's "Double First-Class" university libraries?

Based on the theoretical analysis of the actual background of university libraries and relevant literature, this paper explores the definition of the connotation and dimension of knowledge-based dynamic capabilities in university libraries. Although many scholars have studied the theory of knowledge-based dynamic capabilities, there are few studies on analyzing knowledge-based dynamic capabilities in university libraries or analyzing knowledge-based dynamic capabilities by taking university libraries as the research object.

This research first sorts out the research on knowledge-based dynamic capabilities, and then, based on previous research and combined with the research object to be studied in this paper, that is, taking China's "Double First-Class" university libraries as the research object, defines the connotation of knowledge-based dynamic capabilities in university libraries. The knowledge-based dynamic capabilities in university libraries include five demissions: knowledge absorptive capability, knowledge integration capability, knowledge sharing capability, knowledge protection capability, and knowledge innovation capability.

2. How can a competitive advantage model be developed for China's "Double First-Class" university libraries from knowledge-based dynamic capabilities through service innovation?

Based on the review and sorting of fundamental theories, this paper sorted out the research on knowledge-based dynamic capabilities, university library service innovation, and competitive advantages, constructed the conceptual model of this paper, and put forward four theoretical hypotheses. First, this study used questionnaire surveys and data analysis of quantitative research to prove a positive influence relationship between knowledge-based dynamic capabilities, service innovation, and the competitive advantage of university libraries. Secondly, this study used in-depth interviews of qualitative research to prove that university libraries have enhanced their competitive advantages after practicing dynamic knowledge-based capabilities and service innovation. Finally, this study combined the conclusions of quantitative research with the results of qualitative research and proposed a competitive advantage model for university libraries.

3. What is the model for enhancing the competitive advantage of China's "Double First-Class" university libraries from knowledge-based dynamic capabilities through service innovation?

Based on the research results, this study obtains a competitive advantage model of university libraries regarding knowledge-based dynamic capabilities through service innovation. This model mainly examines how academic libraries can enhance their competitive advantage based on knowledge-based dynamic capabilities. First, this study put the five dimensions of knowledge-based dynamic capabilities into practice in university libraries: knowledge absorptive capability, knowledge integration capability, knowledge sharing capability, knowledge protection capability, and knowledge innovation capability.

Second, university libraries can practice service innovation while practicing knowledge-based dynamic capabilities. University libraries should integrate incremental and radical service innovation when practicing service innovation. On the one hand, incremental service innovation is a resource performance improvement strategy to improve resource utilization effectively. On the other hand, the radical service innovation strategy takes resource

value innovation as its strategic goal, customizes personalized knowledge services for users through integrating resources and services, creates knowledge value, and enhances the value of the library.

Finally, university libraries can enhance their resource, service, space, talent, and technical advantages by practicing knowledge-based dynamic capabilities and service innovation, thereby improving their competitive advantages.

Conclusion

This study attempts to solve the competitive advantage model of university libraries based on knowledge-based dynamic capabilities, with service innovation as the mediating variable, to enhance university libraries' competitive advantage.

The questionnaire in the quantitative research of this study was designed based on references and the actual situation of university libraries, with a total of 44 questions and at least 5 items in each dimension. This study collected questionnaires from 42 "Double First-Class" university libraries in China, and a total of 439 questionnaires were completed, of which 420 were valid questionnaires, with a validity of 96.55%. This study used SPSS26.0 and AMOS 23.0 software for reliability, validity, person correlation analysis, and structural equation model. In the qualitative research, in-depth telephone interviews were conducted with 9 key informants. Then, the interview content was displayed using Word Cloud software. Finally, this study combined the conclusions of quantitative research with the results of qualitative research and got a competitive advantage model for university libraries.

The research objectives are:（1）To investigate the factors of knowledge-based dynamic capabilities through service innovation on university libraries' competitive advantage.（2）To reveal the effect of knowledge-based dynamic capabilities and service innovation factors on university libraries' competitive advantage.（3）To develop a competitive advantage model for university libraries from knowledge-based dynamic capabilities through service innovation.

Knowledge-based dynamic capabilities are knowledge-based development dynamic capabilities. Knowledge is the core element of knowledge-based dynamic capabilities, and the development and change of knowledge directly lead to the development and change of dynamic capabilities. Based on the knowledge-based dynamic capability theory, this study found that the knowledge existing inside and outside the university library is the main driving force for practicing and developing knowledge-based dynamic capabilities.

Limitation

Based on theoretical exposition, this study clarifies the impact path of knowledge-based dynamic capabilities on the competitive advantage model of university libraries by empirical research; there are still many limitations that need further improvement.

First, the study's sample size is small, which may lead to distortion of individual indicators. Second, there is a potential subjective assumption in this study's development: knowledge-based dynamic capabilities positively impact the competitive advantage model of university libraries ((Xuan-Nhi & Ngoc-Tien, 2023). Therefore, subsequent research should comprehensively consider the positive and negative effects. Third, multiple mediating factors affect the relationship between knowledge-based dynamic capabilities and university libraries' competitive advantage model. Future research must integrate various mediating factors and

further introduce multi-dimensional mediating variables such as organizational learning, technological updates, environmental dynamics, resource redundancy, and other mediator variables.

Future Research

In order to refine the research framework on knowledge-based dynamic capabilities, service innovation, and the competitive advantages of university libraries, it is imperative to expand the scope of survey samples in future studies to ensure a broader and more inclusive representation across various regions and levels of academic standing. This will not only validate the model's applicability in diverse contexts but also enhance its relevancy for both academic research and operational guidance. Continued refinement and expansion of the competitive advantage model are also recommended, based on emerging findings and the evolving needs of practical applications, to maintain its usefulness and validity. Empowering university libraries through policies that support the development and enhancement of knowledge-based dynamic capabilities is a critical step. This involves strategic investments in training, technology, and other initiatives that foster innovation and adaptability. Educational policies should further encourage service innovation within university libraries, offering incentives such as recognition programs, funding for innovative projects, and platforms for sharing best practices among institutions. Operationally, university libraries should regularly assess their dynamic capabilities and service innovation strategies to pinpoint areas for improvement. This includes conducting periodic audits, benchmarking against leading libraries, and engaging in strategic planning to prioritize innovation and enhancement efforts. The cultivation of a culture that values continuous learning, adaptability, and innovation is essential, which can be achieved through regular training, cross-departmental collaboration, and the recognition of staff contributions to innovative service delivery. By pursuing these recommendations, university libraries can position themselves to achieve and maintain a competitive advantage in the dynamic environment of higher education and library services.

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