Developing a Model to Assess the Readiness of Implementing Knowledge Management: Evidence from Yazd Regional Electric Company

Naeimeh Taghavi
PhD Student at Tehran University, Tehran, Iran
Email: naeimat@yahoo.com

Abolfazl Sherafat
PhD Student at Tehran University, Tehran, Iran
Email: Sherafat.a@ut.ac.ir

Mahdieh Nasrollahi Kalehbasti
Masters Student at Tarbiat Modares University, Tehran, Iran
Email: Nasrollahi609@yahoo.com

Abstract
Knowledge is now considered as a strategic property and ability of an organization classified as an intangible resource to gain competitive advantage. To prioritize the knowledge management (KM) and identify the current situation of an organization, it seems essential to determine the factors influencing the successful implementation of KM. This study intends to identify the factors affecting the successful implementation of KM and develop a growth model based on the priorities of these factors. It also seeks to evaluate the performance of the organization in terms of KM. Investigation, validation and prioritization of the factors are carried out by the experts and the collected data is analyzed by statistical methods. Using a questionnaire to develop a KM growth model, the current situation of Yazd Regional Electric Company has been then evaluated. Additionally, the weakness and strength points of the organization in relation to the desirable state are identified and finally some suggestions are provided to resolve the weakness points.
Keywords: Knowledge Management, KM Growth Model, KM Measurement, Success Factors

Introduction
The variations of the information technology in the recent years have caused the traditional business models to accommodate themselves to the ever changing environments so that only those organizations which are able to exploit the existing rewards might participate in creating and using knowledge. This philosophy specifies knowledge management as a concept to increase the organizational knowledge [1].

Knowledge management is a mechanism leading to facilitate the vital organizational processes and implementing the practical solutions [2]. This is also an instrument to raise the cooperation intelligence and competitive advantage [1]. The prior experiences confirm that KM is an integral component that the organizations must possess. As a consequence, any organization should look for an instrument by which the ambiguity in implementing KM plans is mitigated. In doing so, it seems necessary to identify the factors affecting the successful implementation of KM, determine the current situation of an organization in terms of KM and use the identified factors to improve knowledge management.

This analysis aims to investigate the three main questions as follows:

- What are the factors influencing the successful implementation of KM in an organization?
- What is the current situation of the organization in terms of KM?
- What are the approaches needed to improve the current situation of the organization in terms of KM?

This study intends to recognize and exploit the factors affecting the measurement and implementation of KM in the organization. Furthermore, the readiness of the organization to adopt KM and measure the level of KM in an organization through a KM based growth model has been examined. In other words, this study seeks to find those factors by which an organization could efficiently implement KM so that the costs are minimized and the competitive advantage is maximized. By meeting the research objective, the current situation based on the intended factors could be determined and the weakness or strength points in relation to the desirable situation are recognized. The implementation level at which the organization is operating along with the indicators to improve this situation are also verified.

Literature Review

Knowledge is a compound of realities, beliefs, experiences, concepts and judgments which is decided, evaluated, monitored, and approached through the information [3].

Policy makers have recently found that the knowledge based economy is dominated in today economic situation [4]. Hence, approaching the knowledge is the main element among the competencies and other abilities of the organization [5]. The leaders of the pioneer organizations follow the ways to create value. This is because they are aware of the necessity involved in gaining and proving the competitive advantage in the current environment [6]. Knowledge is not easily measurable or revisable [7]. Therefore, the organizations should manage their knowledge in order to gain the excellence in skills and intrinsic experiences along with the explicit knowledge of the employees [8].

Alavi and Leinner (2001) defined KM as a specific process for acquiring, organizing, sustaining, applying, sharing and renewing the explicit and tacit knowledge of the employees to enhance the organization performance and create value [9]. Holm (2001) asserts that KM is getting the right information to the right people at the right time, helping people create knowledge and sharing and acting on information [10]. The variables of KM strategy include culture, leadership, technology and evaluation [11].

Levett and Guenov (2000) defined eight standards to measure KM in the automated manufacturing corporations in order to obtain an effective strategy for improving the automatic manufacturing environment through KM. These standards cover a wide range of KM and represent the different methods to measure the different aspects. They found that KM strategy and manufacturing environment might be linked by determining and classifying the standards indicating the implementation level of KM in the organization [2].

Through the empirical investigations by Wei et al (2009) in Malaysia and with the purpose of identifying the significance of KM factors and the implementing these factors in communication organizations, a model was developed including the success factors of KM implementation contained the initial success factors, strategic factors and process factors [12].

Chong et al (2006) evidenced that there are many organizations at the primary stage of KM implementation and they should become ready before the full implementation of KM plans [13].

Quin et al (2007) tried to realize the right time of the organizations' readiness to adopt KM. They also developed a model based on the success factors of KM implementation such as organizational operations, working culture, vision and technology [14].

Wiig (1998) introduced a conceptual model as a perfect beginning point for developing a practical plan of KM. Wiig (1998) suggested six steps to create a KM plan in an organization with little experience. KM is a process established at the heart of the knowledge based organization in which the knowledge and management directly impact the organizational performance. In doing so, the effective implementation of KM causes the organization to best perform its operations [15].

Knowledge Management in Yazd Regional Electric Company

Yazd Regional Electric Company is located in Yazd province with 526 personnel based on the charter of collaboration aimed at generation, transmission and distribution and sale of electricity for all consuming sectors. It is composed of different departments including planning, research and development, production, financial, support, human resource, cooperation and independent offices of protection, board of directors and legislation department.

As opposed to KM team, KM structure is completely implementable. Implementing KM in regional electric company requires a structure which executes control over KM processes in all portal, departments and units. KM structure has one individual holding the responsibility of KM unit at the top of the structure. This individual has agencies in different units of the collaboration known as the knowledge agency. They contribute the official responsible of KM department. They also announce the liable individuals of some cases such as confrontation with a new challenge, innovatively solution of the problem, existence of specific skills and expertise in some employees and selection of the right policy to receive knowledge. The responsible person then decides about how to plan to deal with these situations.

Methodology

Using the information collected from the library studies and interviews with the experts of KM, a set of factors needed for the readiness of the organization to implement KM successfully has been attained. Then, the weight of each factor is determined in accordance with the opinions of the experts and managers of the industry. Through the model of KM readiness and the opinions

of the managers, the factors in the model are classified and evaluated in terms of its readiness and situation in KM implementation.

The population of this study is constituted of the directors and experts of the companies and organizations participating in KM field, and professors and students of KM systems considered by the directors in evaluating the model in the real environment of Yazd Regional Electric Company. The sample is selected based on the census and judgmental method. The questionnaires are fulfilled by 35 experts of these groups. The factors comprise eight main measure and 35 sub-measures including:

Organizational Strategy: Successful KM plans are approached by the transparent job goals [16]. In doing so, knowledge directs the strategy and the strategy approaches KM. Lack of a strong relationship between KM and job strategy causes failure in even the best KM systems [17].

Organizational Culture: KM culture of an organization refers to the organizational knowledge sharing associated with the behavioral patterns of individuals including the thoughts, quotes and affairs [18]. Personnel and culture are the main elements in successful establishment of knowledge based organizations [19].

Managerial Support: Successful KM without managerial commitment and leadership seems to be an impossible task [20]. Therefore, the senior managers of the organizations hold the responsibility to clearly establish their goals, create knowledge based culture and support the changes [21].

Technology: Technology is composed of the infrastructures of equipments, systems, guidelines and automated solutions which lead to increase and concentrate on the applicable plans and dissemination of organizational knowledge [18].

Human Resource Management: Human resource management involves some operations such as training personnel by the right initiatives and methods and self-learning, encouraging staff for participating in the internal and external training plans and applying the expert coaches or expert sectors [22].

Organizational Structure: Organizational structure is defined as division of labor, tasks and responsibilities vertically or horizontally [23]. Knowledge sharing occurs in those organizations with matrix and non-concentrated structure so that emphasize is put on the leadership instead of the management [12].

KM Process: KM process is composed of the generation, embodiment and utilization of knowledge [18]. This process involves creating and investigating the knowledge considered vital to make the KM plan ready to be implemented and is a strong source for acknowledging the organization's power [12]. Knowledge assessment deals with the evaluation instruments and the relationship with the organizational performance. Ignoring this instrument weakens the association between the performance and the process [13,24].

Environmental Factors: Specifying markets, getting information from the market and competitors, considering governmental situations, creating knowledge structure through customers and individuals and designing KM map from the success factors in implementing KM are involved in this element [25].

Information Technology: It is composed of the whole facilities used in obtaining the intended knowledge and saving and storing this knowledge.

After identifying and classifying the above factors, the significance of each factor in readiness of the organization to implement KM is determined by the AHP questionnaire distributed among

35 experts. After responding the questionnaire by the experts, the consistency level was examined so that its inconsistency was equal to 0.04 and this is a satisfactory level. Therefore, the consistency has been confirmed.

Table2.Significance of the factors and indicators influencing the successful implementation of KM

Factor	Weight	indicator	weight	Factor	weight	indicator	weight
Organizational strategy	0.15	KM strategies	0.39	Human resource management	0.08	Empowering the personnel	0.15
		KM perspectives	0.25			Reward and compensation system	0.32
		KM objectives	0.36			Personnel training	0.17
						Creating incentives for KM	0.20
						Maintaining personnel through creating opportunities	0.16
Managerial Support	0.26	Determining the patterns of the roles	0.10	KM process	0.08	Knowledge creation	0.28
		Participation	0.31			Knowledge documentation and storage	0.17
		Leadership style and strategic role	0.28			Knowledge assessment	0.12
		Change management	0.31			Specifying the required knowledge	0.17
						Knowledge sharing	0.17
						Knowledge integration	0.10
culture	0.24	Mutual trust	0.23	Environmental	0.06	Market	0.17
		Change culture	0.22			Competitors	0.19

		Innovation and creation culture	0.36	factors		Customers	0.37
		Cooperation culture	0.20			Economic and governmental situations	0.27
Organizational structure	0.08	Team structure	0.34	Information technology	0.04	hardware	0.14
		KM department	0.17			software	0.24
		Definition of roles and responsibilities	0.31			Security system	0.14
		A unit for planning and enhancing KM	0.19			Personnel familiar with IT	0.48

We try to identify the existing gap and bridge them by evaluating KM factors based on the perceived significance and the real level of implementation in Yazd Regional Electric Company. Finally, a model was developed to assess the readiness of an organization for implementing KM. The level at which these factors are implemented in Yazd Regional Electric Company is investigated by the experts and managers of the organizations through Likert scale. The findings are represented in table below.

Table3. Implementation level of the factors influencing successful KM in Yazd Regional Electric Company

Indicator	Implementation level	Indicator	Implementation level
KM strategies	2.75	Personnel training	4.13
KM perspectives	2.50	Creating incentives for KM	2.63
KM objectives	2.25	Maintaining personnel through creating opportunities	2.38
Determining the patterns of the roles	1.63	Knowledge creation	2.50
Participation	3.88	Knowledge documentation and storage	4.38

Leadership style and strategic role	2.63	Knowledge assessment	4.25
Change management	2.63	Specifying the required knowledge	4.13
Mutual trust	3.75	Knowledge sharing	2.88
Change culture	2.13	Knowledge integration	2.38
Innovation and creation culture	2.25	Market	2.63
Cooperation culture	3.75	Competitors	2.25
Team structure	2.13	Customers	3.38
KM department	4	Economic and governmental situations	2.38
Definition of roles and responsibilities	3.13	Hardware	3.63
A unit for planning and enhancing KM	4.25	software	4.38
Empowering the personnel	2.50	Security system	3.13
Reward and compensation system	2.63	Personnel familiar with IT	4.13

To measure the validity, the opinions of ten experts are taken into account; while the reliability is measured by Chronbach's alpha in SPSS software. Alpha's coefficient is equal to 0.95 and this figure confirms the reliability of the questionnaires. These factors and indicators in KM growth model are prioritized. Using this model, the level of KM growth model in the organization is measured. The model structure has three sections:

1. Maturity level
2. Vital success factors in implementing KM
3. Measuring the maturity indicators

KM Growth model
When an instrument is found to measure the tools, then they might be managed. Measuring knowledge and KM activities is conducted by those measures developed by different models. Growing an organization includes different aspects among which one of them is supplied by knowledge. During this process, once the organization reaches to a higher growth state by

which it could approach the knowledge based processes, a KM model is required. From the perspective of growth in knowledge activities, any organization is placed at any level determined by the growth model of KM. This model describes the growth level of an organization in improving KM and involves different levels of KM processed with the passage of time.

Figure1.Growth model of KM
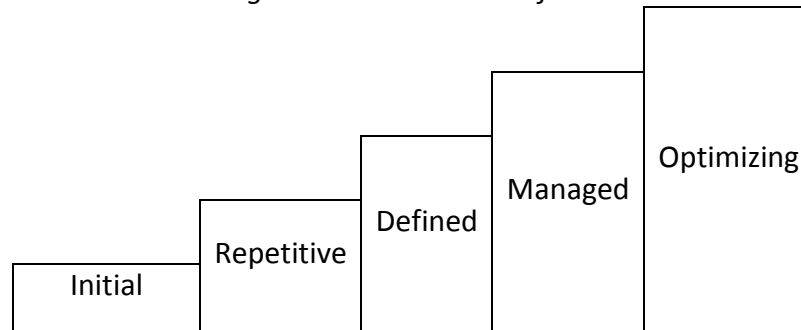
There are four to six levels. The first level shows the earliest statue of implementing KM; while the last level is the optimum level of KM so that the knowledge activities are captured as one of the organizational operations [26]. These elements are collected according to literature review and involve eight areas including organizational strategies, leadership support, organizational culture, organizational structure, KM process, environmental factors and information technology infrastructures.

In order to classify the factors and indicators of the maturity model developed in this study, a questionnaire composed of 34 questions was designed and sent to 35 experts as the first step. They were also asked to describe the classification of each factor in growth model in terms of numbers ranging from 1 to 5. A limited number of factors at maturity level are considered. This means that some activities should be carried out and when finished, they should be evaluated and followed in the next step. Each factor involves those indicators matured at any levels of KM maturity model. Finally, the factor averagely matures at one level. The table of the factors at any levels of maturity model prepared by the experts is depicted.

Table4. Indicators of any level of KM maturity model

1 Primary	2 Repetitive	3 Defined	4 Managed	5 Desirable
KM department	Definition of roles and responsibilities	KM strategies	Knowledge integration	Maintaining personnel through creating opportunities
A unit for planning and	Reward and	KM perspectives	Market	Innovation and creation

enhancing KM	compensation system			culture
participation	Creating incentives for KM	KM objectives	Competitors	Empowering personnel
Mutual trust	Knowledge sharing	Determining the roles	Customers	
Cooperative culture	hardware	Leadership style and strategic role	Economic and governmental situations	
Personnel training	software	Changes culture	Change management	
Knowledge documentation and storage	Security system		Knowledge creation	
Knowledge assessment	Personnel familiar with IT			
Determining the required knowledge				

After the indicators of each level of KM maturity are specified, the implementation level of each one in the organization should be mentioned.

Table5. Implementation level of the indicators of any level of maturity model in the studied organization

Maturity level of KM									
Primary	Degree	Repetitive	Degree	Defined	Degree	Managed	Degree	Desirable	Degree
KM department	4	Definition of roles and responsibilities	3.13	KM strategies	2.75	Knowledge integration	2.38	Maintaining personnel through creating opportunities	2.38
A unit for planning and enhancing KM	4.25	Reward and compensation system	2.62	KM perspectives	2.50	Market	2.50	Innovation and creation	2.25

								culture	
participation	3.88	Creating incentives for KM	2.63	KM objectives	2.25	Competitors	2	Empowering personnel	2.50
Mutual trust	3.75	Knowledge sharing	2.88	Determining the roles	1.63	Customers	3.38		
Cooperative culture	3.75	hardware	3.63	Leadership style and strategic role	2.63	Economic and governmental situations	2.38		
Personnel training	4.12	software	4.38	Changes culture	2.13	Change management	2.63		
Knowledge documentation and storage	4.38	Security system	3.13			Knowledge creation	2.50		
Knowledge assessment	4.25	Personnel familiar with IT	4.13						
Determining the required knowledge	4.13								

Based on the experts opinions, once any of the indicators in the KM maturity model is implemented at a degree higher than 2.5, then the organization is ready to use this measure. When the whole indicators reach to a readiness level, the organization passes the model and moves to the next level. According to the explanations, non specification of the patterns of roles and goals of KM in the organization and lack of the culture of variation leads the organization to cease the operations at this level of maturity. In order to contribute the organization to pass the maturity step and move to the next steps, some approaches are provided. These approaches are as follows:

1. *Establishing an executive committee and determining the short-term quantitative objectives of KM:* This committee aims to plan and monitor KM operations in any assistant department.

One of the purposes of this committee is to determine the short-term objectives of KM implementation in the assistant department. Defining quantitative goals causes the right practical plans to be established and the possibility of monitoring operations come true.

2. *Codification of a system to document the project's lesson learned (specifically designed for R&D assistant):* Implementing any of the projects in Yazd Regional Electric Company and in R&D assistant department causes creating knowledge and various experiences in the company. Once these experiences are documented and transferred to the similar projects, the projects develop and the costs of their implementation decline. Additionally, ignoring this issue disregards these experiences. Concerning the project, expert workshops of the lesson learned are formed and are devoted to edit the lesson learned. At this step, the code of lesson learned of the Yazd Regional Electric Company is provided. Additionally, the required operations are considered to implement the code of lesson learned annually for the whole projects of R&D assistance.

3. *Implementing a documentation system for a sample of the projects:* Once the documentation system of lesson learned of the projects is developed, the designed system is implemented by the contribution of a consultant from one of the projects of Yazd Regional Electric Company. This would facilitate the implementation for the other remaining projects.

4. *Establishing expert associations:* These associations are composed of those individuals who have specialty in a working field and are intended to solve some problems and develop learning and formulation of new ideas.

5. *Holding proper training courses to empower the employees*

6. *Approaching personnel in recognition and documentation of knowledge*

7. *Designing a documentation booklet for the personnel experiences:* This is a cultural tool aimed to promote the culture of knowledge registration and familiarize customers with its concepts and other similar cases.

8. *Integrating the knowledge from creation to operation*

9. *Determining the boundaries and common points between KM system and suggestion system:* After that the organization confirms an optimum level, it should stimulate and empower the personnel to retain and encourage them to become creative.

Conclusion
Some infrastructures are required for the implementation of KM in the organization and these factors are necessary for the successful KM implementation. Many organizations have now turned to invest in KM, however, few of them have the capacity to attract, accept and adapt to KM and many of them fail in this process. As a consequence, the managers should seek for an appropriate tool before wasting the resources to mitigate the ambiguity in the programs of

implementing KM. Therefore, identifying the critical success factors for implementing KM, determining the current situation of the organization for implementing KM and using the identified factors in improving KM are essential affairs.

This study initially seeks to identify the factors impacting successful implementation of KM and then determine the position of each factor in the maturity model of KM. Finally, using the specified model and the implementation level of these factors in Yazd Regional Electric Company, the position of this organization in the maturity model of KM is determined and the minimum level of development from each level is specified as the ability to satisfy fifty percent of the intended factors. The organization leaves the primary level and develops into the repetitive step because the organization applied a department for KM and there is a planning and KM enhancement department. Additionally, there is trust, cooperation and training for the employees and the knowledge determination, documentation and evaluation is performed. In the repetitive step, the responsibilities and roles of the members of KM committee are certainly identified and the knowledge is shared sufficiently and the software and hardware for implementing KM is ready and the individuals are motivated to implement KM and develop to the next stage. At this step, it is difficult for the organization to determine the roles pattern. In addition, when the objectives of implementation of KM are clearly explained and the variation culture is established, then the organization might reach to the managed level. However, some weaknesses such as lack of availability to the competitors' knowledge, lack of awareness from the governmental-economical situations, inability in creating knowledge and its integration are involved. Removing these deficiencies and weaknesses might develop the organization to an optimum level of KM maturity model and stability in this level requires maintaining personnel by motivating them or creating an innovative and creative culture for them.

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