Required Infrastructures for Implementation of Knowledge Management System in the Masjed Soleyman Oil and Gas Production Company

Ali Akbar Ahmadi  
Department of Management, shoushtar Branch, Islamic azad university, shoushtar ,Iran

Mansoor Momeni  
Department of Management, shoushtar Branch, Islamic azad university, shoushtar ,Iran

Farokh Ahmadi  
Department of Management, shoushtar Branch, Islamic azad university, shoushtar ,Iran

Abstract
In the present knowledge-based era wherein knowledge is considered as the most important asset for every organization and community many organizations have made the attempt to implement knowledge management system within their organizations in order to reach knowledge-based goals and strategies utilizing its advantages in favor of their competitive advantage as well as survival of their organizations. If organizations wish to use countless benefits of the knowledge management system they have to provide proper infrastructural factors for this purpose. The present research intended to identify required infrastructures for implementation of knowledge management system within the Masjed Soleyman Oil & Gas Production Company. After identification of the said infrastructures by use of Lee & Choi model the researcher investigated its status and prioritized the infrastructural factors for introducing desirable mechanisms. Based on the outcome of the research infrastructures like organizational structure, organizational culture and information technology were found to be well prepared for implementation of knowledge management but the human resource failed to meet the desired preparedness in this respect. It must be mentioned that investigation of infrastructural factors is the important primary step that can lay a solid foundation for the future steps to this end.

Keywords: Knowledge Management(KM), Infrastructure, Organizational culture, Organizational structure, Human Reasource, Information Technology

Introduction
Knowledge is the most important asset for an organization to create value and sustainable competitive advantage(Chen,2011). Knowledge management aids in the planning, organizing, motivating and controlling of people, processes and systems in an organization in order to ensure that its knowledge-related assets are continuously improved and effectively employed (Rajesh et al., 2011). The foremost purpose behind the present research was to find out to what extent the Masjid Soleyman Oil & Gas Production Company enjoys the desired technological (information technology), structural and cultural infrastructures as well as talented human resources for the implementation of knowledge management system within this organization.

Today, managers have become well aware of the significance of knowledge management within organizations and many of them are seeking to implement this system within their organizations. At the same time they are concerned that they might not be able to have it implemented within their organizations in a proper desired manner facing a possible failure in this respect. Therefore in view of the fact that successful implementation of the knowledge management system is necessary for them to survive within a competitive environment it is very important for them to know whether, basically, their organizations are well prepared to have it implemented or not? At the same time leaders and managers of organizations are always facing this question that where they need to begin. And whether their organizations are ready to embark on its process or not? (Holt, et al, 2007). It goes without saying just like
other similar cases if we can identify the presumptions and required grounds for implementation of knowledge management system within our organization then in the next step we can have it successfully implemented in a desired manner. And for having a successful knowledge management system we need to have or build its required infrastructures.

Knowledge management enablers are the mechanisms for organizations to develop its knowledge and stimulate the creation of knowledge within the organization as well as the sharing and protection of it (Yeh et al, 2006). In the present research the knowledge management infrastructures were identified and extracted based on Lee& Choi model (2003) consisting of four dimensions of culture, structure, individuals (as the human resource) and information technology.

Theoretical Foundations

Knowledge Management Infrastructure

KM has been defined as a strategy for managing organizational knowledge as a corporate asset and harnessing processes such as creation and acquisition, storage, share and dissemination, retrieval and use of tacit and explicit knowledge (Cardoso, 2003; Cardoso and Gomes, 2011; Davenport and Prusak, 1998; Nonaka and Takeuchi, 1995). Knowledge management approaches means that companies and organizations are creating competitive advantages through continuous learning and formulation of different types of knowledge (Ignacio et al, 2008). Knowledge management enabler’s factors are essential infrastructure for increasing the efficiency of knowledge management activities. The most important knowledge management enabling factors are technology, organizational structure and organizational culture (Gold, 2001). Every organization who wishes to embark on implementation of knowledge management is needed to identify factors affecting knowledge management and provide the required ground for this purpose. The enablers have the power to lead the knowledge management within the organization. They persuade members of the group to share their knowledge and experience with others providing suitable environment for the organized and outright growth of the organizational knowledge.

Knowledge enablers, also characterized as influencing factors, can facilitate such knowledge management activities as codifying and sharing knowledge assets among individuals (Chan and Chau, 2005). Based on different studies, 3 key knowledge management and organizational efficiency enabling factors are identified. They are technology, structure and culture. These studies present strong evidence regarding the impact of Knowledge management enablers and processes on knowledge effectiveness (Gold et al, 2001). In another study the relation between organizational elements and knowledge exchange process in private institutes was analyzed. In this research, five important enabling factors are identified: organizational culture, organizational structure, technology, human sources and political factors. The results show that enabling factors can affect knowledge management in the organization (Syed-Ikhsan and Rowland, 2004).

In the present research Lee&Choi scale was used to measure knowledge management enabling factors including: organizational culture, organizational structure, individuals (the human resource) and information technology. Knowledge management enabling factors were utilized as factors for measuring readiness of organizations for implementation of knowledge management. The factor of technology refers to the information technology supported within organization. Two basic dimensions of formalization and centralization are defining the organizational structure (Tata and Prased,2004). And organizational culture includes cooperation, trust and motivation for knowledge sharing within organization (Detinne,et. al, 2004). Since practicing changes within organizations is not possible without involvement of individuals we need to give priority to the human resource for measuring the preparedness and accordingly successful implementation of knowledge management.
Organizational Structure
Organizational culture is a set of values, beliefs, norms, meanings and procedures shared by organization members (Roobin, 2004). Organizational culture affects knowledge management by influencing values of members of the organization and their individual behaviors in dealing with the collective behaviors. Organizational culture affects knowledge transfer as well. Individuals are assumed as knowledge owners who are responsible to do the knowledge sharing. When individuals get involved in the knowledge management process they reflect their values within organization and in the course of time knowledge management will be turned into a segment of the organizational culture (Alavi, et al, 2005). Organizational culture is a very important factor in effective knowledge management. An effective organizational culture can have a stimulating role by providing a suitable environment for knowledge exchange and supporting the knowledge activities (Janz and Prasamphanich, 2003). An organization must have a powerful culture in which values, trust, openness and sociability to stimulate people's interaction and knowledge sharing (Ngok, 2005). According to researchers findings, collaboration, trust and incentives are three major dimensions of organizational culture (DeTienne, 2004).

In the works released on the knowledge management, promotion of organizational culture in favor of further knowledge sharing has been highly emphasized. Knowledge management is in fact a tool that makes it possible for managers to employ knowledge and establish, maintain and use the desired relationships between the available knowledge and the current status and circumstances of the organization (Ajmal and Koskinen, 2008). At the same time organizational culture might prevent the efforts made for organizational changes supposed to be implemented based on knowledge management plans (Yeh, 2005). And most researchers and scholars believe that organizational culture is the most important factor for having a successful knowledge management process (Schult et al., 2006).

Organizational Structure
The structure refers to the relations between the components of an organized collection (hatch, 1998). Organizational structure defines how job tasks are formally divided, grouped, and coordinated (Robbins, 2006). Two of the most common dimensions of structural frameworks are centralization and formalization. Centralization is the degree of authority and control over decisions within every organization and formalization is the degree of formal rules, procedures, and standard polices governing work relationship and decisions (Lee&Choi, 2003).

The more flexible the organization structure is, the more important the distribution and the more limited their thinking will be. Organizational structures are not usually made to be responsive to knowledge management needs. Geographical or functional obstacles may make knowledge distribution difficult or even impossible. Companies need structures based on specific subjects or interests such as capability centers or learning scenes in addition to geographical or functional structures (Probast et al, 2000).

An effective knowledge management structure can lead to creativity and immediate compatibility within organization. Structural components often restrict cooperation and knowledge sharing being turned into an obstacle to the knowledge management effectiveness and cooperation is the basic factor for creation and transfer of knowledge. Although relevant experts have stipulated that individuals can put away organizational structures by development of their respective processes (Alavi, 2006).

The Human Resource
In the era of knowledge most organizations have reached the conclusion that their success is indebted to the experiences and skills of their staff rather than their financial assets and physical possibilities. Now all organizations know well that knowledge, as an important asset, used for the purpose of their better performance shall be managed accordingly just like
other organizational assets (Watson, 2003). By going through texts and literature on knowledge management we can find out that human resources and knowledge management are closely inter-related to each other and until now so many knowledge management plans have failed due to the failure to take the human factor into the account. Going through around 431 private organizations Ruggles (1998) reached the conclusion that the main obstacle to desired implementation of knowledge management within these organizations was related to the human factor. Therefore if we wish to successfully implement knowledge management related plans within our organizations we need to give priority to the role of the human resource. The most important factor in managing knowledge is to make it possible for latent knowledge of individuals within organization to be shared and used by others and later turned into inter-organizational knowledge. For the success of every organization, knowledge as a valuable asset, shall become exchangeable among all individuals and shall be developed accordingly. On the other hand individuals, without enjoying support of each of the said organizational factors including organizational structure, leadership and strategy, organizational culture and information technology that are considered as the necessary factors in favor of organizational preparedness for employing knowledge management, will become anxious and concerned in the relevant knowledge management processes (Jalaledeen et. al, 2009).

Since practice of any change within organizations is not possible without direct involvement of individuals (Gaffoor, 2008) we need to pay particular attention to the human factor for proper assessment of organizational readiness and accordingly successful implementation of knowledge management.

**Information Technology**

Information technology as the major factor responsible for maintaining knowledge management efforts is one of the most important knowledge management enablers within every organization (Yeh et al., 2006)(Gaffoor,2008). Knowledge management is a method used for working activities rather than a technology or product. This occurs while knowledge management is vital for success of knowledge management systems. By providing organizational architecture information technology prepares the ground for utilization of knowledge management. The knowledge management systems can be developed by use of three categories of technology: information technology, collaboration, saving and retrieval (recovery) technology and communication technology facilitating access of users to the required knowledge and further communication among users particularly the experts. Collaboration technology provides required tools for embarking on collective activities and work. Saving and retrieval (recovery) technology makes it possible for saving and management of knowledge by use of a data management system (Turban et. al, 2006). As the matter of fact information technology is playing important role in managing knowledge, backing up the knowledge reservoirs, increasing access to knowledge, transferring knowledge and facilitating knowledge environment. Information technology also makes easy individual, collective and organizational interaction and as an enabling tool it contributes to creation of knowledge creation activities within scientific environments (Tian et al., 2009).

Without suitable information technology(IT) tools, knowledge management can not implemented because IT is a foremost enabler for knowledge management implementation. Different authors have analyzed the significance of IT as key knowledge management critical success factors for knowledge management implementation(Mobashar, 2010). A technological infrastructure, just like an efficient communication network, can remove obstacle to communication between organizational departments making possible knowledge to be distributed within organization (Holsapple, 2006). Relevant researchers believe that technology is a basic element in knowledge creation and distribution (Alavi. 2006).
The Theoretical Frame Work Of The Research
With respect to the knowledge management literature several researches have been done resulted in production of large number of relevant models. It is to be noted that the Lee and Choi (2003) model has been used as the basic frame work of all these works wherein measurement and assessment tools have been employed.
In an article released by Lee and Choi in (2003) titled “Knowledge management enablers, processes and organizational performance” based on PhD thesis of Dr. Choi from Korea Advanced Institute of Science and Technology, knowledge management has been introduced as one of the most important paradigms in the new business environment that is naturally given high priority by several researchers. In the said article Lee and Choi put knowledge management variables in two organizational and technical categories. The organizational category included culture, structure and individuals and the technical category included information technology.
It is worth mentioning that different categories also produced on infrastructures or enablers of the knowledge management that are common to a certain extent. For the present research knowledge management infrastructures have been extracted based on Lee and Choi model (2003) including four dimensions of information technology, organizational structure, organizational culture and the human resource. The infrastructural factors also were introduced for the knowledge management system and the research conceptual model.

Research Methodology
In view of its purpose the present research is an applied research and because it investigated the current situation and described demographic characteristics is considered as a descriptive survey research as well. The statistical community for the present research included full time staff (holding high school diploma and above) of the Masjed Soleyman Oil & Gas Production Company (541 individuals) out whom 226 were selected as samples based on Krejcie and Morgan’s (1970) table. The information gathering tools included library sources, articles and case studies. For collecting data on dimensions of technology, structure and culture the field method was employed using Lee and Choi (2003) questionnaire. For the human resource dimension the Rampersad (2002) questionnaire was utilized using the 5-point Likert Scale including “totally agree”, “agree”, “agree to some extent”, “disagree” and “totally disagree” comprising 34 questions on the relevant components: 12 questions on the organizational culture, 10 questions on the organizational structure, 7 questions on the human resource and 5
questions on the information technology. Therefore 320 questionnaires were distributed among members of the statistical community based on stratified random sampling method out which 226 were collected as the samples and analyzed accordingly. In view of the fact that the standard questionnaire was used for the purpose of the research validity of the measurement tool was confirmed and for calculating the reliability coefficient the Cronbach Alfa was used. Based on the calculations the reliability coefficient was resulted as follows: 0.94 for the culture, 0.76 for the structure, 0.84 for the human resource, 0.90 for the information technology and 0.95 for the whole questionnaire implying desirable coefficients. Therefore it can be admitted that the tools used for the purpose of the research were of required validity. For carrying out the analysis in the research the descriptive statistics method (frequency, frequency percentage, mean and standard deviation) and inferential statistical method (one variable t and Freidman test) were utilized. For testing the hypotheses and analyzing the collected data the SPSS software (18th edition) was used.

Findings Of The Research
Given the available data and information gathered for the purpose of the research on the members of the statistical community it is worth mentioning 98% of them were male and 4% were female. The highest frequency related to the 30-39 years old age group with 45% of the samples and the lowest frequency was related to the 20-26 years old age group with 9.3% of the samples. Within the same respect the frequency for the technical staff stood at 59.7% and the frequency for non-technical staff was 31%. The highest frequency was in the operation sector at 31% and the lowest frequency was related to the administrative sector with 19%. This figure for managers was found to be 9% and for the staff with 21-30 years work record, 37.7%, and for the staff with 31 years work record, 15%, as the lowest frequency.

The hypotheses of the present research included the following:
Hypothesis 1: From the staff view point, the existing information technology infrastructure is well-prepared for implementation of knowledge management system within the company.
Hypothesis 2: From the staff view point, the existing organizational structure is well-prepared for implementation of knowledge management system within the company.
Hypothesis 3: From the staff view point, the existing organizational culture is well-prepared for implementation of knowledge management system within the company.
Hypothesis 4: From the staff view point, the existing human resource is well-prepared for implementation of knowledge management system within the company.

The present research also had to find out the priorities of infrastructural factors within the company from the staff view point.
As displayed in Table No.1 the assessment (measurement) mean score of the questions on the existence of information technology infrastructure for implementation of the knowledge management system from the staff view point stood above the theoretical mean score (value) (3, central limit of the response) and from the statistical point view such a difference was found to be significant (p=0.0001, t=6.22). Outcome of the test indicated that the significance level was below 0.05 and the t value was above 1.64. Therefore this null hypothesis was rejected and alternative hypothesis was accepted leading to confirmation of the first hypothesis. In other words from the staff view point the existing information technology infrastructure is well-prepared for implementation of the knowledge management system within the Masjid Soleyman Oil & Gas Production Company.
Table No.1- Results of the t test analysis for a single group for comparing assessment (measurement) mean score of the existing infrastructures for implementation of knowledge management from the staff view point with mean number of criterion score (3)

<table>
<thead>
<tr>
<th>Variable</th>
<th>T</th>
<th>df</th>
<th>Test value</th>
<th>Standard deviation</th>
<th>Mean</th>
<th>Significant level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information technology</td>
<td>6.22</td>
<td>225</td>
<td>3</td>
<td>0.825</td>
<td>3.34</td>
<td>0.0001</td>
</tr>
<tr>
<td>Organizational structure</td>
<td>4.29</td>
<td>225</td>
<td>3</td>
<td>0.590</td>
<td>3.17</td>
<td>0.0001</td>
</tr>
<tr>
<td>Organizational culture</td>
<td>4.32</td>
<td>225</td>
<td>3</td>
<td>0.742</td>
<td>3.21</td>
<td>0.0001</td>
</tr>
<tr>
<td>The human resource</td>
<td>1.41</td>
<td>225</td>
<td>3</td>
<td>0.740</td>
<td>3.07</td>
<td>0.151</td>
</tr>
</tbody>
</table>

Assessment (measurement) mean score of the questions on the existence of infrastructure of the organizational infrastructure structure was found above the theoretical mean score (value) (3, central limit of the response) and from statistical aspect it was of significant difference (p=0.0001 and t=4.29). The test result implied the significance level below 0.05 and t value above 1.64. Therefore this null hypothesis was rejected and alternative hypothesis was accepted leading to confirmation of the second hypothesis. In other words from the staff view point the existing organizational infrastructure is well-prepared for implementation of knowledge management system within the Masjed Soleyman Oil & Gas Production Company.

Assessment (measurement) mean score of the questions on the existence of organizational culture infrastructure was found above the theoretical mean score (value) (3, central limit of the response) and from statistical aspect it was of significant difference (p=0.0001 and t=4.32). The test result implied the significance level below 0.05 and t value above 1.64. Therefore this null hypothesis was rejected and alternative hypothesis was accepted leading to confirmation of the third hypothesis. In other words from the staff view point the existing organizational culture infrastructure is well-prepared for implementation of knowledge management system within the Masjid Soleyman Oil & Gas production Company.

Assessment (measurement) mean score of the questions on the existence of the human resource infrastructure was found a little above the theoretical mean score (value) (3, central limit of the response) and from statistical aspect it was not of significant difference (p=0.151 and t=1.041). The test result implied the significance level above 0.05 and t value below 1.64. Therefore this null hypothesis was confirmed and alternative hypothesis was rejected leading to non-confirmation of the fourth hypothesis. In other words from the staff view point the existing human resource infrastructure is not well-prepared for implementation of knowledge management system within the Masjed Soleyman Oil & Gas Production Company.

Freidman test for prioritizing infrastructures for implementation of knowledge management system:

Table No.2- Freidman test results

<table>
<thead>
<tr>
<th>Factors</th>
<th>Mean rank</th>
<th>Rank</th>
<th>(χ²)</th>
<th>df</th>
<th>P significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information technology</td>
<td>2.78</td>
<td>1</td>
<td></td>
<td>24.50</td>
<td>3</td>
</tr>
<tr>
<td>Organizational structure</td>
<td>2.41</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizational culture</td>
<td>2.59</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The human resource</td>
<td>2.22</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table no.2 indicates that χ² value equals 24.50 being significant at the level of p=0.0001. This implied that from the staff view point the factors should be prioritized and they were not the same in the matter of their priority. In another word some factors are more significant and
some others are of lesser significance. For instance information technology, with mean rank of 2.78, ranked first and human resources with mean rank of 2.22 ranked last. And other factors ranked between the said two factors.

Chart No.1- Analogy of mean measurement of the ranks and current status of the infrastructure

![Chart No.1](image1)

(Radar) Chart No.2- Infrastructures for implementation of knowledge management

![Chart No.2](image2)

Analysis of infrastructural factors took place in four areas of information technology, organizational structure, organizational culture and the human resource. The Radar (Chart No.2) has displayed current status, significance, and desirable conditions of each of the factors. Information technology, organizational culture, organizational structure and the human resource, respectively, have been identified as the most important infrastructural factors. Enjoying information technology was of highest significance for the staff and its current status within the company found to be more desirable as compared with other variables. Given the lowest rank of the human resource and its lack of readiness for successful implementation of knowledge management within the company it is necessary, to pay special attention to this variable persuading individuals to acquire and transfer knowledge through organization of training and educational programs and introducing relevant incentives.

**Conclusion**

Implementation of knowledge management is facing many challenges. To deal with these challenges we need to get a better understating of the concepts of knowledge, the knowledge management and the relevant obstacles facing organizations in this respect. In order to find
out when organizations are ripe and ready to have knowledge management implemented within their organizations we need to take variables like existing organizational culture, existing organizational structure, existing human resource as well as available information technology within organizations into our account and adopt a contingency method according to the structural and cultural situations within organizations. Based on the outcome of a number of studies already made implementation of knowledge management requires serious support of managers and leaders for the human source and to this end every organization is needed to define its knowledge–based prospect and strategy showing their commitment to individuals and the relevant time schedule. At the same time some opine that further knowledge would lead to further power. This occurs while it seems that knowledge by itself cannot produce power and the real power comes when individuals start sharing their knowledge with each other. In every organization knowledge management is usually followed by much profit both at individual and organizational levels. The assessment made in the present research implied that infrastructures required for implementation of knowledge management within Masjed Soleyman Oil & Gas Production Company found to be at average level. And irrespective of the human resource variable other variables enjoyed required readiness for implementation of knowledge management. It is noticeable that promotion of the human resource in favor of knowledge management implementation requires change and promotion of organizational culture. All organizations are needed to promote a culture that prevents knowledge-hoarding and develop an environment characterized by knowledge sharing as well as trust and honesty. To this end it is necessary to take note of individuals’ motivations and readjust and promote reward systems, performance assessment system and other measurement systems based on efforts of the staff in knowledge sharing efforts. Within the next few years knowledge will be turned into an integral part of all organizational complexes and those organizations that provide required ground and basis for implementation of knowledge management designing relevant suitable infrastructures will be successful in this respect.
References


Gaffoor, Shamin(2008), Assessing readiness for the implementation of knowledge management in local governments: The case of Stellenbosch Municipality. Thesis for the degree of Master of Commerce at Stellenbosch University, School of Public Manangement and Planning Faculty of Economic and Manangement Sciences, Decmber 2008.


Jalaldeen Reza & etc.(2009), " Organizational Readiness And Its Contributing Factors To Adopt KM Processes. A Conceptual Model ", 2009, Communicaions Of The IBIMA.


Watson, J,(2003). *Applying km:techniques for building corporate memories morgan kaufman publishers*, pp.4-7