

Investigation of Knowledge Management (KM): The Case of Iranian Agricultural Experts

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Abstract

Nowadays efficient and productive knowledge management is a key competency for organizations and require proper arrangement of factors such as people, processes and organizational infrastructures. The purpose of this study was to investigate attitude and skill in applying knowledge management (KM) of agricultural experts. The paper was conducted using survey research. The sample was consisted of 120 experts in Jihad-e-Keshavarzi Organization of Mazandaran province. Data was gathered using questionnaire. The most important findings of the study showed that monthly income, organizational characteristics of experts, group-human factors, infrastructural factors, strategic and management factors, structural and process factors, access to information resources and technologies and attitude to development of knowledge management had positive and significant correlations with skills in applying knowledge management. Results of stepwise regression analysis also showed that independent variables of access to information resources and technologies, structural and process factors, organizational characteristics of experts, infrastructural factors, group-human factors and monthly income explained 50 percent of the variability in the skill in applying knowledge management.

Keywords: Knowledge management, Experts, Jihad-e-Keshavarzi, Mazandaran, Iran

1. Introduction

In the age of communication, knowledge is considered as essential and vital source of organizations for sustained competitive advantage. Along with a rotation of the industry-based economy to a knowledge-based economy, organizations also have to rely on their own knowledge and using it to increase competitive ability in business process. Organizations generally rely to two categories of assets; tangible assets and intangible assets. Until recently, acquisition and optimization of tangible assets such as machinery and equipment was important for organizations. But today organizations have realized that intangible assets such as intellectual capital, experiences, organizational knowledge and information are contribute to the success and survival of an organization. In fact, to achieve optimal productivity should give importance to what know (intellectual capital) more than what are (physical capital) (Ansari Ranani and Ghasemi Namaghi, 2011). Knowledge-based organization is different from previous organizations. This type of organizational structure is designed to produce, access, sharing, and applying knowledge (Golchinpour, 2008). So far, many authors have proposed models of knowledge management process, which some of them are listed in table 1. In the models listed in table 1, the four stages of knowledge creation or acquisition, knowledge classification or sharing, storage of knowledge, and application of knowledge are jointly considered. In model of Probst et al. (2002), in addition to the three stages of the acquisition, selection and application of knowledge, internalization and externalization of knowledge has been also seriously discussed.

Table 1. Models of knowledge management systems

Theorists	Model Elements					
	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Depres and Chauvel, 1999	Knowledge creation	Compose/ Classification	Storage	Sharing/ Transfer	Reuse	Conclusion
Lee and Hong, 2002	Knowledge capture	Spread	Formalization	Sharing	Applying	
Nevis et al., 1995	Knowledge acquisition	Knowledge sharing	Applying knowledge			
Probst et al., 2002	Knowledge acquisition	Knowledge selection	Internalization of knowledge (assessment)	Applying knowledge	Externalization of knowledge	

In this research, model of Probst et al. (2002) was used because more practical and more comprehensive than other models. Knowledge management process in this model includes knowledge acquisition, knowledge selection, internalization of knowledge, application of knowledge, and externalization of knowledge (Zahedi and Najjar, 2009 ; Kazeminejad et al., 2011).

Information, knowledge, technology and skills in agricultural organizations should be organized in a proper way. Organizing information and knowledge in organizations, especially the kind of knowledge that is consistent with the climatic conditions of each region, is considered as one of the main tasks of agricultural management. This knowledge may be documented at various levels of organizations or that began to be experimentally accessible. The sector of knowledge management identifies knowledge gaps in organization and providing necessary conditions for people to interact and exchange experiences in the right direction to avoid wasting time (Shahvali and Lachini, 2007). The purpose of this study is to identify attitude and skill of experts in Jihad-e-Keshavarzi Organization in the Mazandaran province in applying knowledge management and assess factors affecting it.

Shakeri et al. (2010) in their study assessed the knowledge management process in Yazd Agricultural and Natural Resources Research sector using a general assessment framework (leadership, policy and strategy, human resource management, processes and resources). The results showed that only two dimensions of human resources management and resources and partnerships affected on knowledge management. TOPSIS Technique showed that the team working, identifying the competencies of individuals and the composition and distribution of staff suggestions, adequate facilities to carry out research projects, and transferring new research findings had the greatest impacts on knowledge management. Akhavan et al. (2011) study on the development of knowledge management processes based on the factors affecting the success of knowledge management cycle revealed that according to Friedman ranking, incentives and motivational factors, senior management support and leadership, teamwork, knowledge transfer channels, continuous learning, trust, employee empowerment, open space in organization, culture, employee training, employee involvement and participation issues, strategies and objectives of management and job security had highest impacts in the process of production, distribution and use of knowledge. The results of Mokhtarnia et al. (2009) in examination of relationship between attitude and skill in using information technologies and knowledge management between agricultural extension experts in eight selected provinces of Iran showed that six factors of knowledge management (knowledge acquisition, knowledge sharing, knowledge evaluation, knowledge creating/saving and removing, knowledge publishing/application and document management) had positive and significant correlation with dependent variables of extension experts attitude and skill in applying information technology. According to the study of Ommani et al. (2011), the correlation between job motivation and status of knowledge acquisition and absorption with attitude towards knowledge management was significant. Also association between organizational culture and attitude of managers, was significant. The results also showed that organizational culture, leadership style and knowledge about Information Technology (IT) can explain 37 percent of variances in attitude of managers and senior experts regarding the development of knowledge management in Jihad-e-Keshavarzi in Khuzestan province in Iran. Torres et al. (2011) reported that the practice of knowledge management can be initiated within the research process itself. This means that it can be inserted into the process from the moment the research problem is first conceived to its final outcome. This new approach, which has been implemented by the INTAGRO Project team,

has been emphasized the new way of thinking about knowledge in the field of operations research, development and innovation. Assefa (2010) found that Ethiopian dairy producers' knowledge about health and nutrition needs of their livestock, pastures conditions and livestock selection with various methods have acquired agriculture and rural development organizations (BWARDO), their own experience neighbours and family. These methods are included farmer's observations, listening to radio, experiencing sharing sessions and on-farm demonstrations. They also transferred their knowledge to their neighbours, friends, relative and children.

There are several models to examine the relationship between attitudes and behaviour. Azjen and Fishbein have suggested that demographic variables, knowledge and observations affect the beliefs. Beliefs affect the attitudes, intentions, and finally behaviours. In this model, attitude and subjective norm influence behavioural tendencies (Veisi et al., 2008). In other words, the individual tends to behave in a certain way based on their attitude toward the behaviour and subjective norms, which cause the social pressures of group to individuals to perform the behaviour in the specific path (Rehman et al., 2003). According to the studies, and the model presented in this study, the outlined theoretical framework is considered to explain the relationship between research variables (Figure 1).

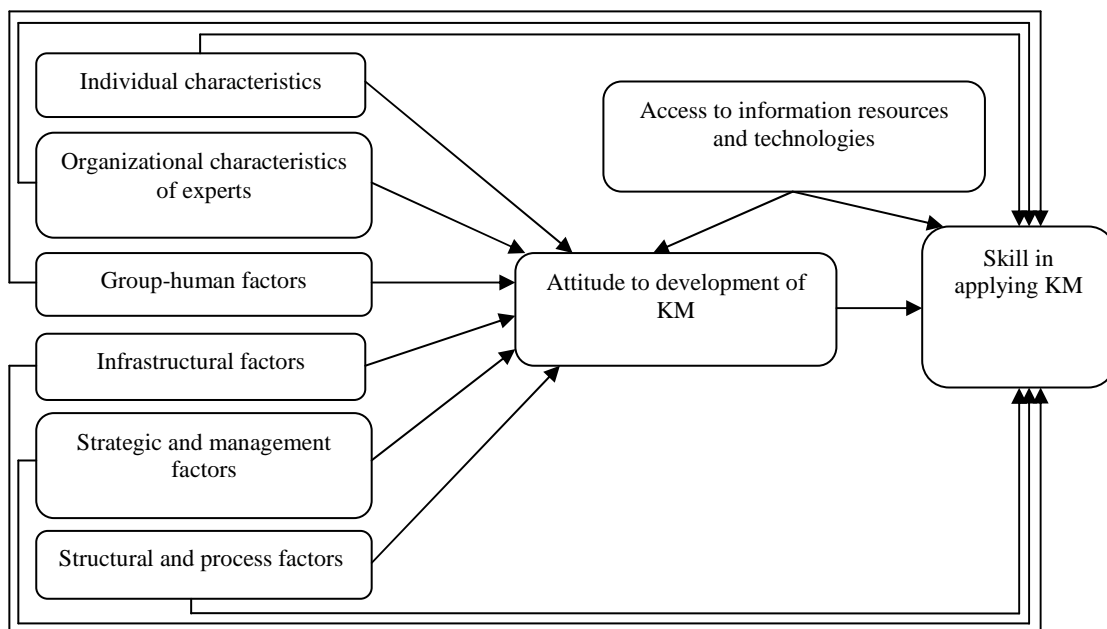


Figure 1. Framework of Research

2. Materials and Methods

This study is a quantitative research and in term of the control of the variables is non-experimental research. The experts of headquarter in Jihad-e-Keshavarzi in the Mazandaran province are statistical population in this study. According to Krejcie and Morgan (1970), 120 experts were selected as the sample. Data was collected through questionnaire using random sampling technique. Panel of Experts method was used to assess the validity of the questionnaire. For measuring the reliability of the questionnaire, a pilot study used to compute Alpha Cronbach's Coefficients. Alpha Cronbach's Coefficients for different sections of the questionnaire calculated 0.7 to 0.91. The data was analyzed using SPSS_{win18} software. Variables and criteria used in this study are included:

- Attitude towards development of KM: This variable refers to ideas associated with development of KM. This was measured with 9 items about the impacts of KM development, such as encouraging teamwork, avoiding duplication and repetition, increasing productivity, reducing costs caused by frequent errors, greater access to knowledge resources and ability to store more knowledge by experts, continuous learning, effective participation and involvement of employees at all levels to achieve organizational goals. To measure the responses of the experts, Likert spectrum (highly agree, agree, no opinion, disagree and highly disagree) was used.
- Organizational characteristics of experts: This variable measures the impact of organizational features

of experts such as the ability of employees to meet expectation in knowledge management process, financial and moral support of staff to create a sense of loyalty in employees to organization, safe and secure environment of job and the trust in knowledge sharing for development of KM in organization. Four items designed using Likert spectrum (very low, low, medium, high and very high).

- Group-human factors in organization: This variable measures the effect of group-human factors such as active participation and involvement of employees in the affairs of the organization, provide staff training needs, provide timely training for staff, foster a spirit of teamwork based on the mutual trust and empowering managers to evaluate the skills of staff. Five items designed to measure this variable and was evaluated using a range of five options (very low, low, medium, high and very high).
- Infrastructure factors: This variable means the impact of infrastructural factors such as technical infrastructure, knowledge infrastructure, financial infrastructure, human and cultural resources in development of KM. The variable was measured using 4 items and the range of five options (very low, low, medium, high and very high).
- Strategic and management factors: This variable measures the effect of strategic and management factors include financial and moral support of senior manager of KM strategy in organization, conjunction of organizational resource management (training, decision making, performance evaluation, reward and punishment) with KM, use of knowledge and information as a basis for the purposes and strategies of organization, willingness and ability of senior manager to communicate between organizational strategic needs and operational issues of staff to developing KM in organization. To measure the variable 4 items designed and Likert spectrum used (very low, low, medium, high and very high).
- Structural and process factors: This variable indicated the effect of structural and process factors such as remove constraints, complexity and high recognition in organization, continuous learning at all levels of the organization, having a framework and processes to identify, acquire and disseminate KM through different channels in development of KM. The variable was measured using 4 items and the range of five options (very low, low, medium, high and very high).
- Skills to apply KM: This variable means using KM principles by experts. To measure this variable 16 items was designed include the use of existing knowledge to improve organizational performance, activities and tasks carried out as a group to exchange information, ideas and knowledge with other experts and senior managers, ensure the sharing of knowledge, documenting organizational successes and failures to future action, use of the knowledge transfer networks to gain and share knowledge, using knowledge and experience of retired and veteran personnel to do things better, use of courses within and outside the organization to gain and share knowledge, use a question and answer session to learn and share knowledge, participate in local, national and international conferences, using knowledge of staff who come from outside the organization, and using indirect methods of knowledge transfer such as job rotation and informal networks. This variable was measured using a spectrum of five options (very low, low, medium, high and very high).
- Access to information resources and technologies: This variable means access of staff to training courses inside and outside the organization, conferences and seminars inside and outside the organization in local, national and international levels, question and answer session and focus groups, internet and intranet, local and international magazines and books to gain new knowledge and information. This variable was measured using 7 items and the range of five options (very low, low, medium, high and very high).
- Personal characteristics: These characteristics include age, level of education, organizational position, field of study, income and work experience.

3. Results and Discussion

The findings showed that the average age of experts was 41.5 years. The average education was 16.5 years (Bachelor level). The average work experience of experts was 17.3 years. Table 2 shows the frequency and percentage of experts on the basis of scores obtained for attitude towards development of KM. The results indicated that the greater percentage of experts with 78.3% have gained the scores between 27 and 36. In fact, more experts have gained scores over the average.

Table 2. Distribution of experts based on the scores of attitude towards development of KM

Score	Frequency	Percent	Cumulative Percent
0-9	0	0	0
9-18	0	0	0
18-27	26	21.7	21.7
27-36	94	78.3	100
Total	120	100	-

Mean = 30 Minimum = 19 Maximum = 36

Notice: Domain score of attitude towards development of KM is 0-36.

Also, ISDM¹ method was used to assess the skill in applying KM. This variable was grouped according to the mean, standard deviation using the following formula:

A = Low

B = Relatively Low

C = Relatively High

D = High

$$A < Mean - SD$$

$$Mean - SD < B < Mean$$

$$Mean < C < Mean + SD$$

$$Mean + SD < D$$

Table 3 shows the results of this analysis. Results indicate that 13.3 percent of respondents have low skill, 33.3 percent have relatively low skill, 39.2 percent have relatively high skill and 14.2 percent of respondents have high skill in applying KM in organization.

Table 3. Distribution of experts based on the level of skill in applying KM

Level of Skill	Frequency	Percent	Cumulative Percent
Low	16	13.3	13.3
Relatively Low	40	33.3	46.7
Relatively High	47	39.2	85.8
High	17	14.2	100
Total	120	100	-

Maximum = 48 Mean = 30.94
 Minimum = 11 Std. Deviation = 8.19

The correlations between independent variables and attitude in the development of KM have been shown in Table 4. The results showed that variables of organizational characteristics of experts, group-human factors, strategic and management factors, access to information resources and technologies had positive and significant correlations in the level of 0.05 with attitude towards development of KM. Also two variables of infrastructural factors and attitude towards development of KM had positive and significant association in the level of 0.01. The results of Ommani et al. (2011) based on the correlation between infrastructural factors, especially cultural factors in organization and attitude towards development of KM is consistent with this finding.

Table 4. Correlation of variables with attitude towards development of KM

Variables	Correlation Coefficient (Pearson)	Significant Level
Age	-0.072	0.434
Level of education	0.145	0.114
Monthly income	0.040	0.721
Work experience	-0.046	0.620
Organizational characteristics of staff	0.199	0.029
Group- human factors	0.182	0.046
Infrastructural factors	0.322	0.000
Strategic and management factors	0.190	0.037
Structural and process factors	0.158	0.085
Access to information resources and technologies	0.184	0.044

¹. Interval of Standard Deviation from the Mean

Table 5 reports the correlations between independent variables and skill of experts in applying KM. Findings of this study showed that according to Pearson Correlation Coefficient (0.234) and significant level (0.033), two variables of income and skills in applying KM have positive and significant correlation. Also there is a positive and significant correlation between organizational characteristics and skill in applying KM ($r = 0.184$). The findings of Akhavan et al. (2011) supported this finding. Variables of human-group factors ($r = 0.356$), infrastructural factors ($r = 0.362$), strategic and management factors ($r = 0.353$), structural and process factors ($r = 0.357$) had positive and significant correlations with skill in applying KM in the level of 0.01. This findings are consistent with Shakeri et al. (2010) and Akhavan et al. (2011) findings. Variables of access to information resources and technologies ($r = 0.598$) and attitude towards development of KM ($r = 0.249$) had positive and significant correlation with skill in applying KM in the level of 0.01. These results are consistent with Mokhtarnia et al. (2009) and Aseffa (2010) findings.

Table 5. Correlation of variables with skill in applying KM

Variables	Correlation Coefficient (Pearson)	Significant Level
Age	-0.141	0.126
Level of education	0.057	0.534
Monthly income	0.234	0.033
Work experience	-0.035	0.704
Organizational characteristics of staff	0.184	0.045
Group- human factors	0.356	0.000
Infrastructural factors	0.362	0.000
Strategic and management factors	0.353	0.000
Structural and process factors	0.357	0.000
Access to information resources and technologies	0.598	0.000
Attitude towards development of KM	0.249	0.006

In the next section, variables of access to information resources and technologies, organizational characteristics, infrastructural factors, human-group factors, strategic and management factors, structural and process factors, attitude towards development of KM, skill in applying KM and personal characteristics analyzed among different groups of experts. The results have presented in the Table 6. According F-statistic values and significance levels, between the average scores of experts in attitude towards development of KM, skill in applying KM, infrastructural factors, human-group factors, strategic and management factors, structural and process factors, age and work experience in four departments of Jihad-e-Keshavarzi in the Mazandaran province were not significant difference. In four departments, scores of attitude towards development of KM, infrastructural factors, human – group factors, strategic and management factors, and structural and process factor is over the average. Also the skill in applying KM in three departments of planning and economic affairs, livestock productions improving, and development of human resources management are below the average, and the average of scores between experts of plant production improving department is higher than average (according to the range rating of variable). According to the F-statistic (5.526) and significance level (0.001), average scores of access to information resources and technology in departments is observed significant difference in the level of 0.01. Tukey’s test indicated that the mean score for this variable in plant production improving department (15.76) was higher than other departments. In other words, experts in this department had greater access to information resources and technologies. Also based on the F-statistics (5.162) and significance level (0.002), the average scores in organizational characteristics of experts in departments was significant different. Tukey’s test indicated that the average score for this variable in department of planning and economic affairs (12.06) was higher than other departments. According to the F- statistics for two variables of education level (3.061) and monthly income (4.670) and significance levels, between the average scores of these variables in departments was observed significance different. According to the Tukey’s test results, the average of education level and income in plant production improving department was more than other departments.

Table 6. Analysis of variance based on the departments in Jihad-e-Keshavarzi in the Mazandaran province

Department Variable	Planning and Economic Affairs	Animal Production Improving	Plant Production Improving	Development of Human Resource Management	F- statistic	Significant
Age	43.73	40.03	42.26	40.23	1.339	0.265
Level of education (years)	16.53 ^{ab}	16.40 ^{ab}	16.73 ^b	16.13 ^a	3.061	0.031
Monthly income (Million Rials)	7.35 ^b	6.82 ^{ab}	7.70 ^b	6.02 ^a	4.670	0.005
Work experience (years)	18.33	16.26	18.30	16.26	0.568	0.637
Access to information resources and technologies	12.20 ^{ab}	9.43 ^a	15.76 ^b	11.86 ^{ab}	5.526	0.001
Attitude towards development of KM	29.90	30.30	30.00	30.60	0.307	0.820
Skill in applying KM	30.70	31.16	32.53	29.36	0.757	0.520
Organizational characteristics of experts	12.06 ^b	10.70 ^{ab}	9.66 ^a	9.80 ^a	5.162	0.002
Infrastructural factors	11.06	10.23	10.60	10.73	0.359	0.782
Group- human factors	14.53	14.20	13.33	13.50	0.900	0.443
Strategic and management factors	12.00	11.03	10.90	10.66	1.119	0.345
Structural and process factors	11.13	10.13	10.36	9.56	1.617	0.189

Note 1. The range of scores in access to information resources and technology is 0-28, attitude towards development of KM is 0-36, skill in applying KM is 0-64, organizational characteristics of experts is 0-16, infrastructural factors is 0-16, group-human factors is 0-20, strategic and management is 0-16, and structural and process factors is 0-16.

Note 2. Comparisons of departments are based on Tukey HSD test

In order to predict the variability of skill in applying KM by the independent variables Stepwise Regression Analysis was used. The variables used in this analysis were monthly income, organizational characteristics of staff, group- human factors, infrastructural factors, strategic and management factors, structural and process factors, access to information resources and technologies, and attitude towards development of KM. Based on the computed regression coefficients (B) and constant coefficient, regression equation is as follows:

$$Y = 16.962 + 0.476X_1 + 1.738X_2 - 1.477X_3 - 0.939X_4 + 0.695X_5 + 0.735X_6$$

The results showed that the independent variables of access to information resources and technologies, structural and process factors, organizational characteristics of experts, infrastructural factors, group- human factors, and monthly income explained 50% of the variability in the skill in applying KM (Table 7). Also, based on the Beta coefficients to determine the contribution of independent variables in explaining the dependent variable, structural and process factors have the most important role in explaining the variability of this variable.

Table 7. The results of stepwise regression analysis with dependent variable of the skill in applying KM

Independent Variable	B	SE B	Beta	T	Tsig	R	R ²	R ² Adj
Access to information resources and technologies (X ₁)	0.476	0.125	0.356	3.811	0.000	0.524	0.274	0.265
Structural and process factors (X ₂)	1.738	0.393	0.650	4.425	0.000	0.558	0.312	0.294
Organizational characteristics of staff (X ₃)	-1.477	0.290	-0.540	-5.092	0.000	0.673	0.452	0.432
Infrastructural factors (X ₄)	-0.939	0.287	-0.428	-3.273	0.002	0.696	0.484	0.458
Group- human factors (X ₅)	0.695	0.328	0.318	2.120	0.037	0.716	0.513	0.481
Monthly income (X ₆)	0.735	0.362	0.166	2.029	0.046	0.733	0.538	0.501
Constant	16.962	3.759	-	4.512	0.000	-	-	-

F = 14.737

Signif F = 0.000

4. Conclusion

Nowadays, the issue of knowledge in organizations, especially agricultural organizations to transition from the industrial age to the knowledge age is essential as a key element in survival of organization. This research has been conducted to assess attitude and skill of experts in Jihad-e-Keshavarzi Organization in the Mazandaran province. The experts had attitude towards development of KM more than average. More than half of the experts had high and relatively high skill in applying KM. Organizational characteristics of experts are related with improving skills in applying KM. In other words, with improving organizational features such as the ability of experts to meet expectations in KM process, financial and moral support from the experts, creating a safety space in organization and trust of experts to share their knowledge, improves their skill in applying KM. According to the results, improvement of human-group factors (active participation of staff, training employees in a timely manners and in accordance with their needs, foster a spirit of teamwork and empowerment of managers for evaluating skills of employees), infrastructural factors (technical, knowledge, financial, human resources and cultural infrastructures), strategic and management factors (financial and moral support of KM strategies by senior managers, conjunction of human resources management with KM, use of knowledge and information as a basis for organizational strategies, and ability of senior management to communicate the organizational needs and operational issues of staff), structural and process factors (removing constraints in the organization, continuous learning, frameworks to identify, acquire and disseminate knowledge and knowledge transfer through various channels) improve skills in applying KM. Also with increase access to information resources and technologies, such as training courses within and outside the organization, conferences and seminars within and outside the organization, question and answer sessions and group discussions, use of internet and intranet, use of foreign and domestic books and magazines improves the skills of experts in applying KM. The results showed that the independent variables of access to information resources and technologies, structural and process factors, organizational characteristics of staff, infrastructural factors, group- human factors, and monthly income explained a major part of the variability of skill in applying KM. Among these variables, structural and process factors had the most important role in explaining the variability of the skill in applying KM.

According to the findings, the following recommendations are offered:

- Considering the association between organizational characteristics of experts, human-group factors, infrastructural factors, strategic and management factors, structural and process factors with skill to apply KM, is recommended that KM positions in organizational structure fully be identified and be designed necessary standards in agricultural organizations. Also staff awareness of the knowledge

benefits be increased. Suggestions system and culture of question and study should be institutionalized in organization. Participation of staff should be used to find ways to improve their productivity and satisfaction. Processes, procedures and guidelines in the organization should be continually revised.

- Also according to the obtained results between income and attitude of experts towards development of KM with skill in applying KM, is recommended the changes in human attitude towards knowledge sharing, reform of salary system to increase staff motivation and strengthening culture of knowledge sharing in the organization through designing efficient system in information flow and thus innovation system in organization.
- Considering the relationship between use of information resources and technologies, and KM skills, we can help the staff by providing greater access to information technologies and encourage them to use these resources, especially training courses, national and international conferences, thinking and group discussion sessions to improve their skills in applying KM.

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