Intelligent Service Affecting Smart Library Effectiveness in Colleges and Universities in Anyang under Henan Province

Huang XiaoLu
Sataporn Pruettikul
Sukhum Moonmuang
Bangkokthonburi University
E-mail: 393693403@qq.com
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ABSTRACT

The purpose of this study is to (1) understand the factors that affect the effectiveness of intelligent services in intelligent libraries of universities in Henan Province, and (2) explore the mediating role of intelligent perception services in the relationship between knowledge services and the efficiency of intelligent library services. The research method is quantitative research.

This study included 6 universities in Anyang City, Henan Province, and selected 300 students as samples through stratified random sampling method. A survey questionnaire was used for data collection, and a total of 247 valid questionnaires were collected. Among them, there are 44 from Henan Nursing Vocational College, 44 from Anyang Vocational and Technical College, 39 from Anyang Preschool Vocational College, 43 from Anyang Normal College, 40 from Anyang Institute of Technology, and 37 from Anyang College. Descriptive statistics and structural equation modeling (SEM) were used for data analysis using data analysis software.

The results indicate that the key factors affecting the effectiveness of intelligent services in university smart libraries include knowledge services, intelligent perception, and research service needs. The demand for knowledge services, intelligent perception, and scientific research services has a positive impact on the intelligent services of university smart libraries. Intelligent service perception plays a mediating role between the demand for scientific research services and their effectiveness.

Keywords: knowledge services, intelligent service perception, research service demand, intelligent services

1. Introduction

The smart age is an advanced stage of the development of the information age. The changes in the big data environment, the development of information technology, the changes in people's information needs, and the development of the global economy are the main factors driving the inevitable trend of the information age towards the smart age. The continuous development of information technology has become a powerful driving force in the era of intelligence. Smart cities represent the direction of future urban construction and development. Smart libraries are one of the important components of the public cultural system in smart cities, so the research on smart libraries has increasingly become the focus of modern library research.

At the beginning of the 21st century, developed countries in Europe and America first proposed the concept of smart libraries and conducted extensive and effective practices. Compared to foreign countries, China started relatively late, and the library service model has been discussed by a large number of experts and scholars in recent years. Among them, the library service models in Shanghai and Taipei started the earliest. In the era of rapid development of network and digital technology, libraries, as organic growth entities, have undergone repeated transformations. Throughout their long history, libraries have also kept up with the times. The service functions of libraries are constantly developing, playing an irreplaceable role in collecting, classifying, storing, and utilizing human wisdom, culture, and knowledge achievements, making them the most valuable knowledge and information organization.

As a part of social public services, university libraries need to keep up with the pace of the times and continuously explore smart models, upgrade their services intelligently, continuously optimize and innovate, in order to better meet the needs of social development and readers. At present, the construction of smart libraries in the province is in a stage of transitioning from theoretical research to a combination of theory and practice, thus there is an urgent need to carry out research on the intelligent services of university libraries in the province. Intelligent services are the latest form of library services to date, and their implementation requires the cooperation of the library environment, which is the construction of smart libraries.

Smart library is a new type of library supported by a series of modern communication and high-tech intelligent technologies such as big data, cloud computing, and the Internet of Things. Its service purpose is to provide users with intelligent services based on human text, consider and solve practical problems from the perspective of users, and meet their various

personalized needs. Due to the difference between the knowledge services of smart libraries and traditional library literature and information services, as an important component of smart library research, it has increasingly attracted widespread attention. The inheritance and service of knowledge is the eternal theme of libraries. Under different historical backgrounds, researchers have conducted innovative research on knowledge services from different perspectives, resulting in different academic contributions. This study is based on the actual work of library services and conducts theoretical and empirical research on library intelligent services.

Through analyzing the literature content, it was found that the current theory of library intelligent services has not formed a corresponding system, and most of the literature focuses on the application of new technologies in intelligent services. The theory of intelligent services in domestic libraries is relatively comprehensive, focusing on the construction, development strategies, and technical practices of intelligent services. However, the research on the problems encountered in the construction of humanistic, intelligent, and ubiquitous library intelligent services and the actual implementation of services is not in-depth enough. In order to continuously adapt to the rapid development of external information and network environment, as well as the growing demand of readers, the research on library intelligent services needs to absorb interdisciplinary research results. Analyze the satisfaction of intelligent services in university libraries and propose relevant countermeasures and suggestions. University libraries take serving university teachers and students as the norm and shoulder the important function of the "heart" of universities. In order to better provide services, they are required to comprehensively utilize current information technologies such as cloud computing, the Internet, and big data in combination with actual situations, and complete the transformation of intelligent and digital organic integration through these technologies, in order to promote the construction of smart libraries and the effectiveness of intelligent services, It is necessary to conduct in-depth research on the needs, habits, and preferences of readers in order to provide them with intelligent services that are more in line with their actual needs.

2. Research Question

1. What are the factors that affecting the effectiveness of intelligent services in smart libraries of universities in Anyang City?

2. Do Smart perception services have a mediating effect on the relationship between knowledge service and Smart Library Smart Service Effectiveness.

3. Research Objectives

1. To find factors Influencing the Effectiveness of intelligent Services in Smart Libraries of Universities in Henan Province

2. To find the mediating effect of Smart perception services on the relationship between knowledge service and Smart Library intelligent service Effectiveness.

4. Research Hypothesis

H1 Knowledge services have a direct positive impact on the effectiveness of intelligent services in smart libraries.

H2 The perception of intelligent services has a direct positive impact on the effectiveness of intelligent services in smart libraries.

H3 The demand for scientific research services has a direct positive impact on the effectiveness of intelligent services in smart libraries.

H4 Knowledge services have a direct positive impact on the perception of intelligent services.

H5 The demand for scientific research services has a direct positive impact on the perception of intelligent services.

H6 The intermediary of intelligent perception services affects the effectiveness of knowledge services and intelligent services.

H7 Mediation of demand for scientific research services affects the perception and effectiveness of intelligent services

5. Conceptual Framework

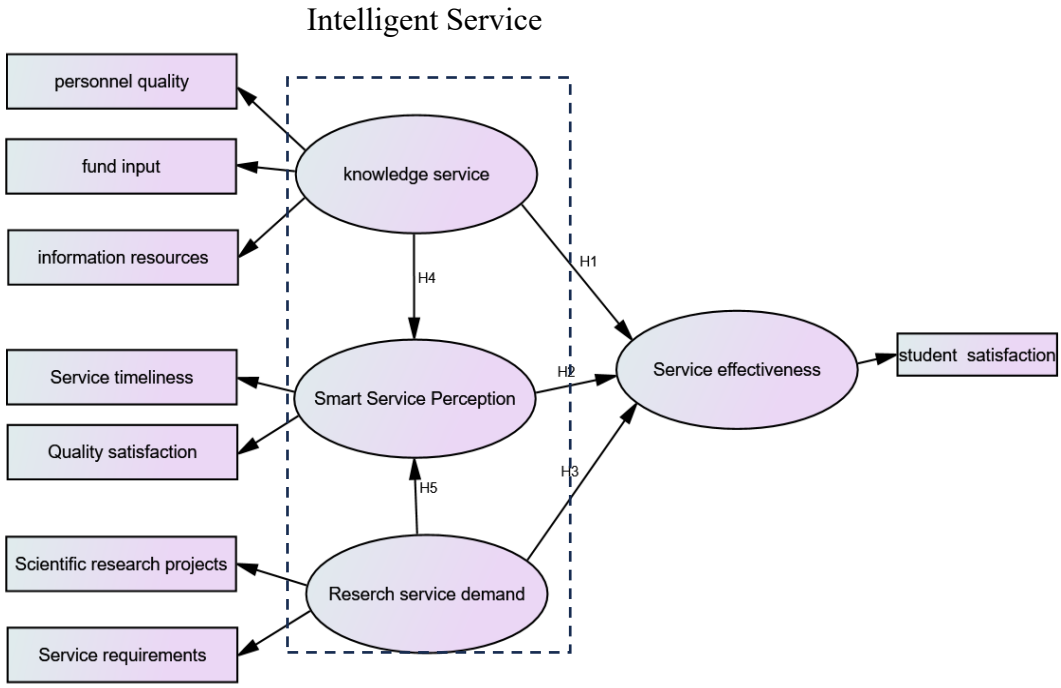

Figure 1-1 Conceptual Framework

6. Methodology

Research methodology refers to the systematic process and techniques employed to conduct research, gather information, analyze data, and draw conclusions. It provides a structured framework for researchers to plan, execute, and validate their studies, ensuring that the research objectives are met effectively. The methodology chosen depends on the nature of the research question, the type of data needed, and the overall goals of the study. This research adopted quantitative research. There are three processes involved in research: research design, data analysis, and results. Details were as follows:

Research Design

To achieve the aims of this study, the research design was structured into three distinct stages, as outlined below:

Phase 1: Determine the factors that affect the effectiveness of intelligent services in the intelligent library of universities in Anyang City, Henan Province.

In the initial stage, researchers conducted in-depth research on a literature review focused on decision theory, emphasizing the factors that influence the effectiveness of intelligent services on the intelligent library of universities in Anyang City, Henan Province.

These determining factors include knowledge services, intelligent perception, and demand for scientific research services, which come from students' perspectives, school funding, and management.

Phase 2: Establish factors that affect the effectiveness of intelligent services in intelligent libraries of universities in Anyang City, Henan Province. Using intelligent perception as a mediator variable, analyze the impact of intelligent services on the efficiency of intelligent libraries in universities in Anyang City, Henan Province.

Based on the research results of the first step, researchers have identified the key factors that affect the effectiveness of intelligent services in the intelligent library of universities in Anyang City, Henan Province. The information extracted from the initial stage results helps identify these influencing factors and guides the writing of questionnaires designed for data collection purposes.

Phase 3: Establish a logistic regression equation for predicting the effectiveness of intelligent services in academic libraries in Anyang City, Henan Province.

In the final stage, researchers created a predictive model using logistic regression equations to understand the decision-making behavior of intelligent services on the effectiveness of intelligent libraries in universities in Anyang City, Henan Province.

This research design is characterized by these three different steps, aiming to comprehensively investigate the factors that affect the effectiveness of intelligent services on the intelligent library of universities in Anyang City, Henan Province.

Population and sample

The subjects of this study are students from 6 universities in Anyang, Henan Province. They are Henan Nursing Vocational College; Anyang Vocational and Technical College; Anyang Preschool College; Anyang Normal University; Anyang Institute of Technology; Anyang College has a total of 119830 students.

The sample selection method adopts stratified random sampling method. Researchers will divide students into two groups based on different schools, and then sample proportionally based on the total number of data in each group. The sample is 229 people, and the test power is 0.80 calculated using the G * power program.

The creation of research instruments

The researchers utilized a questionnaire comprising two parts; Part I: Basic Information of Students. Part II: Factors Affecting Questionnaire Survey. The quality of the questionnaire was evaluated by content validity and reliability. For content validity, it was checked by 5

experts and analyzed using item-objective consistency (IOC). The value of the item value is ≥ 0.50. For reliability, it was analyzed by Cronbach's alpha at 0.80.

Data Collection

The researcher sent Likert(5-point) rating scale questionnaires to the respondents. Questionnaires were sent online.

Data analysis

In order to analyze the sample characteristics, descriptive analysis of demographic characteristics was conducted on the collected effective questionnaires, mainly from the current school; Gender; Have you ever used a smart library; Would you like to choose a smart library or a traditional library; Level; Analyze it in terms of age.

To describe the characteristics of observed variables, descriptive statistical data such as mean and standard deviation were analyzed, and skewness, kurtosis, and Maria coefficients were used to test the normality hypothesis.

To ensure that the measurement of data is suitable for confirmatory factor analysis (CFA) and structural equation modeling (SEM) analysis, cross correlation matrices and tolerance and variance inflation factors (VIF) are used to test multicollinearity. And analyzed the reliability, effectiveness, and other measurement quality of the measurement.

The statistical tests for each hypothesis are 5 direct effects hypotheses and 2 intermediate effects hypotheses.

7. Results

Quantitative data analysis

Table 1 Demographic Information

Level	Frequency	Percentaged	Effective percentage	cumulative percentage
School				
Henan Nursing Vocational College	44	17.8	17.8	17.8
Anyang Vocational and Technical College	44	17.8	17.8	35.6
Anyang Preschool College	39	15.8	15.8	51.4
Anyang Normal University	43	17.4	17.4	68.8
Anyang Institute of	40	16.2	16.2	85.0

Level	Frequency	Percentaged	Effective percentage	cumulative percentage
Technology				
Anyang College	37	15.0	15.0	100.0
Gender				
Male	129	52.2	52.2	52.2
Female	118	47.8	47.8	100
used a smart library				
Yes	247	100	100	100.0
NO	0	0	0	0
Library				
Smart Library	149	60.3	60.3	60.3
Traditional Library	98	39.7	39.7	100.0
Grade				
Freshman	54	21.9	21.9	21.9
sophomore	92	37.2	37.2	59.1
junior	72	29.1	29.1	88.3
senior	29	11.7	11.7	100.0
Age range				
Below 17	48	19.4	19.4	19.4
17	45	18.2	18.2	37.7
18	51	20.6	20.6	58.3
19	65	26.3	26.3	84.6
More than 19	38	15.4	15.4	100.0
Total	247	100	100	

From Table 1, it can be seen that among the 247 valid samples, there are 129 male respondents, accounting for 52.2%, and 118 female respondents, accounting for 47.8%. etc.

Table 2 Results of descriptive statistical analysis

Table Descriptives

			Skewness		Kurtosis		
	$\overline{x}$	SD	Skewness	SE	Kurtosis	SE	P.
SR	3.51	1.167	-0.834	0.155	-0.45638	0.309	.000
SP	3.62	1.040	-0.823	0.155	-0.27198	0.309	.000
QS	3.75	0.985	-0.853	0.155	-0.00690	0.309	.000
ST	3.71	0.970	-0.753	0.155	-0.05135	0.309	.000
IR	3.86	0.946	-1.235	0.155	1.24180	0.309	.000
FI	3.84	0.978	-1.168	0.155	0.79328	0.309	.000
PQ	3.77	1.064	-1.122	0.155	0.56655	0.309	.000
SS	3.67	0.932	-0.781	0.155	0.25625	0.309	.000
Mardia’s coefficient			34.8		150.5		.000

From Table 2, All of validates distribute normally while met the requirement of CFA assumption.

Table 3 Intercorrelation matrix

Correlation Matrix

	SS	PQ	FI	IR	ST	QS	SP	SR
SS	1.000***	1.000						
PQ	0.555***	0.619***						
FI	0.663***	0.596***	1.000					
IR	0.646***	0.460***	0.600***	1.000***				
ST	0.734***	0.452***	0.497***	0.556***	1.000***			
QS	0.762***	0.323*	0.491*	0.468*	0.772*	1.000*		

	SS	PQ	FI	IR	ST	QS	SP	SR
		**	**	**	**	**		
SP	0.721***	0.323**	0.407**	0.402**	0.650**	0.707**	1.000	
SR	0.699***	0.329**	0.376**	0.367**	0.552**	0.586**	0.775**	1.000

Note: ***represent P≤.001

According to the data analysis, all pairs of correlations show a positive link with a moderate scale and can be utilized as indicators in a model of CFA.

Measurement model

In the measurement model specification of this study, researchers identified four factors: 1. Service Efficiency (SS), 2. Knowledge Services (KS), 3. Intelligent Service Perception (SSP), and 4. Research Service Demand (RSD). And 8 observation variables: 1. Service effectiveness (SS); 2. Personnel Quality (PQ), 3. Capital Investment (FI), 4. Information Resources (IR), 5. Service Timeliness (ST), 6. Quality Satisfaction (QS), 7. Scientific Research Projects (SP), 8. Service Needs (SR).

Structural Equation Model

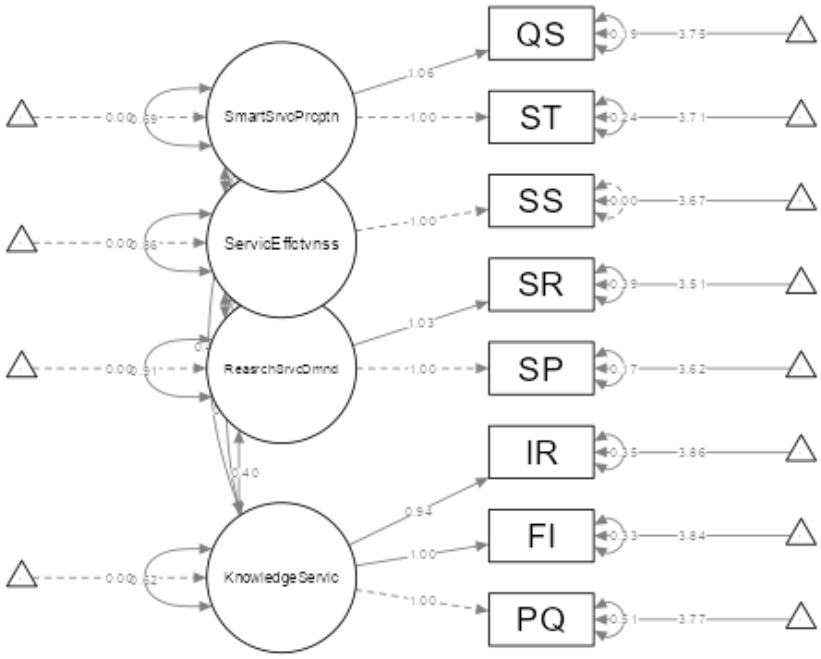

Figure 1Unstandardized CFA model

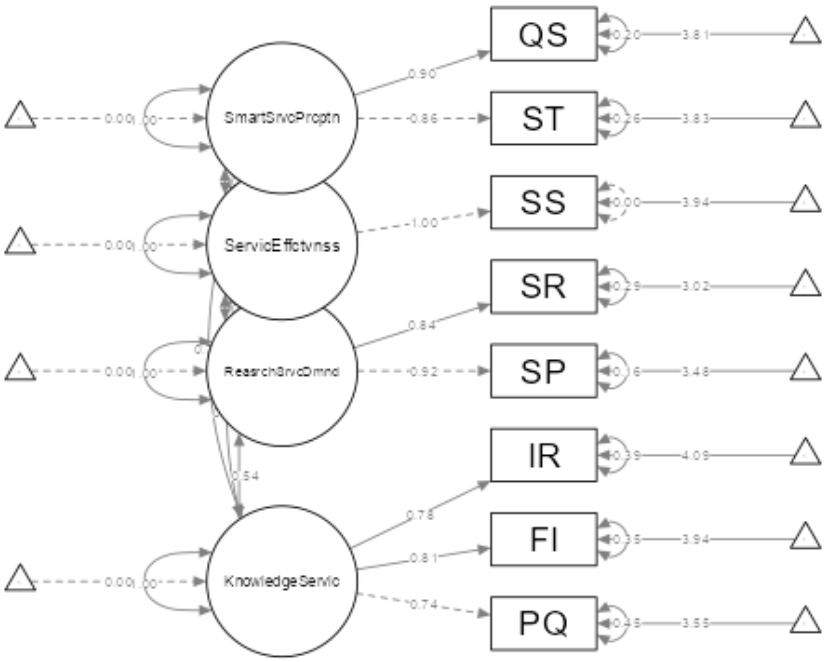

Figure 2 Standardized CFA Model

Table 4.1 Measurement model tests

Table 4.1.1 Model tests

Label	X^2	df	p
User Model	36.7	15	0.001
Baseline Model	1428.4	28	< .001
X^2/DF 2.45			

Table 4.1.2 Fit indices

		95% Confidence Intervals		
SRMR	RMSEA	Lower	Upper	RMSEA p
0.021	0.076	0.045	0.108	0.077

Table 4.1.3

User model versus baseline model

	Model
Comparative Fit Index (CFI)	0.985
Tucker-Lewis Index (TLI)	0.971
Bentler-Bonett Non-normed Fit Index (NNFI)	0.971
Relative Noncentrality Index (RNI)	0.985
Bentler-Bonett Normed Fit Index (NFI)	0.974
Bollen's Relative Fit Index (RFI)	0.952
Bollen's Incremental Fit Index (IFI)	0.985
Parsimony Normed Fit Index (PNFI)	0.522

Firstly, the model fitting indicators of the confirmatory factors were obtained, and the results showed that in the model validation, $\mathbf{X}^2$ = 36.7, df=15, therefore, X is obtained $\mathbf{X}^2$ /Df=2.447, meeting the academic standard of below 3. SRMR=0.021 < 0.05; RMSEA=0.076 < 0.08; Comparative Fit Index (CFI)=0.985; Tucker Lewis Index (TLI)=0.971; Bentler Bonett Non normalized Fit Index (NNFI)=0.971; Relative Noncentrality Index (RNI)=0.985; Bentler Bonett Normalized Fit Index (NFI)=0.974; Bollen's Relative Fit Index (RFI)=0.952; Bollen's Incremental Fit Index (IFI)=0.985 is greater than 0.9, and the Parsimony Normed Fit Index (PNFI)=0.522 is greater than the minimum standard of 0.5. Overall, the fitting index values of the questionnaire model meet the requirements of the academic community. indicating that the structural model of this study was reasonable and can analyzed.

The researcher tested the fit of the structural model and found that the fit of the model was as follows: (X^2 = 36.7, TLI=0.971, GFI=0.971, CFI=0.985, RMSEA=0.058). indicating that the structural model of this study was reasonable and can analyzed.

Hypothesis testing

Based on the theoretical model constructed in this article, the Service effectiveness is improved; Personal quality; Fund input; Information resources; Service timeline; Quality satisfaction; Scientific Research Projects; Service recommendations are included in the same structural model to empirically test the research hypotheses of this article.

Firstly, the structural equation model verification results under standardized and unstandardized states are shown in Figure 3 and Figure 4, respectively.

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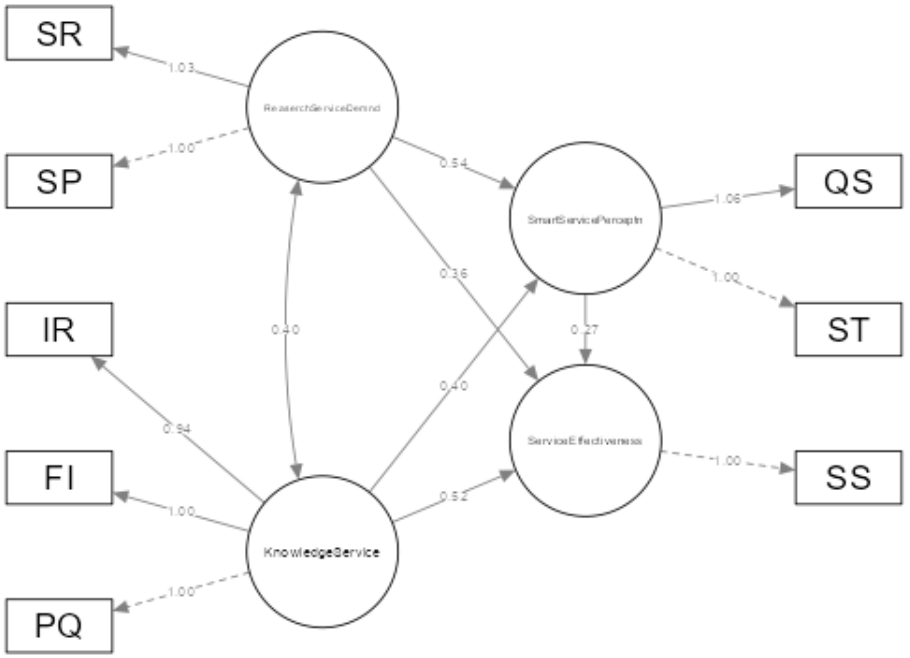

Figure 3 Structural Equation Models in Unstandardizatio

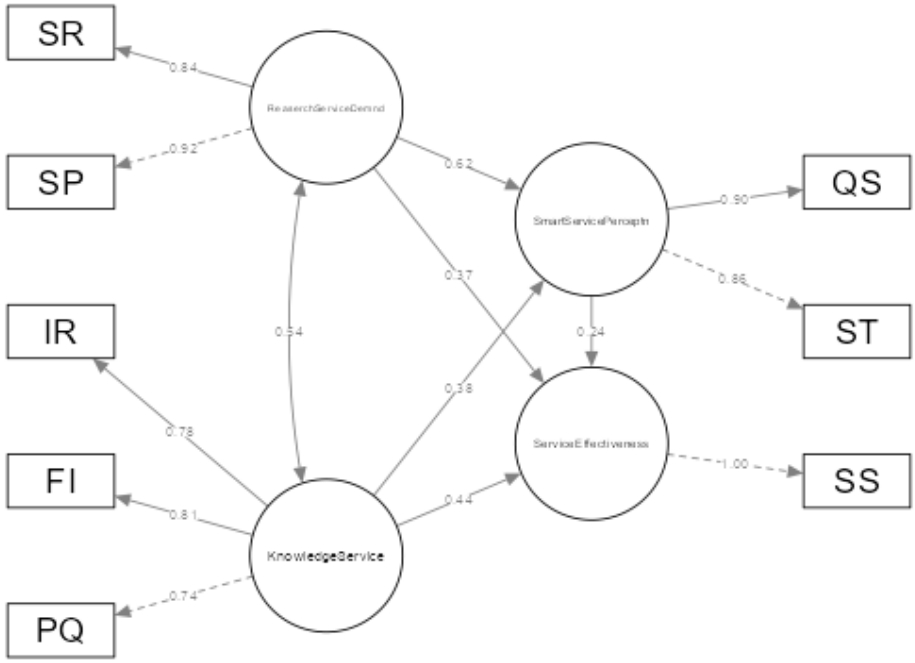

Figure 4 Structural Equation Models in Standardization

Table 5 Direct Impact

Dependent v.		Predicttors	Estimate	SE	β	z	p
H:1 Service Effectiveness	⇦	Knowledge Service	0.52	0.07	0.44	7.14	< .001
H:2 Service Effectiveness	⇦	Smart Service Perception	0.27	0.10	0.24	2.62	0.009
H:3 Service Effectiveness	⇦	Research Service Demand	0.36	0.07	0.37	5.00	< .001
H:4 Smart Service Perception	⇦	Knowledge Service	0.40	0.07	0.38	5.81	< .001
H:5 Smart Service Perception	⇦	Research Service Demand	0.54	0.06	0.62	9.57	< .001

Table 5 provides information on the relationship between predictive variables (knowledge, needs, and services) and dependent variables (effectiveness or services). Estimations, standard errors, confidence intervals, z-values, and p-values are crucial for evaluating the importance and direction of these relationships in statistical analysis.

Table 6 Hypothesis testing for indirect effects

Label	Description	Parameter	Estimate	SE	β	z	p
H:6	Knowledge Service ⇒ Smart Service Perception ⇒ Service Effectiveness	p12*p9	0.11	0.04	0.09	2.52	0.012
H:7	Research Service Demand ⇒ Smart Service Perception	p13*p9	0.15	0.06	0.15	2.57	0.010

Label	Description	Parameter	Estimate	SE	β	z	p
	⇒ Service Effectiveness						

Through the direct effect test results, it can be seen that knowledge services have a significant positive impact on the perception of intelligent services, and the demand for scientific research services has a significant positive impact on the perception of intelligent services; Both knowledge services and intelligent service perception have a significant positive impact on service effectiveness. Therefore, it is a prerequisite to explore whether intelligent service perception mediates between knowledge services and service effectiveness, as well as research service demand and service effectiveness. To further explore the mediating effect of intelligent service perception.

The research results indicate that in the mediating effect path test of Knowledge {Service} Effectiveness, the standardized influence coefficient of indirect effects is 0.090, Z=2.518, P=0.012<0.05, and the 95% confidence interval is [0.024; 0.190]. Therefore, 0 is not included in the 95% confidence interval of this path test. Therefore, Service has a significant mediating effect between Knowledge and Effectiveness. Therefore, there is a research hypothesis that there is a mediating effect between knowledge services and service effectiveness based on the perception of intelligent services.

In the process of mediating the effect path test, the standardized influence coefficient of indirect effects is 0.148, Z=2.570, P=0.0010<0.05, and the 95% confidence interval is [0.034; 0.255]. Therefore, 0 is not included in the 95% confidence interval of this path test. Therefore, Service has a significant mediating effect between Demand and effect. Therefore, there is a research hypothesis that the perception of intelligent services plays a mediating role between the demand for scientific research services and their effectiveness.

8. Conclusion

The research results show that as follows:

(1) The factors that affect the effectiveness of intelligent services in intelligent libraries of universities in Anyang City, Henan Province include knowledge services, intelligent perception services, and research demand services.

(2) After modifying the measurement model, it is very suitable for empirical data.

(3) Knowledge services, intelligent perception services, and research demand services have a positive impact on the efficiency of intelligent services in university libraries. Knowledge

services and intelligent perception services have a mediating effect. After data analysis and testing, the relationship model and empirical data are good.

9. Discussion

Research Objective 1: Based on literature review and questionnaire survey results. According to the data analysis results in Table 6, the significance results (P-values) of the direct hypothesis of HI-H6 in this study are all less than 0.05, indicating that all five direct hypotheses in this study are valid. The normalized path coefficients of HI-H5 are set to 0.437, 0.367, 0.240, 0.618, and 0.376, respectively. The P-values are all 3 * (P<0.01), indicating that knowledge services, perception of intelligent services, and demand for scientific research services have a positive impact on the effectiveness of intelligent services.

Research Objective 2:

Based on literature review and questionnaire survey results. According to the data analysis results in Table 6, during the mediation path test of Knowledge Service Effectiveness, the standardized influence coefficient of indirect effects is 0.090, Z=2.518, P=0.012<0.05, 95% confidence interval is [0.024; 0.190], and 0 is not included in the 95% confidence interval. Therefore, there is a mediation effect between knowledge service and service effectiveness in intelligent service perception.

In the process of testing the mediating effect path of Demand Service Effectiveness, the standardized impact coefficient of indirect effects is 0.148, Z=2.570, P=0.0010<0.05, and the 95% confidence interval is [0.034; 0.255]. Therefore, 0 is not included in the 95% confidence interval of this path test. Therefore, there is a mediating effect of intelligent service perception between scientific research service demand and service effectiveness.

10. Recommendation

Recommendation for policy formulation

1. Develop a smart library management mechanism. In terms of top-level design, smart libraries need to pay attention to the planning of incentive methods, guide the transformation of service concepts in management systems, strengthen the professional literacy of librarians in team building, and provide services and facilities that are suitable for users' continuous use as much as possible, with a user centered approach. On the other hand, on the basis of fully considering user needs, corresponding management and incentive mechanisms can be established, and librarians can appropriately guide users' continuous use activities. This will

provide adaptive and friendly performance, enhance user experience, stimulate users' interest and willingness to use, and actively guide the utilization and interaction of new users.

2. Strengthen incentive policies for smart library management. Smart libraries are an emerging thing, and many knowledge service related work has a pioneering nature. Therefore, it is particularly necessary for smart libraries to strengthen management incentives, establish clear behavioral norms and reward measures, design appropriate working environments and external reward forms for librarians, and actively guide, stimulate, maintain, and normalize the behavior of library librarians through timely and effective information communication, Thus achieving the goal of intelligent library knowledge services to meet the diverse needs of users. The higher the incentive level of a smart library, the higher the effort and work efficiency of librarians to achieve their goals, and the stronger their job satisfaction; On the contrary, if the motivation level is consistently low, librarians will lack motivation to actively achieve organizational goals, and work efficiency will also be greatly reduced. It should be noted that in the management incentive process of smart libraries, it is not only necessary to rely on stimulus variables (money), but also to consider the existence of intermediate variables, namely the subjective factors of individual librarians.

Recommendation for practical application

1. Develop new intelligent service professionals with core competitiveness. Smart libraries represent a leap forward in the new era of library service functions and models based on the rapid development of big data, Internet of Things technology, and artificial intelligence, directly targeting users to participate in their knowledge activities. Therefore, knowledge service personnel who solve practical problems for users are given multiple identities. They are not only educators of user information cognition, navigators of information utilization, collectors of information resources, creators of knowledge information, but also participants in knowledge services. This requires strengthening the construction of knowledge service talents in smart libraries. Only by clarifying the functional positioning and long-term development of smart libraries from a macro strategic perspective, restructuring internal business links from a micro strategic perspective, emphasizing the cultivation of librarians' new professional and service abilities, and continuously strengthening their adaptability and innovation abilities, can libraries better promote the transformation and development towards smart libraries. Personnel reengineering refers to the development of librarians' professional service capabilities, which have comparative advantages over users. New intelligent services require improving librarians' comprehensive information literacy and the ability to reasonably utilize new professional tools, highlighting the development and utilization of librarians' unique

knowledge and skill advantages, forming a professional team that serves users, and ultimately forming a core competitive professional advantage for future libraries.

2. Increase investment in the construction of smart libraries. The school library serves the entire school's teachers and students. Increasing investment in funds can significantly improve the overall service level of the library, and can effectively stimulate enthusiasm for investment in the library, produce a positive impact, and ultimately form the "Matthew effect", that is, the more investment, the better the library operates, and thus stimulate greater investment. With a certain investment in library construction funds, maximizing the rationalization of the resource allocation structure of physical personnel, finance, and materials in the library lays a solid hardware infrastructure foundation for improving the output efficiency of library investment, thereby maximizing the inheritance of social culture and the growth of knowledge, and creating conditions for the subsequent service work and service efficiency realization of smart libraries.

3. University libraries can consider establishing a library information technology training program to ensure that staff are proficient in intelligent service technology, and also need to work closely with the school's information technology department.

Recommendation for further research

1. Provide practical suggestions to university library administrators and policy makers to help them more effectively promote the transformation of libraries into intelligent libraries. University libraries can consider establishing training programs to ensure that their staff are proficient in intelligent service technologies, while also working closely with the school's information technology department.

2. Build an adaptive service scenario that accurately tracks users' personalized dynamic needs. Real time capture of user needs through data interconnection through IoT devices, improving the timely performance of service feedback, promoting timely response to user information demands, and promoting timely, moderate, and quality optimization of services, effectively providing users with knowledge services that meet their personalized development needs; Enable users to achieve collaborative innovation of knowledge discovery and sharing based on the free use and sharing of information, thereby enhancing the coordination and co creation of knowledge services in smart libraries; In order to enhance the applicability of knowledge services in smart libraries, efforts need to be made to optimize the service's usage and expansion capabilities. By comprehensively tracking user behavior to understand user preferences and behavioral habits, the gap between user expectations and user perceptions can be shortened to improve the effectiveness of services. Comprehensive understanding and

accurate prediction of user needs can be implemented, and information can be pushed based on the predicted results, ultimately achieving intelligent services. Future research can explore how to integrate virtual reality technology to enhance the effectiveness of intelligent services and conduct more detailed analysis of user satisfaction.

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