Original article

Investigating the Knowledge Management Infrastructures of SBMU-Affiliated Libraries

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Abstract

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Introduction: Increasing productivity in academic libraries can be due to knowledge management. The successful implementation of knowledge management requires appropriate infrastructures. In this study, to determine the level of readiness of SBMU-affiliated libraries and to implement knowledge management, the infrastructure of the management approach, organizational culture, human resources, organizational structure, and information technology has been examined.

Methods: The descriptive-survey research method was used to determine the status of the infrastructures studied to obtain the opinions of 58 librarians working in the libraries of Shahid Beheshti University of Medical Sciences. The data collection tool was a researcher-made questionnaire. The opinions of 10 experts obtained to analyze the qualitative validity. Content validity ratio (CVR) was calculated to analyze the quantitative content validity, content validity index (CVI), and the validity of each item, which was considered 62% and 79%, respectively. Cronbach's alpha was also used to measure reliability, which was 0.92, indicating that reliability is appropriate. A 5-point Likert scale was used to weigh a 50- item questionnaire. For each infrastructure, the mean of fewer than three scores, undesirable; 3-4 score, moderate; and above four scores, desirable was considered.

Results: The mean obtained for the infrastructures of the management approach was 2.72, organizational structure 2.66, organizational culture 3.13, human resources 3.26, and technology 3.21, respectively.

Conclusion: The status of the two infrastructures of management approach and organizational structure was undesirable, and the three infrastructures of organizational culture, human resources, and technology were at a moderate level. Consequently, these infrastructures need investment and exceptional attention to provide a suitable platform for the implementation of knowledge management in the SBMU-affiliated libraries.

Introduction

In the information era, in which knowledge is the most valuable asset, most essential advantage of competition, the basis of sustainable development, and the key to the competitive advantage of organizations (1–4) .creation, coding, and distribution of knowledge are most essential needs of modern organizations. In an information-driven economy, instead of being limited to manual workers, organizations have focused on knowledge workers and are continually looking for effective ways to transfer knowledge among human resources (5–7). Organizations have found that in the present era, successful organizations will be able to manage the knowledge of human resources and be able to turn it into a smart asset to increase the organization (8, 9). Thus, one of the most crucial concerns of today's organizations is to create organizational knowledge (10). Creating organizational knowledge is the process of accessibility and expanding the knowledge produced by individuals, as well as crystallizing and connecting it to the organization's knowledge system (11) and constitutes an essential component of knowledge management (10). Knowledge management, which emerged with the slogan of controlling tacit knowledge, in less than a few decades, became one of the most exciting and attractive management topics (12). This knowledge is the

process by which an organization produces, acquires, captures, and uses knowledge to enhance an organization's productivity (13). It can be stated that knowledge management is a strategic effort of an organization to control the intellectual assets of staff and customers to achieve goals and superiority in a competitive market (14). Knowledge management provides a mechanism through which employees of the organization can act more intelligently, reduce duplication and repetitive processes, and ultimately produce more creative products, and thus, they can better meet the users' needs (10-13). Adopting a creative approach to knowledge management can lead to improved performance, increased productivity, and increased revenue. Some of the benefits of knowledge management are directly related to saving on organizational costs, but many of the benefits are extremely difficult to quantify. Knowledge management can contribute significantly by reducing organizational costs through simplifying processes and eliminating unnecessary processes, as well as accelerating the supply of products and services in the market to increase profitability in the organization. Strengthening innovation and encouraging the free flow of ideas, improving decision-making, promoting services, boosting the possibility of staff survival by recognizing the value of their knowledge, and rewarding it are other benefits of using knowledge management (7). Implementing knowledge management, like any program or activity, requires a set of factors and infrastructures that ensure its success. Many studies have been carried out to introduce these factors and infrastructures (14-26). Information and communication technologies (9,15–17,19–22,26,27), management approach (9,20,21,23,24,28), organizational culture (14,15,19–22,28), organizational structure (14,20,22), human resource management (14,20,22,23,28) are among the infrastructural elements for the implementation of knowledge management, which were emphasized more than other elements in these studies.

Libraries, as learning organizations, are the reservoirs of human knowledge that indirectly participate in the production of knowledge and play an irreplaceable role in the cycle of knowledge production and knowledge creation by collecting, storing, processing, disseminating information and knowledge, especially academic libraries that act as communication bridges in the transfer of knowledge and the conversion of scientific results into real means of production (15, 16). Knowledge management can inject new blood into the library culture (29). It can provide an exceptional opportunity to communicate between libraries and users and to facilitate the smooth and rapid flow of knowledge exchange between them (30,31), and ultimately improve the effectiveness of libraries and parent organizations (32). Knowledge management can lead to the empowerment of academic and professional libraries and the more dynamic and efficient performance of these knowledge storages as well (29). Therefore, the need to use knowledge management as a powerful tool for the promotion of academic libraries to achieve organizational goals and its real position is essential. In Iran, this also is a long-standing necessity, which has been felt so far that some research conducted to implement knowledge management in academic libraries (33–36). In the libraries of medical sciences universities, this issue requires special attention due to the importance of these institutions in promoting education, research, and entrepreneurship in the health area. However, the status of the infrastructure needed to implement knowledge management in the SBMU-affiliated libraries, as one of the most prestigious universities of medical sciences in the country, is not clear. Therefore, the researchers decided to examine the

status of the infrastructure needed to implement knowledge management, including technology infrastructure, management approach, organizational culture, organizational structure, and human resource management in university libraries. Due to the many benefits of implementing knowledge management at the individual and organizational level, especially its essential role in increasing efficiency, productivity, quality, and innovation in the organization (37–42), the research findings can determine the readiness level of the libraries understudy to establish knowledge management. By providing a clear view of the current situation, knowledge management provides the necessary information to decision-makers, policymakers, and planners to implement knowledge management in the SBMU-affiliated libraries.

Methods

The present study is a descriptive survey kind. In this study, the infrastructures of the management approach, the status of organizational culture, human resources, organizational structure, and information technologies, as well as their use, have been investigated. The study population includes librarians working in the libraries of educational hospitals, schools, research centers of Shahid Beheshti University of Medical Sciences. This study did not have sampling, and the census method was used. Librarians' views (N=58) have been received to determine the status of the studied infrastructures through the distributing and collecting the questionnaires in person. The data collection tool is a researcher-made questionnaire prepared by an in-depth study of previous studies and similar research questionnaires. The questionnaire was given to 10 researchers to analyze the qualitative content validity in the field of knowledge management to obtain the opinions of experts, and the necessary corrections were then made based on their opinions. In the next step, to analyze the quantitative content validity, all the items of the questionnaire, content validity ratio (CVR), and content validity index (CVI) were calculated. For the relative content validity ratio, considering that the panel members were ten people, the minimum validity value of 62% was considered. For the content validity index, based on previous studies' recommendations, the value of the validity for the definitive confirmation of each item was 79%. Cronbach's alpha coefficient was used to measure the reliability of the questionnaire. Cronbach's alpha coefficient for the entire infrastructure was 0.92, which indicates the questionnaire's appropriate reliability. In this questionnaire, 50 questions were designed to assess the status of knowledge management infrastructure, including 14 questions for management approach, 12 questions, organizational culture; 9 questions, human resources; 8 questions, organizational structure; 7 questions, information technology. The dimensions measured to implement knowledge management for each of the approaches are as follows:

- Management approach includes training staff to perform current activities, communication between staff and senior managers, empowering staff to perform knowledge activities, planning, using the capabilities of staff in performing knowledge activities, and budgeting and financial affairs.

- Organizational culture approach, including the existence of a creative thinking platform and active exposure to change, knowledge sharing, intra-organizational knowledge collaboration, extra-organizational knowledge collaboration.

-The human resources approach includes the status of holding the required training courses for human resources and

the capabilities of human resources in performing knowledge activities.

- The organizational structure approach, including considering knowledge management in organizational structure, formulating rules, and standards to implement knowledge management, and providing the possibility of using the collective participation of librarians in the knowledge management process.

- The information technology approach includes the provision of technologies related to organizing, storing, transferring, and exchanging knowledge, and software, hardware, and bandwidth infrastructure. A five-choice Likert scale was used to weigh the responses. If the mean score of each infrastructure was less than 3, the status of that infrastructure was undesirable, and if it was between 3- 4, it was moderate, and if it was above 4, it was reported to be desirable. SPSS 22 software was used for data analysis. The T-Student test was used to compare the mean of the approaches with the mean value of the Likert scale (score 3). Before this test, the Kolmogorov-Smirnov test first examined the normality of the data, and the test result (P-value <0.05)indicated the normality of the research data.

Results

A descriptive study of the demographic characteristics of 58 librarians in the SBMU- affiliated libraries who answered the research questionnaire showed that women accounted for 85.5% of the respondents and had the highest frequency in terms of gender. In terms of educational characteristics, most individuals, approximately 48.3%, had a bachelor's degree, and 37.9% had a master's degree; 5.2% had an associate's degree, 3.4% had a doctorate, and 3.4% had a diploma, respectively. In terms of discipline, most individuals who had an academic degree (72.4%) had a degree in librarianship.

Management approach infrastructure

Findings related to the scores obtained by the management approach infrastructure are shown in Table 1. As can be seen, the management approach has scored 58.54% of the total of 4060. The minimum and the maximum mean of 14 questions related to this approach were 1.43 and 4.29, respectively. The mean infrastructure of the 2.72 management approach with a standard deviation of 0.61 was significantly lower than the average score of the Likert scale (score 3) (P-value <0.05), so it can be accepted with 95% confidence that the management approach status was undesirable.

Among the dimensions of the management approach, as shown in Figure 1, the highest mean is for staff training to perform current activities (3.22), and the lowest mean is for budget and finance (2.41).

Table1. Descriptive statistics for management approach infrastructure's scores and comparing its mean with the average score of the Likert scale (score 3)

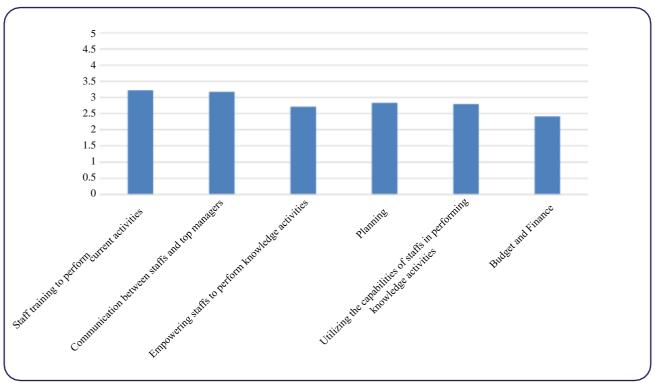| Infrastructure	Number of questions	Total maximum scores	Total earned scores	Percentage of earned scores	The mean	Lowest mean	Highest mean	Standard deviation	T-test	*P*-value
Management approach	14	4060	2216	54.58%	2.72	1.43	4.29	0.61	-3.37	0.001

Figure1. The mean score of the dimensions of the management approach

Organizational culture infrastructure

According to the table 2, the organizational culture infrastructure has gained 62.73% of the total score of 3480, and the mean score of this infrastructure is 3.13 with a standard deviation of 0.57, which is significantly higher than the mean score of the Likert scale (P-value> 0.05), so it can be accepted with 95% confidence that the approach of organizational culture was moderate.

Among the dimensions of the organizational culture approach, a creative thinking platform and active exposure to change with the mean of 3.43, has the highest mean and extra-organizational knowledge cooperation with the mean of 2.61, has the lowest mean. (Figure2).

Table2. Descriptive statistics for organizational culture infrastructure's scores comparing its mean with the average score of the Likert scale (score 3)

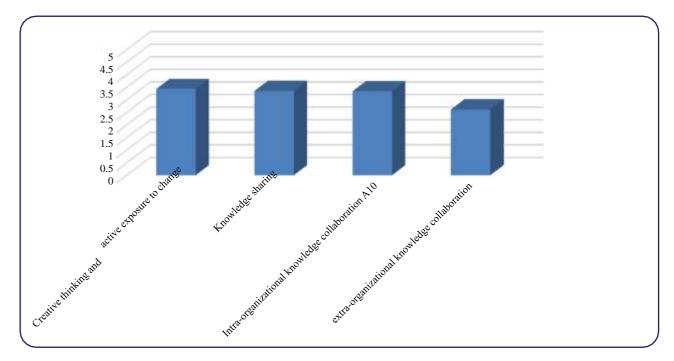| Infrastructure	Number of questions	Total maximum scores	Total earned scores	Percentage of earned scores	The mean	Lowest mean	Highest mean	Standard deviation	T-test	P-value
Organizational Culture	12	3480	2183	62.73%	3.13	1.33	4.67	0.57	1.81	0.075

Figure2. The mean score of the dimensions of the organizational culture approach

Human resources infrastructure

According to table 3, the human resources infrastructure has achieved 64.44% of the total score of 2610. The mean human resource infrastructure was 3.26, with a standard deviation of 0.57, which is significantly higher than the mean score of the Likert scale (P-value <0.05), so it can be assumed with 95% confidence that the human resource infrastructure status was moderate.

As Figure 3 shows, among the dimensions of the human resource approach dimension, human resource capabilities in performing knowledge activities with the mean of 3.51, the highest mean and holding the required training courses for human resources with the mean of 2.97 have the lowest mean.

Table3. Descriptive statistics for human resources infrastructure's scores and comparing its mean with the average score of the Likert scale (score 3)

Infrastructure	Number of questions	Total maximum scores	Total earned scores	Percentage of earned scores	The mean	Lowest mean	Highest mean	Standard deviation	T-test	P-value
Human resources	9	2610	1682	64.44%	3.26	1.89	4.89	0.57	3.43	0.001

Figure3. The mean score of human resource approach dimensions

Organizational structure infrastructure

Table 4 also indicates that the organizational structure infrastructure has achieved 53.32% of the total 2610 scores. The mean score of this infrastructure was 2.66, with a standard deviation of 0.8, which was significantly higher than the mean score of the Likert scale (P-value <0.05), so it can be accepted with 95% confidence that the infrastructure status of the organizational structure was moderate.

As shown in Figure 4, among the dimensions of the organizational structure approach, providing the possibility of using the collective participation of librarians in the knowledge management process with the mean of 2.75 is the highest mean and then considering knowledge management in the organizational structure with the mean of 2.59 is the lowest.

Table4. Descriptive statistics for organizational structure infrastructure's scores and comparing its mean with the average score of the Likert scale (score 3)

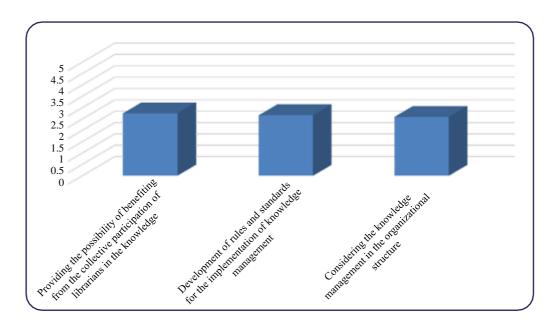| Infrastructure	Number of questions	Total maximum scores	Total earned scores	Percentage of earned scores	The mean	Lowest mean	Highest mean	Standard deviation	T-test	P-value
Organizational structure	8	2320	1237	53.32%	2.66	1	5	0.8	3.17	0.002

Figure4. The mean score of the dimensions of the organizational structure approach

Information technology infrastructure

Information technology infrastructure also gained 64.24% of the total 2030 scores. As shown in Table 5, the mean score of this IT infrastructure was 3.21 with a standard deviation of 0.61, which was significantly higher than the mean score of the Likert scale (P-value <0.05), so it can be accepted with 95% confidence that

the human resource infrastructure was moderate.

As shown in Figure 5, among the dimensions of the information technology approach, the technologies related to organizing, storing, transferring, and exchanging knowledge with the mean of 3.34 have the highest mean and bandwidth with the mean of 2.78 has the lowest mean.

Table5. Descriptive statistics for information technology infrastructure's scores and comparing its mean with the average score of the Likert scale (score 3)

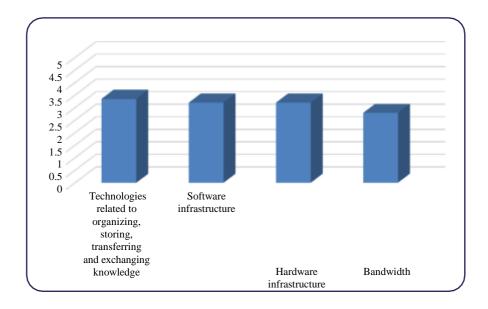| Infrastructure	Number of questions	Total maximum scores	Total earned scores	Percentage of earned scores	The mean	Lowest mean	Highest mean	Standard deviation	T-test	*P*-value
Information technology	7	2030	1305	64.24%	3.21	1.57	5	0.72	2.25	0.028

Figure5. The mean score of the dimensions of the information technology approach

Discussion

Knowledge management requires effective leadership, and comprehensive management support is needed to implement and obtain successful outcomes. The results revealed that, in general, the infrastructure of the management approach to implementing knowledge management in the SBMU-affiliated libraries is not at the desired level. The lowest mean score in the elements examined for this infrastructure is related to budget allocation and other financial affairs for the knowledge activities of the libraries under study. Several other studies that have examined the knowledge management infrastructure in Iranian university libraries have reported the management approach's poor status, especially the budget status for the implementation of knowledge management in academic libraries (43–45). Hassanzadeh also stated in a research that the infrastructure situation of the budget for knowledge management in the government of the Islamic Republic of Iran is undesirable and also emphasized on the importance of financial resources in the implementation of knowledge management plans (46). Since the allocation of appropriate financial resources is an essential factor in advancing the organization's goals, if the SBMU-affiliated libraries tend to use knowledge management to advance their goals, it is necessary to pay special attention

to providing the necessary financial resources. The findings also show that library administrators care about the training staff to perform current activities at a moderate level; however, the situation is undesirable in terms of efforts to empower staff to perform knowledge activities. While staff empowerment is directly related to the successful implementation of knowledge management (9), the results of some research in Iran confirm this issue (47–49).

Organizational culture refers to beliefs, shared values learned from the organization (50), and methods and norms that shape the staff's behavior (51). The findings of the present study showed that the infrastructure status of organizational culture in the present study showed that, in general, the infrastructure status of organizational culture in the SBMU-affiliated libraries is moderate. Unfortunately, status is undesirable regarding extra-organizational knowledge collaboration. The availability of organizational culture infrastructure plays a vital role in the implementation of knowledge management (13,51–54) If there is no culture of participation and mutual trust in organizational culture, knowledge management will face unpleasant challenges. Mason also indicated in his research that the unfavorable context of organizational culture could hinder

the successful implementation of knowledge management (55). Therefore, it seems that there is an undeniable need for managers to pay special attention to this infrastructure, which is closely related to the management approach's infrastructure.

The findings of the present study showed that the status of training courses related to human resource empowerment for knowledge activities is undesirable, and the situation of human resource capabilities for knowledge activities is moderate (close to the desirable status). In general, the final mean of human resource infrastructure has been evaluated as moderate. Given that in knowledge-based organizations, human resource is the most valuable organizational asset (12, 56) and is one of the most important factors influencing the successful implementation of knowledge management (57), it is expected that the improvement of this infrastructure will be considered by the top managers of the organization to implement knowledge management successfully.

The organizational structure represents the various roles, the hierarchy of roles, the relationships between roles, and how power and authority are distributed within an organization (13). The infrastructure of the organizational structure in the SBMU-affiliated libraries, both in general and the roles related to knowledge management in the organizational structure, the development of rules and standards to implement knowledge management, providing the possibility of using the collective participation of librarians in the knowledge management process has been evaluated less than average. Given that in the implementation of knowledge management, the organizational structure acts as a channel of knowledge flow and provides a basis for change and improvement of this flow (58), as well as due to the direct and positive relationship between organizational structure and knowledge management (59), it is necessary to pay special attention to the optimization of this infrastructure to implement knowledge management.

The findings revealed that the status of technology infrastructure in general, as well as in the dimensions of providing technologies related to organizing, storing, transferring, and exchanging knowledge, software infrastructure, and hardware infrastructure, is at a moderate level. Only the mean scores related to bandwidth were assessed at a lower than average level, but in general, the scores related to the status of technology infrastructure in the SBMU-affiliated libraries were evaluated as moderate. Although according to Davenport and Prusak (1998, Cited by Chang (60)) technology is less important than human and organizational factors, it is essential to note that new technologies can facilitate the integration of scattered knowledge that leads to most work in the shortest possible time (57). Information technology is also the most crucial factor in managing the knowledge of organizational culture and can help to remove cultural barriers (61). Even Davenport and Prusak (1998, Cited by Chang (60)) consider information technology to be a crucial enabler for implementing knowledge management in organizations. Lambe also states that the infrastructures of human resources, culture, and organizational structure are of great importance in the implementation of knowledge management, and that information technology is a facilitative tool in this regard (62). Therefore, in addition to strengthening other infrastructures, it is necessary to upgrade the information technology infrastructure and consider decision-makers and policymakers implementing knowledge management in the SBMU-affiliated libraries.

Conclusion

In general, the status of knowledge management infrastructures in the SBMU-affiliated libraries is not desirable. Given the many advantages of implementing knowledge management and its impact on increasing efficiency, productivity, quality and innovation in the organization (37-42), it seems that strengthening the necessary infrastructure for knowledge management requires special attention and care of the managers and authorities of the university to provide a suitable platform for the implementation of knowledge management in the SBMU-affiliated libraries.

Declarations

Acknowledgement

Conflicts of Interests

The authors declare no conflict of interests.

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