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Research Paper

Study the Impact of Knowledge Management Pillars on Knowledge Sharing

Farshad Andam[*1], Ali Rezaian[2]
1.Master of Information Technology Management, Shahid Beheshti University, Tehran, Iran.
2.Professor of Management, Faculty of Management & Accounting, Shahid Beheshti University, Tehran, Iran.
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Abstract

Nowadays, managers are eager to establish knowledge management system in their organizations to take advantages of beneficial consequences. One of these results is improvement of knowledge sharing among workforce in order to maintaining sustainable growth. The kernel of a knowledge management system was constructed from the elements were catalogued under four pillars, noting the key elements of a knowledge management system. The goal of this paper is to explore the relationship between knowledge management pillars and knowledge sharing among Ministry of cooperatives, labor & social welfare employees' in order to identify the pillars' elements which have the most impact on knowledge sharing. Data was collected via a questionnaire designed to measure the relationship between knowledge sharing and knowledge management pillars. The data collected from 258 Ministry of cooperatives, labor & social welfare headquarter experts was explored by multiple regression analysis. Regression analysis was applied to test hypotheses and compare strength of association between variables deploying SPSS version 22. Then one-way ANOVA was used to explore additional associations in the research and stepwise regression was performed to provide the model. According to the findings in this article, gender, age, post, education and experience of the respondents had no significant impact on the their knowledge sharing. Knowledge management pillars include leadership, organization, learning and technology had meaningful and positive impact on knowledge sharing. Among 18 elements of these pillars, the 6 ones including "place in an office with colleagues", "trust-based relationship", "informal relationship", "knowledge sharing reward system", "availability of organizational knowledge bases" and "easiness of knowledge sharing technologies usage" have the most impact on knowledge sharing respectively and were depicted within a model. At last a couple of suggestions were made to promote knowledge management in the ministry.

Keywords: Knowledge sharing, Knowledge management pillars, Paper type Research paper.

Introduction

Senge (1997) pointed out that knowledge sharing, which refers to knowledge exchange among individuals via social interactions, is the most important element of knowledge management. Not only do knowledge sharing allow passing of knowledge to others, it facilitates for others to acquire useful information. In other words, knowledge sharing is a mechanism through which knowledge is transmitted from one to another. Through the transformation, individuals gain a new edge to enable new actions. Thus, knowledge sharing adds values to existing knowledge within organizations. On the other hand, if individuals are reluctant to share knowledge, organizations cannot benefit from existing knowledge held by individuals. With organizations' inability to acquire useful information, solving problems or creating new ideas through sharing knowledge becomes challenging (Nonaka et al., 1994).

The value of four pillars of knowledge management is to levera ge the technologies of the era, while at the same time balancing the right alignment of mix of leadership, organization, and learning. The rapid evolution of new processes, models, and business tools make it necessary to capture and cultivate learning, and manage knowledge of all enterprise systems. It is an enterprise-wide endeavor to share knowledge to enhance effectiveness, facilitate innovation, and improve efficiencies and competitiveness. The pillars are interconnected and build on each other for successful implementation of knowledge management program. But what constitutes alignment for the organization, its enterprise, or a process is not so much to conduct a perfect alignment among these elements as it is to develop a construct suitable to the business strategy and to the environmental influences that impact that strategy on a day-to-day bias. A balance of these elements must remain flexible in our turbulent and ever-changing environment (Park, 2001). In this paper the elements of knowledge management pillars that affect employees' knowledge sharing were explored and then a model was proposed applying stepwise regression.

Materials & Methods

Knowledge sharing

Knowledge sharing is a process, an activity, or a behavior (Hung & Cheng, 2013). Ryu et al. (2003) proposed that knowledge sharing is a conveyance behavior, through which people acquire knowledge from others. Lee (2001) suggested that knowledge sharing is an activity in which individuals, groups, or organizations transmit or diffuse knowledge to others. Holthouse (1998) indicated that knowledge, as a flow concept, could be used for communication between knowledge possessors and receivers. In addition, Bock et al. (2005) suggested that knowledge sharing is the behavior of providing and conveying knowledge, while Wijnhoven (1998) noted that knowledge sharing through information media can result in knowledge transfer and that the receivers can integrate new knowledge into their existing knowledge.

Sharing of knowledge and expertise is delicate because it implies conflicts of interest among the individuals involved (Von Krogh, 1998) as the prominent example of open source projects shows (Gaechter et al., 2004). There are also other factors that affect the decision whether to share or conceal knowledge, for example the particular case of a social dilemma

*Correspondent Author : Farshad Andam
E-mail : farshad.andam@yahoo.com

(Cabrera & Cabrera, 2002; Von Krogh, 2002). Social dilemmas are paradoxical situations in which individual rationality, i.e., maximizing the personal pay-off, leads to collective irrationality (Kollok, 1998). Increasing individual pay-off may evoke an individual's unwillingness to share knowledge (Matzler et al., 2008). Moreover, some of the individual resist and unwilling to share their knowledge due to the insecurity, originality and mistrust to the others (Razak et al., 2016).

Knowledge management pillars

The essence or DNA of a knowledge management system was constructed from the knowledge management best practices and writings over many years. Numerous elements were noted and catalogued under four pillars, noting the key elements of a knowledge management system (Stankosky, 2002). These elements were represented in the Appendix Table and the theoretical model was depicted in Figure1. Therefore, these pillars were hypothesized as following :

H1. Knowledge management pillars positively and significantly affect knowledge sharing.

The following is an explanation of the pillars.

Leadership

Enterprise-wide knowledge management programs must have the visible support and follow through by the leadership of the enterprise to manage the timely collaboration and sharing of pertinent knowledge with the correct decision makers throughout an organization, and to do so in concert with the enterprise's strategic vision and operational goals. The enterprise must nurture an environment of open knowledge sharing, collaboration, and learning, facilitated by and enabled by the power of leading-edge technology tools and methods (Stankosky, 2005). In addition, it has also been noted that having a shared vision among the members of the workforce is an essential determinant of culture that will have an influence on knowledge sharing (Ladd & Ward, 2002). Calantone et al. (2002) argued that firms with great innovation capabilities and high innovative performance start with a shared strategic vision that stresses the importance of innovation and that guides the creation of innovation capabilities through organizational knowledge sharing practices.

According to Syed-Ikhsan and Rowland (2004), employees need a strong motivator in order to share knowledge. It is unrealistic to assume that all employees are willing to easily offer knowledge without considering what may be gained or lost as a result of this action. Managers must consider the importance of collaboration and sharing best practices when designing reward systems. The idea is to introduce processes in which sharing information and horizontal communication are encouraged and indeed rewarded. Such rewards must be based on group rather than individual performance (Goh, 2002). Meanwhile, in practice, owners of knowledge share knowledge selectively. Sometimes, the owner of knowledge will find it impossible to not to share even though he is not willing to share. Reduction of power is not the only result of sharing knowledge with subordinates by a supervisor. Successful learning by subordinates may improve organizational performance and in turn promote a supervisor's status in an organization. That will prompt supervisors to share knowledge. Therefore, when examining the effect of sharing knowledge on the owner's part, one can approach it from a negative but also a positive point of view (Peng et al., 2006). Moreover, managers should view sharing knowledge as a way of transforming employees into better workers. However, genuine recognition in the form of tokens of appreciation, such as letters of achievement, awards ceremonies, or small gifts, gives employees a sense that their contributions matter and are noticed by supervisors and upper management (Chiem, 2001). Hence, the pillar was hypothesized as following :

H2. Leadership positively and significantly affects knowledge sharing.

Organization

Park (2001) stressed that many organizations are implementing knowledge management strategies and infrastructures that are yielding real benefits in terms of knowledge sharing and streamlining processes. Companies are adopting more technologies to maximize the benefit of knowledge management than ever, but there is evidence that they do not take full advantage of them. If a culture of collaboration and knowledge sharing does not exist, those technologies will yield minimal benefit. Before an organization implements technologies for a successful knowledge management implementation, it must address cultural issues. Also all organizations have personalities as people do and characteristics such as flexibility, innovation, and more. Employees deal with a particular pattern of behavior based on the organizational culture. Hence, organizational culture can be a powerful lever for guiding organizational behavior (Chaudhry, 2005). More than that, communication and management are important factors in building a good business and they are enhanced by the adoption of a good performance appraisal system. Effective appraisal systems act as a primary vehicle for the measurement of management change in this rapidly changing world marketplace (longenecker, 1997).

It is important to create a climate of continuity and trust so that we may have proactive knowledge sharing across time and space (Stankosky, 2005). Davenport and Prusak (1998) argued that people usually share their knowledge with their organizational neighbours. Especially to specific knowledge, the transaction of the knowledge more depends on the mutual trust because of its potential risk. Individuals generally trust the persons whom they know. So, it could be expected that individual's knowledge sharing would be limited by their interactive networks that are composed of different social relationships including formal and informal relationships. Furthermore a thriving knowledge management program requires the active participation of all workers in the enterprise. These employees must contribute, as well as seek information and processes that will help them to accomplish the mission of the organization and work unit. When trying to encourage the sharing of knowledge in the public sector, most practitioners recommended linking it to performance rather than payment for contributions. The performance link demonstrates to workers that participating in the organization's knowledge management system is a necessary part of their jobs (Chiem, 2001).

As Gomez-Mejia et al. (2000) pointed out that gainsharing programs are inherently more risky for employees than a more traditional fixed pay system because gainsharing bonuses are contingent on achieving plant-wide cost reductions. Employee acceptance of gainsharing thus requires a degree of trust that management will fulfill their promise to pay employees fairly based on their increased participation and performance. Under gainsharing plans, employee participation comes in the form of knowledge sharing that if formalized through an employee suggestion system. Employees are encouraged to write down their cost-saving ideas on a standardized form and submit them to a committee (generally made up of employee and management representatives) who determine the viability of the suggestion and, if accepted, authorize its implementation. The monetary savings from these implemented suggestions are calculated using a formula based on historical cost data. These savings then become part of a pool of money that is distributed to all participating employees in the form of a gainsharing bonus or reward (Graham-Moore & Ross,1995). Therefore, the pillar was hypothesized as following :

H3. Organization positively and significantly affects knowledge sharing.

Learning

Training in team building should increase levels of structural, cognitive and relational social capital that will also help to stimulate knowledge-sharing behaviours. Team-based training will help build relationships that are vital for the transfer of knowledge. Cross-training will facilitate knowledge sharing among employees from different areas by increasing interactions, creating a common language, building social ties and increasing employees' awareness of the demands of different jobs. Thus, any training that emphasizes cooperation and builds relationships among employees should increase knowledge-sharing behaviours (Cabrera & Cabrera, 2005).

A cooperative climate implies social exchanges among organizational members and thus, employees may show a tendency to "pay back" their colleagues' cooperative behavior by engaging in knowledge sharing (Blau, 1964; Deutsch & Gerard, 1955). Additionally, social comparison theory (Festinger, 1954) suggests that when employees are part of a cooperative climate, their comparisons of themselves with other members will result in a greater tendency to behave in a cooperative manner.

Brown & Duguid (1998) stressed that some perspectives of social network theories such as structural holes and closeness of network theories are relatively underutilized and may improve our understanding of knowledge sharing in teams and communities of practice. These theories may be useful because they recognize that employees do not work, learn, or share knowledge in isolation but are embedded in social networks. Many organizations support multiple communities of practice that may be interdependent and overlapping: knowledge sharing across the communities can contribute to organizational learning and innovation. When a formal or informal group (or community of practice) is formed its members bring with them not only their own knowledge, skills, and abilities but also their social connections (Wang & Noe , 2010). Afterwards a knowledge base can give employees easy access to information that would otherwise require contact with an organization's staff; as a rule, this capacity should make the interaction simpler for both the employee and the organization (Ramasami, 2011). Hence, the pillar was hypothesized as following :

H4. Learning positively and significantly affects knowledge sharing.

Technology

Technology is an enabler—an essential asset for decision support, data warehousing, process modeling, management tools, and overall communications. Technology must support the business strategy, add value, and be measured (Park, 2001). Menolli et al. (2015) mentioned that the correct choice of technology and correct configuration of these tools ensures that content is better organized and better communicated among employees. Thus, using the appropriate technology can help decrease resistance to the use of new technologies to manage knowledge.

Han et al.(2007) discussed that developments in technology, specifically in information and communications technologies, have played a vital role in providing the infrastructure needed to support network structures and organizational learning. It is important for organization to realize that making the latest technology available is not the solution to promote knowledge sharing. There is a need for an implemented system where employees receive training in using the available technology for knowledge transfer. With this in mind Nikravan (2011) expressed that the ease of use of technology increases sharing and integration of text, voice, data, images and video between people and the organizations where they work. It also fosters greater willingness to share, adaptability to new situations and incorporation of critical information into initiatives. Furthermore, Chow (2011) mentioned that operational factors like perceived usefulness, perceived ease of use, staff capability, and nature of work induce higher usage of IT for knowledge sharing. Therefore, the pillar was hypothesized as following :

H5. Technology positively and significantly affects knowledge sharing.

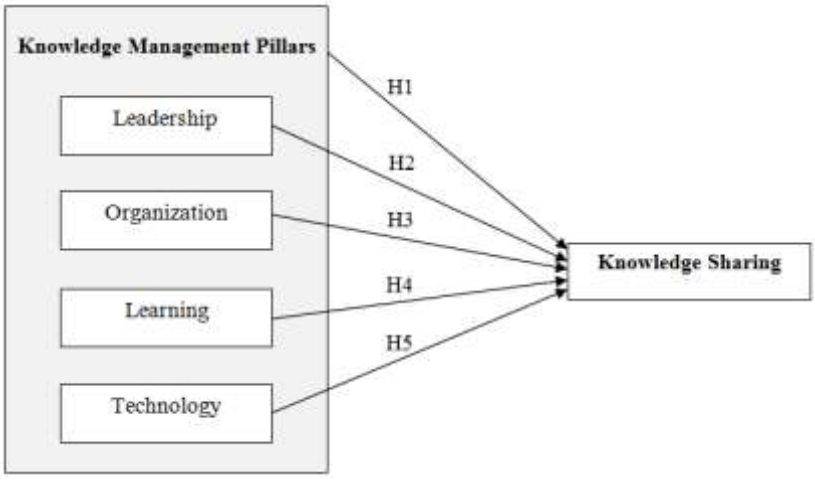

Figure1. Theoretical model

Methods

Questionnaire

A set of questions was developed using extensive literature review. First section of the questionnaire addressed respondents' demographic information including gender, age, post, education and experience. Demographic characteristics of the respondents were shown in Table1. Knowledge management pillars were assessed using 18 independent variables grouped into four pillars as identified in Appendix Table. The 5, 6, 5 and 2 measures used to evaluate "leadership", "organization", "learning" and "technology" respectively. A dependent variable was also defined to quantify the employees' knowledge sharing. All of the 19 measures were measured by obtaining the respondents' extent of agreement through five-point Likert scale assessment ranging from 1 which indicates very poor to 5 which denotes very good. The sample size was calculated using the following formula:

$$n = NZ2\alpha/2(1-P)P/[(N-1)\varepsilon 2+Z2\alpha/2(1-P)P]$$

where n = sample size, N = size of the population, $Z\alpha/2 = Z$ statistic for a level of confidence (α=0.05), P = expected prevalence or proportion (P = 0.5), ε = the estimation error (ε=0.07). The calculated n was equal to 300 and a total of 300 questionnaires were distributed and 276 returned, with 258 useable, giving a response rate of 86 percent.

Table1. Demographic characteristics of respondents

Gender	f	%	Education	f	%
Male	142	55	High school diploma	5	2
Female	116	45	Associate's degree	14	5
Age	f	%	Bachelor's degree	138	54
=< 30	21	8	Master's degree	93	36
31-40	103	40	Doctoral degree	8	3
41-50	92	36	Experience	f	%
51-60	36	14	=< 7	13	5
> 60	6	2	8-14	90	35
Post	f	%	15-21	75	29
Expert	173	67	22-28	70	27
Senior expert	85	33	>= 29	10	4

The simple random sample was chosen as the sampling method. A paper-based questionnaire was developed in Persian. A pilot test was conducted before the final questionnaire was distributed to the respondents. To ensure the appropriateness of the research design, the validity and reliability were tested. The initial questionnaire was reviewed by three scholars in knowledge management and was further revised based on their comments.

Cronbach's alpha

In this study, several items were measured for each construct. To analyze all of the constructs in a single regression model, the Cronbach's alpha statistic was used to test its internal consistency, or reliability of the group items. According to Nunnally and Bernstein (1994) the minimum accepted alpha level utilized was 0.7. The alpha coefficients of leadership, organization, learning and technology were 0.796, 0.845, 0.856 and 0.787 respectively. The values of the scales were all observed to be fairly high and therefore, reliability was approved.

To analyze the primary data collected through the questionnaire, the Statistical Package for Social Science (SPSS) version 22 was deployed. After data was described statistically, the Pearson correlation coefficient and regression analysis was

applied to test hypotheses and compare strength of association between variables. Then one-way ANOVA was used to explore the hypothesis investigated whether mean of knowledge sharing between employees has significant difference according to their gender, age, post, education and experience. At last stepwise regression was performed to predict knowledge sharing, given knowledge management pillars and the best model was provided.

Results & Discussions
Regression analysis

Regression analysis is a technique aimed at proportionate reduction in error. As with all statistical applications, it is designed to simplify and summarize complex information, through the deduction of errors, to ascertain underlying patterns in the data. Regression analysis informs how strongly related a pair of variables is, via a measure of correlation. It also measures the extent of the effect that a change in the independent variable has on the dependent variable (Rose & Sullivan, 1993). Relationship between knowledge sharing and elements of knowledge management pillars were examined and regression analyses displayed in Table2.

Table2. Regression analyses

Regression analysis for knowledge management pillars								
Model	R	R Square		Sum of Squares	df	Mean Square	F	Sig
	0.931	0.867	Regression	58.781	18	3.094	19.906	0.000*
			Residual	9.014	58	0.155		
			Total	67.795	76			
Regression analysis for leadership								
Model	R	R Square		Sum of Squares	df	Mean Square	F	Sig
	0.821	0.674	Regression	45.710	5	9.142	29.804	0.000*
			Residual	22.085	71	0.307		
			Total	67.795	76			
Regression analysis for organization								
Model	R	R Square		Sum of Squares	df	Mean Square	F	Sig
	0.876	0.768	Regression	52.061	6	8.677	39.155	0.000*
			Residual	15.734	70	0.222		
			Total	67.795	76			
Regression analysis for learning								
Model	R	R Square		Sum of Squares	df	Mean Square	F	Sig
	0.847	0.718	Regression	48.680	5	8.113	30.137	0.000*
			Residual	19.114	71	0.269		
			Total	67.795	76			
Regression analysis for technology								
Model	R	R Square		Sum of Squares	df	Mean Square	F	Sig
	0.770	0.593	Regression	40.174	2	20.087	54.542	0.000*
			Residual	27.621	74	0.368		
			Total	67.795	76			

*p < 0.050

According to Table2 there were positive relationships between knowledge management pillars and knowledge sharing (sig=0.000<p=0.050), between leadership and knowledge sharing (sig=0.000<p=0.050), between organization and knowledge sharing (sig=0.000<p=0.050), between learning and knowledge sharing (sig=0.000<p=0.050) and also between technology and knowledge sharing (sig=0.000<p=0.050). It was inferred that 86.7, 67.4, 76.8, 71.8 and 59.3 percent variance in knowledge sharing was explained by knowledge management pillars, leadership, organization, learning and technology respectively.

ANOVA test

The one-way ANOVA was applied to compare the means between the groups you are interested in and determines whether any of those means are significantly different from each other. So, the ANOVA was used to explore the hypothesis investigated whether mean of knowledge sharing between employees has significant difference according to their gender, age, post, education and experience. The ANOVA test results were shown in Table3.

Table3. The ANOVA test

Gender					
	Sum of Squares	df	Mean Square	F	Sig
Between Groups	0.270	1	0.270	0.306	0.581*
Within Groups	226.075	256	0.883		
Total	226.345	257			
Age					
	Sum of Squares	df	Mean Square	F	Sig
Between Groups	5.724	1	1.431	1.641	0.164*
Within Groups	220.621	256	0.872		
Total	226.345	257			
Post					
	Sum of Squares	df	Mean Square	F	Sig
Between Groups	0.029	1	0.029	0.033	0.857*
Within Groups	226.316	256	0.884		
Total	226.345	257			
Education					
	Sum of Squares	df	Mean Square	F	Sig
Between Groups	2.717	1	0.679	0.768	0.547*
Within Groups	223.628	256	0.884		
Total	226.345	257			
Experience					
	Sum of Squares	df	Mean Square	F	Sig
Between Groups	4.914	1	1.228	1.404	0.233*
Within Groups	221.431	256	0.875		
Total	226.345	257			

*p < 0.050

Model representation

The stepwise regression was performed to get the most efficient prediction of dependent variable values and the best model was provided. The prediction model contained 6 out of the 18 predictors and was reached in six steps. As displayed in table4 it was concluded that 84.6 percent of the variation in the knowledge sharing can be explained using the variables displayed in Table5.

Table4. Model summary of regression analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	0.920	0.846	0.833	0.383

Table5 illustrated the linear regression equation coefficients for the model variables. The equation would be y = -1142 + 0.257O2 + 0.149T2 + 0.247LD3 + 0.255LR2 + 0.259O5 + 0.171LR3.

Table5. Regression analysis coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig
	B	Std. Error	Beta		
(Constant)	-1142	0.295		-3864	0.000*
O2	0.257	0.089	0.243	2903	0.005*
T2	0.149	0.079	0.144	1889	0.063**
LD3	0.247	0.060	0.238	4108	0.000*
LR2	0.255	0.094	0.212	2705	0.009*
O5	0.259	0.102	0.191	2550	0.013*
LR3	0.171	0.082	0.123	2068	0.042*

*p < 0.050 , **p < 0.100

Han & Anantatmula (2007) showed that issues related to availability and usability of technology, leadership support and motivating structures had influence on knowledge sharing. In this research, place in an office with colleagues, trust-based relationship, informal relationship, knowledge sharing reward system, availability of organizational knowledge bases and easiness of knowledge sharing technologies usage were the output elements in a stepwise regression analysis to predict knowledge sharing. Figure2 illustrated final model.

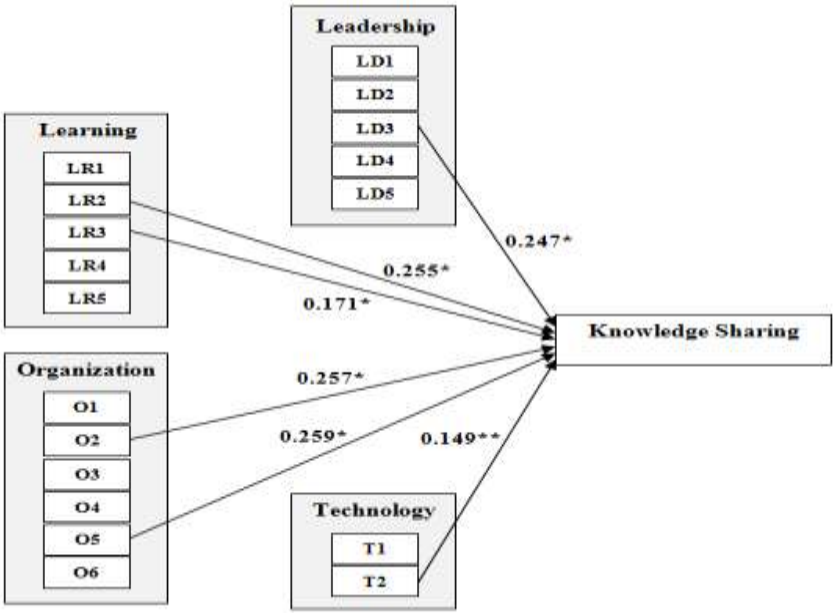

Figure2. Structural model

Conclusions

In this paper, the effect of knowledge management pillars on knowledge sharing were examined. Findings reveal that knowledge management pillars were positively related to knowledge sharing. Table6 demonstrated a summary of hypothesis tests. It also showed the percent of the variation in the knowledge sharing that can be explained by the predictors.

Table6. Summary of the hypothesis tests

Hypothesis		Supported	Predictors	% of the variation in KS
H1	KM pillars significantly influence KS	Yes	LD1, LD2, LD3, LD4, LD5, O1, O2, O3, O4, O5, O6, LR1, LR2, LR3, LR4, LR5, T1, T2	86.7
H2	Leadership significantly influences KS	Yes	LD1 , LD2 , LD3 , LD4 , LD5	67.4
H3	Organization significantly influences KS	Yes	O1 , O2 , O3 , O4 , O5 , O6	76.8
H4	Learning significantly influences KS	Yes	LR1 , LR2 , LR3 , LR4 , LR5	71.8
H5	Technology significantly influences KS	Yes	T1 , T2	59.3

* $p < 0.050$; ** $p < 0.100$

As indicated in Table3 there was no significant relationship among the mean of knowledge sharing in different clusters of respondents according to their gender, age, post, education and experience. It can be concluded that gender, age, post, education and experience of the respondents had no significant impact on the their knowledge sharing.

According to the findings, "place in an office with colleagues", "trust-based relationship", "informal relationship", "knowledge sharing reward system", "availability of organizational knowledge bases" and "easiness of knowledge sharing technologies usage" have the most impact on knowledge sharing respectively. If the ministry's executives are willing to promote knowledge management, the following concerns should be taken into consideration :

Information technology as a tool for knowledge sharing must be deployed to develop user-friendly applications due to the fact that a product that is difficult to figure out, inefficient to use, or poorly supported is not going to enchant users. Furthermore, employees access to organizational knowledge bases prompt existing knowledge utilization, in turn, lead to creation of new approaches and solutions for challenges and complications. Meanwhile, designing a reward system framework that evaluate workforces' shared knowledge so that owner of the approved ones get paid and admired according to framework's rules and regulations needs to be taken into account.

Working divisions should be laid-out in order to locate workforces of a division or the ones who take utmost advantage from their workmates' knowledge transmission in an office, otherwise they can be organized in a community of practice or problem-solving teams. Moreover, the staffs that have informal relationship with each other are more triumphant to reinforce mutual formal connections and therefore trust in each other more conveniently. Therefore, trust-based relationship among personnel bring about knowledge sharing augmentation. The optimum will be the climax at that point trust becomes the organizational culture.

An attention to the factors of knowledge management pillars that had no effect on employees' knowledge sharing needs to be paid in order to make a very positive contribution to these neglected factors. Then, the research should be repeated to determine the factors that significantly influence employees' knowledge sharing again. In each iteration of the cycle the disregarded factors that can be enhanced will be identified.

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Appendix Table. Measurement items

Construct	Label	Measure	Mean
Leadership	LD1	Top manager support for knowledge sharing	2.49
	LD2	Employees participation in formulating vision, missions and goals	1.57
	LD3	Knowledge sharing reward system	2.00
	LD4	Recognition for knowledge sharing	1.52
	LD5	Sharing knowledge with subordinates	2.48
Organization	O1	Knowledge sharing culture	2.50
	O2	Trust-based relationship	3.07
	O3	Performance appraisal according to shared knowledge	1.97
	O4	Place in an office with colleagues	3.98
	O5	Doing work via knowledge utilization	3.48
	O6	Suggestion and innovation committee	2.05
Learning	LR1	Teamwork and cooperative climate	2.03
	LR2	Informal relationship	4.01
	LR3	Availability of organizational knowledge bases	2.49
	LR4	Participate in training courses, seminars, conferences and etc	2.56
	LR5	Knowledge transmission among colleagues at a peculiar time and place	2.54
Technology	T1	Knowledge sharing technologies availability	2.51
	T2	Easiness of knowledge sharing technologies usage	2.95
Knowledge sharing			3.05

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