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Original article

Investigating the Effects of the Basic Components of Knowledge Management on Improving Information Services in Medical Sciences Libraries

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Abstract

Introduction: Knowledge is considered the most critical resource in the global economic environment, and knowledge management is considered a service lever in libraries. The current study aims to investigate the effects of knowledge management components, including information technology, culture, and organizational strategies, in improving information services in medical sciences libraries in Iran.

Methods: This survey is conducted with a statistical population of 630 in the year 2021. The statistical population was selected from the managers of the central and affiliated libraries of the universities of medical sciences in Iran. The sample size was determined to be 373 people using Cochran's sample size formula. Besides, sampling was done using simple random. The research tool was a consolidated questionnaire that included two standard questionnaires: the Asian Productivity Organization and the LibQual questionnaire. Data analysis was done through descriptive and inferential statistics using Amos software.

Results: The results revealed that knowledge management technology had the strongest correlation with the quality of information services, with a beta coefficient of 0.26. The organizational culture variable, with a beta value of 0.23, was in second place, and the strategy variable was in third place, with a beta value of 0.22.

Conclusion: Among knowledge management components, information technology, organizational culture, and organizational strategies impact the promotion and optimization of library information services, respectively. Therefore, to provide the best information services, library managers should pay special attention to promoting information technology in libraries. Then, to improve the organizational culture, they should enhance the processes and structural strategies.

Introduction

The current world pays special attention to information as a global information village. By adopting the approach of giving meaning and value to information and knowledge as an efficient tool, it tries to take significant steps to maintain stability, and technical and scientific competition, confront environmental uncertainty and keep pace with new developments. Managers rely on the information extracted from the knowledge management system under the title of intangible assets of the organization to formulate policies and strategies, strategic planning, and management of technical and service activities to

achieve short-and long-term organizational goals and, ultimately, the best services and information services. (1)

The application and capability of knowledge management originate from two critical factors: knowledge infrastructures and knowledge management processes. The basic knowledge infrastructures include technology, structure, strategy, and culture. Knowledge management processes are the organizational capabilities of knowledge acquisition, transformation, application, and protection. (2) Organizations emphasize these two factors to improve the effectiveness and efficiency of performance. Based on this definition, an organization that rewards group work, knowledge sharing, discovery, and innovation and helps create an atmosphere of trust has a knowledge management facilitating culture. (3)

Nowadays, providing and improving the quality of health information services to users has become one of the most important and challenging goals of health information systems worldwide. Libraries and medical information centers, as the guardians of health information systems, have tried to pay attention to the information needs of their users, take practical steps to increase the quality of providing information, and use new approaches. To achieve their primary goal, which is to provide services to the members of society, they should be more user-oriented. With increasing demand, they should provide services designed based on their particular users' needs. (4) Shiroshire et al. pointed out that university libraries should use knowledge management to improve their conditions. (5) Since human resources and library staff are considered essential elements for libraries, and considering that the employees will leave the organization at the appointed time through the completion of the plan and contract or retirement, knowledge management can play an essential role in creating and maintaining a culture of learning and maintaining knowledge and information of employees and organization if implemented in university libraries. In addition, knowledge management plays a vital role in creating intra-organizational communication. Employees learn from each other how to meet the needs of their patrons, libraries use knowledge, and service delivery and meeting users' information needs will improve. Eventually, the organization will be closer to its goals in service delivery. (6) Correspondingly, awareness of the application of knowledge management and its results in providing all services, specifically information services, can be influential in the policymaking and decision-making of library managers and other high-level managers of medical sciences universities. (7) This will be achieved if the libraries provide the best information services in quantity and quality to meet their patrons' needs.

There are some precedents regarding knowledge management in libraries. For example, Egwu investigated organizational factors as predictors of knowledge management practices in federal university libraries in Nigeria. This study showed that management support and cooperation is the most crucial predictor of knowledge management practices in federal university libraries in Nigeria. The success of knowledge management in Nigerian university libraries depends on cultural background factors such as the support of employees, management, and the level of cooperation between employees. (8) Longzao states that knowledge management applications are mainly limited to library services. Academic libraries should try to meet the knowledge demands of different users by restructuring their organizational strategy and structure and redefining the positions of their employees based on the "flow of knowledge." (9) Besides, Morov Yan has pointed out that in a knowledge-oriented society, users' information needs are so complex that traditional library services often cannot fully meet users' needs. In his model, librarians are transferred from libraries to users' domains, and he focuses more on librarians than libraries. Librarians connect information to users through skills, experiences, initiatives, and research concerning users' needs, and its main foundation is the librarians' participation and knowledge-sharing culture. (10) Rafi et al. showed that integrating the organizing staff training programs, innovative research projects support, and library technology infrastructures into the knowledge management model improves the university's teaching and research performance. (11)

David-West stated that technology-based knowledge management is optional for organizations. However, it is mandatory for university libraries that intend to digitize the information field. (12) Nikomo et al. concluded that the Johannesburg city library needs an effective strategy for managing the tacit knowledge of librarians and users. They suggested creating a record group of tacit knowledge and sharing and providing information services in the library. (13) Enakrire and Onyancha, in the field of knowledge management practices in selected university libraries in Nigeria and South Africa, concluded that to advance the provision of better-quality services, continuous sharing of knowledge is necessary to meet the information needs of users. (14)

Akbari, in her study to identify the foundations of organizational culture effective on the establishment

of knowledge management in the Organization of Documents and the National Library of the Islamic Republic of Iran, showed that organizational culture is a factor in achieving the goals of knowledge management. Aligning the knowledge management program with the organizational culture can assure managers of reaching the set goals and not resisting implementing the knowledge management program. (15)

In a study, Khademizadeh et al. investigated the relationship between organizational culture and knowledge management in university libraries. They suggested that the necessary platform to change the hierarchical culture governing the studied libraries to a group culture should be created to implement knowledge management in these libraries more successfully. (16)

Generally, the review of studies shows that the success of organizations is in adopting a knowledge approach and emphasizing knowledge management, technology components, organizational culture, and knowledge-based management strategies. Knowledge management provides an effective solution for providing information services in organizations and libraries. It creates added value for the organization by converting the information of the organization's employees into information and knowledge assets. Nevertheless, the research showed that, so far, a comprehensive study has yet to be conducted to investigate the relationship between knowledge management and the level of information services of libraries. Therefore, the current research is designed to determine the relationship between knowledge management and information services of medical science libraries in Iran and intends to answer the following question by examining this issue:

- From library managers' point of view, to what extent do knowledge management components, including information technology, organizational culture, and organizational processes and strategies, affect the promotion of information services in libraries and information centers of medical sciences universities?

Conceptual model of research

The conceptual research model is designed based on the theory of Davenport and Prusak, which can be seen in Figure 1.

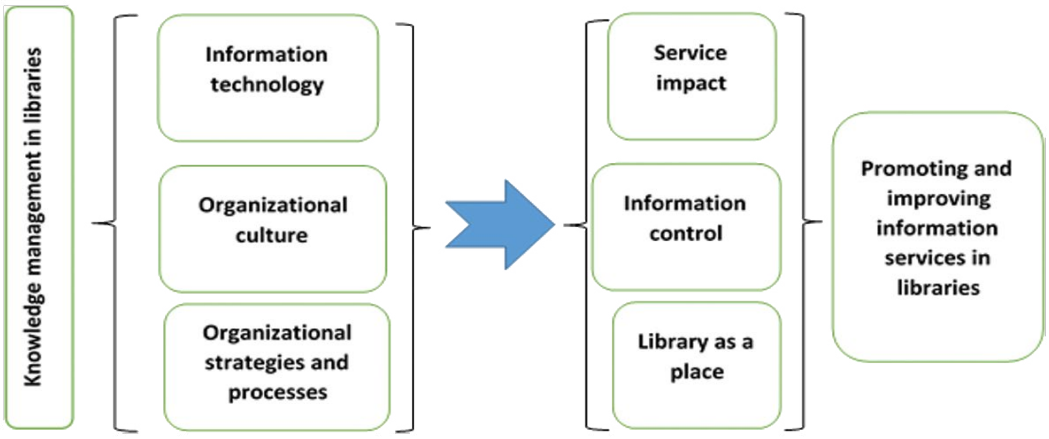

Figure 1. Proposed research model

Methods

The current research is a descriptive-applied one. The statistical population comprises managers of central, college, and hospital libraries of medical sciences universities in the country (630 people in total). Using Cochran's sample size formula, the sample size was determined to be 373 people. (56 out of 64 central libraries, 181 out of 345 college libraries, and 136 out of 221 hospital libraries). The sampling was done using a simple random sampling method. To collect data, the authors distributed 378 questionnaires via e-mail; 373 questionnaires were completed and returned and became the basis of the analysis. The process of distributing and collecting questionnaires lasted eighty days.

The data collection tool is a consolidated questionnaire that includes two standard Persian questionnaires of the Asian Productivity Organization (https://parsmodir.com/db/theory/kmappraisal.php) and the LibQual questionnaire (http://porseshname .com/? id=397), and two questions from these two questionnaires were merged with the opinion of librarian and information experts. The questionnaire

was organized in two parts and electronically. The first part of the questionnaire was demographic questions. The second part of the questionnaire included two features: knowledge management and library services related to the purpose of the research, and had thirty-four items. The first part was the questions related to knowledge management extracted from the standard questionnaire of the Asian Productivity Organization (17), including information technology variables with five items, organizational culture with four items, and organizational strategy and processes with five items. The second part was related to the measurement items of library information services extracted from the LibQual questionnaire with three components: service impact with seven questions, information control with eight questions, and library as a place with five questions. Answering the questions in the Likert method was set from very low, low, moderate, high, and very high with points from 1 (very low) to 5 (very high).

Thirty questionnaires were distributed among the statistical population to determine the reliability of the questionnaire, and Cronbach's alpha value was calculated using SPSS software. Cronbach's alpha coefficients for the variables obtained from the questionnaire were higher than 0.7, so the reliability of the questionnaire was confirmed.

Confirmatory factor analysis was used in AMOS software to check the validity of research items. To check the items' validity, the components' factor load should be higher than 0.4. The analysis results by the factor load of all the components and sub-components of the questionnaire were significant and had the desired value.

Also, the fitness indices of the model had acceptable values. Therefore, the items' validity and the model's fitness were confirmed. AMOS software used for descriptive statistics (including prevalence, frequency percentage, and mean) and inferential statistics (correlation-confirmatory factor analysis) to answer the research question.

Results

Demographic variables of the respondents

After the random distribution of the questionnaires, as can be seen in Table 1, the results of examining the variables of education, the field of study, age, gender, and organizational position show that 210 of the managers (56.03%) had Bachelor's degree, 130 (34.85%) had a master's degree and thirty-three (8.85%) had a Ph.D. One hundred forty-six of the library managers (39.14%) had a librarianship degree, 227 (60.86%) had a non-librarianship degree, and the age of the participants in this study was between twenty-four and fifty-seven years. Likewise, the mean age was 38.89 years, with a standard deviation of 6.21 years. The studied sample comprised 293 women (78.5%) and eighty men (21.45%), and women were more frequent in the sample. Although the current research population was the managers of libraries, in terms of the position in the employment orders, 362 people (97.05%) were working with the manager's order, and 11 people (2.95%) were working with the employee's order.

Table 1. Demographic variables of the respondents

Variable	Class	Frequency	Percentage
Education	Bachelor's degree	210	56.3
	Master's degree	130	34.85
	Doctorate	33	8.85
Field of study	Librarianship degree	146	39.14
	Non-librarianship degree	227	60.86
Age	24-30 years	18	83.4
	31-40 years	159	63.42
	41-57 years	196	55.52
Gender	Man	293	78.55
	Woman	80	21.45
Organizational position	Manager	362	97.05
	Employee	11	2.95
Total		373	100.0

The state of knowledge management and the quality of information services in the investigated libraries

Table 2 illustrates each research variable's descriptive indices, including average, standard deviation, minimum, maximum, skewness, and kurtosis. The Kolmogorov test shows that the centrality and dispersion indices of the knowledge management component and related sub-components in terms of two quantities of skewness and kurtosis are between +2 and -2 values with a score of -1.54 and 1.16, respectively, and the distribution is normal. Also, the examination of two quantities of skewness and kurtosis of these indicators for the quality of information services and its related sub-components, with scores of -0.93 and 0.10, respectively, showed that they have a normal distribution.

Table 2. Central indices and dispersion of knowledge management variables and library service quality and related sub-components

Variables	Components	Statistical indices					
		Mean	Standard deviation	Minimum	Maximum	Skewness	Kurtosis
Knowledge management	Information technology	17.23	2.98	10	20	-1.39	1.19
	Organizational culture	17.20	2.00	8	20	-1.98	0.88
	Strategy	18.82	3.94	10	22	-1.57	0.77
	The total score of knowledge management	53.25	6.10	31	62	-1.54	1.16
Library services quality	Information services	25.72	5.19	14	31	-1.61	0.97
	Information control	25.61	5.75	14	32	-1.37	0.08
	Library as a place	19.69	2.77	10	23	-1.85	1.38
	The total score of library services quality	71.02	8.19	44	84	-0.93	0.10

The effect of knowledge management components on the quality of information services

Due to several variables in each department, structural equation analysis was used to analyze the relationship between research variables and determine the factors affecting the quality of information services. The proposed model for structural equation analysis consists of two fields with six variables: the field of knowledge management with the components of technology, organizational culture, and organizational strategies, and the field of quality of library information services with the elements of service impact, information control, and the library as a place of information. In this research, the effects of knowledge management components on improving the quality of information services of the studied libraries were investigated and measured. The results of this investigation can be seen in Figure 1. The path coefficient between the components affecting the quality of information services was obtained using AMOS software.

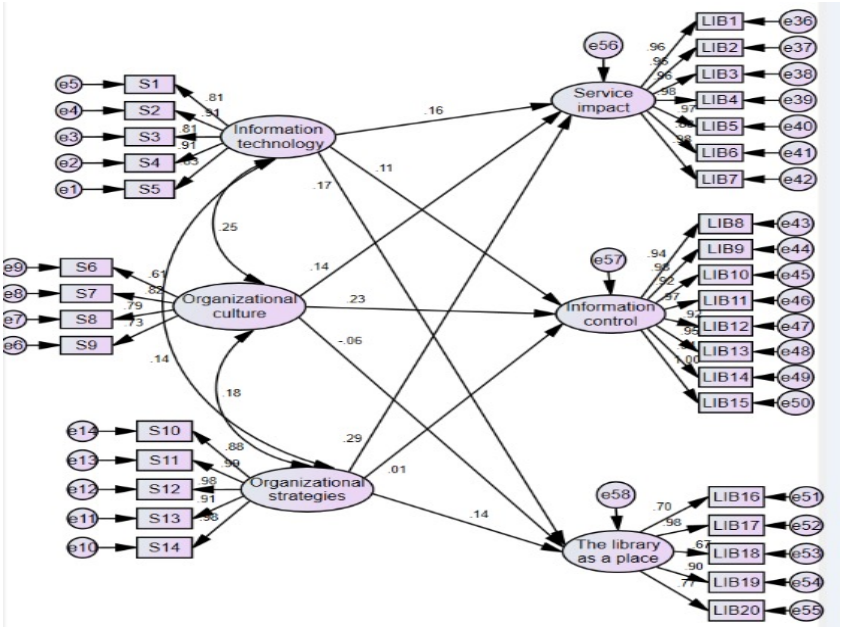

Figure 2. Factor loadings in the conceptual model of the effect of knowledge management on the quality of library information services

The path coefficients of the relationships between the knowledge management components and the quality of information services in the standard estimation mode are given in Table 2. According to the results, the information technology sub-component had a significant effect on all three sub-components of knowledge management, i.e., services (P=0.015), information control (P=0.041), and library (P=0.039). The sub-component of organizational culture also had a significant effect on the two sub-components of services (P=0.01) and information control (P=0.01). The sub-component of organizational strategy also substantially impacted the two sub-components of services (P=0.01) and library (P=0.01).

Table 3. The path coefficients of knowledge management components on library information services' quality components.

Path			Standard path coefficient (β)	Standard error	P
Information technology	→	Service impact	0.16	0.016	0.015
Information technology	→	Information control	0.11	0.054	0.041
Information technology	→	Library as a place	0.17	0.063	0.039
Organizational culture	→	Service impact	0.14	0.055	0.01
Organizational culture	→	Information control	0.23	0.065	0.01
Organizational culture	→	Library as a place	0.06	0.057	0.299
Strategy	→	Service impact	0.29	0.06	0.01
Strategy	→	Information control	0.01	0.047	0.945
Strategy	→	Library as a place	0.14	0.055	0.01

Examining the fitness of the research model

According to the results of the factor loadings, all the components and sub-components of the research model were significant and had desirable values. Also, the fitness indices of the model, according to Table 4, had acceptable values, so the proposed research model is confirmed.

Table 4. Structural equation model fitness indices.

RMSEA	TLI	IFI	CFI	NFI
0.015	0.8888	0.898	0.718	0.875
AGFI	**GFI**	**2x /df**	**df**	**x2**
0.674	0.718	2.98	515	1534.73

Examining the effects of research variables

Correlation Coefficient were used to investigate the effect of knowledge management on the quality of library information services, the results of which are presented below.

Pearson correlation

Table 5 shows the Pearson correlation coefficients between different components of knowledge management and the quality of library services two by two. According to the results, different elements of knowledge management had a positive and significant relationship with the quality of library services.

Table 5. Correlation coefficients between measured parameters

Variable	Service impact	Information control	Library as a place	The total score of services quality
Information technology	0.231**	0.173**	0.243**	0.350**
Organizational culture	0.228**	0.238**	0.06	0.333**
Strategy	0.348**	0.04	0.150**	0.300**
Knowledge management total score	0.412**	0.189**	0.236**	0.474**

* and ** are significant at 5 and 1 percent probability levels, respectively

Discussion

The research results revealed that among the components of knowledge management, the element of information technology and technology and communication infrastructures have the most significant impact on the promotion of information services in libraries and is in first place among the components of knowledge management. By strengthening the technology and communication infrastructures, the best information services can be provided to the community of researchers, students, and library users. These results are entirely consistent with the research results of David-West (12) and Anakireh (14), who considered the information technology component ahead of other knowledge management components.

After the information technology component, the organizational culture variable is second in influencing the quality of library services. This means that making changes to improve the quality of library services in the libraries of medical sciences by using the criterion of organizational culture is available. A rich organizational culture includes interaction, communication, commitment, and knowledge sharing among libraries' managers, policymakers, and human resources, and each needs investigation and research. Reconstruction and improvement of organizational culture to motivate and empower managers and policymakers to support librarians and knowledge forces and experts in the field of librarianship in the field of production, sharing, application, and storage of new knowledge is at the heart of knowledge management procedures. The intensity of this transformation should be such that all people consider themselves responsible for collecting, transferring, and producing knowledge. The research of Morov (10), Nikomou (13), Akbari (15), and Khademizadeh (16) showed that organizational culture is the priority of knowledge management application in the information services of libraries, which is inconsistent with the results of the present research. The research results indicated that the organizational strategies variable is in third place with a minimal distance from the organizational culture component. This means that in the medical sciences libraries, to improve the quality of library services, by emphasizing the component of organizational processes and strategies, as the third component of knowledge management, one can witness changes and developments in the body of the system and service delivery improvement in libraries.

The research results of Long Zao (9) and Shiroshire (5) noted that emphasizing the managerial and strategic organizational components and attracting administrative and organizational structural support as an essential component of knowledge management can improve the provision of library services. Their results are inconsistent with the present research results in prioritizing knowledge management components affecting services.

Conclusion

Managers of health libraries emphasize and pay more attention to information and communication technology in library services. Particular attention should be paid to the information technology component and the information platform with a technological approach to

improve the quality and quantity of library services, which is crucial in the current digital and electronic world of technology. Libraries can play a role in optimizing services with the goal and approach of technology and library intelligence and upgrading software and information groups. The component of information and communication technology and the quantitative and qualitative development of knowledge infrastructures is at the top of the practical elements of knowledge management on the optimization of information services of medical science libraries, which requires more attention and emphasis from managers and decision-makers, and policymakers. After that, paying attention to the organizational culture and promoting it in libraries for cooperation and knowledge sharing are in second place. Organizational culture has played a significant role in providing services and sharing organizational knowledge, and managers emphasized the role of organizational culture. Organizational strategies and processes and their modification and restoration are in the third place of the model.

Finally, according to the research findings, informing library managers about the benefits of using knowledge management and new information technologies, gaining the support of senior managers of universities of medical sciences, regarding the use and emphasis on knowledge management and knowledge workers, and promoting the participation culture of employees based on new information technologies by educational workshops can effectively improve the quality of information services.

Declarations

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Conflicts of Interests

The authors declared no conflict of interest.

Ethical statement

The Ethics Committee of Hormozgan University of Medical Sciences approved the protocol of this study, with Code of IR.HUMS.REC.1401.275.

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Authors' contributions

All authors contributed to designing, running, and writing all parts of this study.

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