# Improving Knowledge management systems implementation by means of IT as an enabler: Gap analysis technique

**ABSTRACT**
Knowledge has widely been acknowledged as one of the most important factors for corporate competitiveness, and we have witnessed an explosion of IT solutions claiming to provide support for knowledge management. Due to the rapid development of knowledge and information technology (IT), business environments have become much more complicated. In order to cope with ensuing complications, enterprises ought to incessantly innovate; otherwise, it will be very difficult for them to survive in the marketplace. Hence, IT can help a firm aiming to gain a competitive advantage. In addition, many studies have argued that business value comes mainly from intangible assets, such as knowledge. Thus, knowledge workers will be able to replace clerical workers as the new mainstream of manpower resources, a field in which the development of IT is the major force for change in knowledge management system (KMS). Therefore, based on the definition of the six gaps in KMS, this study explores the role and effect of IT in the implementation of KMS; moreover, relationships between KMS and IT are analyzed and demonstrated by means of the literature reviews, expert interviews and questionnaire analyses. Furthermore, this study discusses how to enhance the effectiveness and efficiency of implementing KMS through appropriate IT.

**KEYWORDS:**
Knowledge management, Information technology, Gap analysis, Knowledge gap

## 1- INTRODUCTION

Knowledge is one of the critical assets to leverage when pursuing enterprise competitive advantage (Sang and Soongoo, 2002; Lee and Choi, 2003; Sharkie, 2003) [5]. The key knowledge-management (KM) challenges facing companies today are determining what robust knowledge-management systems (KMS) to implement, which user friendly processes and practices to institute that are not cumbersome, and what added value intellectual capital to capture[3]. Organizations have traditionally identified knowledge with a repository of information that is leveraged judiciously (Gupta et al., 2000), however, it is well known that knowledge is a fluid mix of framed experience, values, contextual information, and expert insight (Davenport and Prusak, 1998) [8]. Furthermore, knowledge activities are dynamic as well as humanistic with active and subjective natures created by social interactions dependent on individuals, their community and organization interactions, and applicability to needs (Holsapple and Joshi, 2002). In recent years, the rapid development of information technology (IT) has made it easier for employees, customers, suppliers, and partners to interact while carrying out each of their business functions; moreover, cross-function collaborations become feasible in product development, marketing, distribution, and customer service. That is, IT does not merely support efficient business operations, workgroup task and collaborations, and effective business decision-making; but they also change the way businesses compete (Ruiz-Mercader, Merono-Cerdan, & Sabater-Sanchez, 2006) [11]. Therefore, it is obvious that IT is a tool crucial for enterprises to achieve a competitive advantage and organizational innovation. Due to the IT revolution and advancements of the Internet, the value of knowledge assets has been greatly enhanced. Many companies are building knowledge management system (KMS) in order to manage organizational learning and business know-how. The main purpose of such a policy is to help knowledge workers to create important business knowledge, to organize it, and to make it available whenever and wherever it is needed in the companies (O'Brien & Marakas, 2006). Facing a tremendous amount of data on a daily basis, enterprises only use IT to integrate each division of various tools, such as intranet, data warehouse, electronic whiteboard, artificial intelligence and expert systems so that the jumbled business data is well-organized and more integrated (Khandelwal & Gottschalk, 2003) [4]. Furthermore, the value of business can be increased by applying IT. For example, many hotel chains and travel companies record individual preferences, so that the client is automatically given their favorite rooms or seats in the future (Probst, Raub, & Romhardt, 2000) [7]. The highest value of IT to KM is in allowing the expansion and universalization of the scope of knowledge and in increasing the speed of transferability[3]. Additionally using IT, we are able to retrieve and store knowledge in individual or groups, which allows this knowledge to be shared with other divisions in the same organization or business partners in the world. Furthermore, IT contributes to the integration of knowledge or even to the stimulation of new knowledge (Davenport & Prusak, 1998) [7]. Nowadays, a long-lasting competitive advantage is achievable only if companies develop into knowledge-creating companies (Carlucci & Schiuma, 2007; Vouros, 2003). However, many companies have faced various kinds of difficulties in implementing KMS. First, if knowledge is merely accumulated in workers' brains, there is no way of recording it systematically. Second, even though knowledge is recorded and recorded in documents, it is very complicated to search for, retrieve, or review it, a problem which erects barriers to the diffusion of

knowledge. Thus, in past times, even though managers knew how important KM was, it was very difficult to implement it successfully (Bradley, Paul, & Seeman, 2006) [9] Thus recently, there has been concern about what the enablers and barriers to implementing knowledge management successfully for enterprises. The response to that concern is that there are broad and value studies related with the implementation of knowledge management (Nonaka, 1991; Barney, 1995; Nonaka et al., 2000; Ndlela and Toit, 2001; Tiwana, 2001) [4]. Their study revealed that the influences of situation-specific factors on knowledge levels are more severe than others. By understanding components in the knowledge management technology framework and evaluating the existing infrastructure, Tiwana (2001) [12] identified gaps existing in the current infrastructure for building knowledge management systems. The knowledge gap was once defined as a quantitative and qualitative difference between the knowledge needed and available in the organization, that needs to be detected and measured either by developing new knowledge, buying knowledge, improving the existing knowledge, or removing out-of-date, irrelevant knowledge. Beyond these studies about the knowledge management gap, it is worth examining what a holistic gap is and how it might occur and be eliminated when implementing the knowledge management system.

## 2- KM and IT

IT concepts are pervasive in the current business environment, yet its definition also contains certain intangible aspects. Many organisations employ IT in one form or another to manage their knowledge [4]. This study mainly probes IT as a tool which is able to manage, store, and transmit structural knowledge. It can support us in our efforts to make the knowledge stored in the human brain or in documents available to all employees of an organization (Davenport & Prusak, 1998). In the process of KM, the absorption, creation, arrangement, storage, transfer and diffusion of knowledge are all dependent on assistance provided by IT. Khandelwal and Gottschalk (2003) pointed out that the application of IT to the support of KM apparently influences the results of knowledge collaboration within the organization. Spiegler (2003) stated that certain methods, such as data mining, can be helpful to an organization in extracting valuable information from a database, particularly when they are applied to field such as marketing, customer relationship management (CRM), and e-commerce. Furthermore, Sher and Lee (2004) suggested that both endogenous and exogenous knowledge are effectively manageable through the application of IT, as well as being able to increase the dynamic capabilities of the enterprise [12]. Hence, IT plays an important role in determining the success or failure of the implementation of KMS (Johannessen, Olaisen, & Olsen, 2001). However, the concepts of knowledge encoding and translation are not completely new to the world of organizations; on the contrary, training to encode development curriculums, organizational policies, routines, procedures, report and guidance manuals, etc. has been conducted for years. Only through advancements in IT will the progress of KM be given the impetus to accelerate (Alavi & Leidner, 2001). Thus, the growth of KM has been closely tied to information and communication technology (Chumer, Hull, & Prichard, 2000). Therefore, it is found that IT plays a major role in the implementation of KMS (Hislop, 2002) [8]. Nevertheless, few studies explore the role and effect of information technologies in the KMS. Hence, the purpose of this study is to investigate the role and effect of IT in implementing the KMS. Furthermore, this study also discusses how to enhance the effectiveness and efficiency of implementing KMS through appropriate IT.

## 3- Gaps of knowledge management systems

Based on the concept of KM gaps proposed by Lin [6] and Tseng[1], 2005b, this study proposes a holistic framework, depicted in Figure.1, within which to explore the role and effect of IT in KMS. The KM gaps model is divided into six gaps (Gap 1 to Gap 6) and fully illustrates the management gaps that might occur during the implementation of KMS. These six gaps are defined as follows:

Gap 1: The gap between the knowledge required to enhance the competitiveness of an enterprise as perceived by the upper management and the knowledge actually required to enhance its competitiveness.

Gap 2: The gap between the knowledge required to enhance an enterprise's competitiveness as perceived by the upper management and the plan to implement KM.

Gap 3: The gap between the plan to implement KM as proposed by the upper management and the progress of the implementation of the KM plan.

Gap 4: The gap between the knowledge obtained after implementing the KMS and the knowledge required to enhance an enterprise's competitiveness.

Gap 5: The gap between the knowledge required to enhance an enterprise's competitiveness as perceived, on the one hand, by the upper management and, on the other, other employees.

Gap 6: The gap between the knowledge required to enhance an enterprise's competitiveness as perceived by employees and the knowledge actually obtained after implementing the KMS.

Furthermore, reasons for establishing reality of these gaps have been discussed, while several fundamental approaches have been proposed bridge these gaps, which could serve as useful references for enterprises in the process of implementing the KMS. As a result, it has been stated that IT is one of the most crucial factors influencing the magnitudes of these gaps. Thus, it is

necessary for a firm to have well-developed technology that is accessible and that makes it easy to leverage KM (Desouza, 2003). Therefore, based on the definition of the six gaps in KMS, this study explores the roles and effects of IT in the implementation of KMS for firms. Through review of the literature, expert interviews and questionnaire analyses, the relationships between each gap and IT are demonstrated and analyzed. Furthermore, this research also discusses how to enhance the effectiveness and efficiency of the implementation of KMS through appropriate IT.

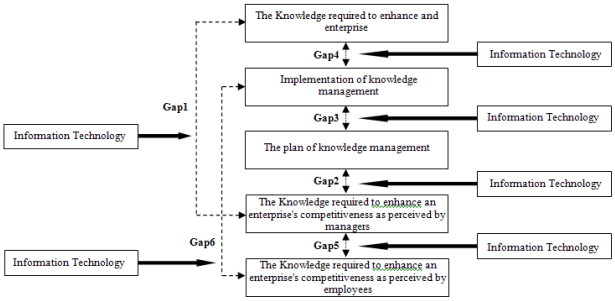


**Figure (1): Conceptual Framework**

## 4- Case Study

The case study represents one of the most commonly research designs in qualitative research. The case analysis is a good starting point in the inductive process of theory building (Yin, 1988, 1994). In addition, it is an apt method for inductive or teleological studies since it permits the researcher to observe and gather information about new or undiscovered natural phenomena that has never been studied before. The purpose of our case study is to explore the relation between IT and KMS. As this research is rooted in organizational rather than technical interests, the case study approach is, therefore, appropriate. It is usually possible to develop the core categories of the constructs observations derived from case studies (Yin, 1988, 1994).

### 4-1- Iran Khodro Industry Group

Iran Khodro was founded on 18 Aug 1962 in Tehran. Iran Khodro (IKCO) is a public joint stock company with the objective of creation and management of factories to manufacture various types of vehicles and parts as well as selling and exporting them. Now, after 45 years, continue to design and manufacture automobiles and buses as the largest vehicle manufacturer in the Middle East, and try to supply for domestic demand, penetrate into global markets, go deeper into locally part manufacturing, and eventually, to help realize the high objectives of the Islamic Republic of Iran. Iran Khodro is the largest vehicle manufacturing company in Iran, having an average share of 65 percent of domestic vehicle production. In 1997, IKCO broke the production record in the 30-year history of the company by producing 111,111 units of various passenger cars and vans. Furthermore, the company was able to improve the quantity and quality of its products remarkably. Iran Khodro has received ISO 9001 from RW-TUV, Germany, as well as many other health, safety, and environment certificates including ISO 14001 and OHSAS 18001.(www.ikco.com)

### 4-2- Case Findings

#### 4-2-1- GAP 1

Interviewees explain that information technologies play a significant role in management and operations, while such influences may differ in different fields of works. For example, professionally trained workers not only increase production, but are also more flexible in their working methods. Due to the increasing volume and frequency of information, managers who make good use of IT are better able to deal with decision-making. Hence, information technologies are potentially useful in helping managers to gain a deeper understanding of the problems that exists in their enterprises and to locate the competitive environments. Furthermore, interviewees also emphasize that an over-optimistic attitude should not be maintained towards resource technologies which function merely as supports. After synthesizing the results of the interviews, the primary causes for Gap 1 are described as follow:

- Managers who improperly apply the IT to assist core problem findings.
- IT, which is only used in a supporting role, is not omnipotent.

As a result, we propose the following has generalizations regarding the major factors on influence Gap 1:

(1) Insights into an enterprise's problems: The primary benefit of IT was an enhanced ability to identify and target valuable knowledge. IT can assist in processing diversified knowledge resources and in performing on the basis of both implicit and explicit knowledge. Furthermore, it also helps upper management to gain a deeper insight into the core problems in their enterprises, and it facilitates in their decision-making (Campbell, 2003; Sher & Lee, 2004).

(2)The recognition of IT: In a rapidly changing marketplace, information technologies might also have sparked off unnecessary distractions. For instance, companies who do not provide integral workflow management and lead-in KM tools waste their knowledge resources. Furthermore, IT supports the abilities that the higher value of knowledge-creating has more limited. Thus, the company must recognize that IT is only one means to foster knowledge. Furthermore, proper recognition of IT improves the effectiveness of KM

(Gravill, Compeau, & Marcolin, 2006; Martin, Hatzakis, Lycett, & Macredie, 2004; Spira, 2005).

### 4-2-2- GAP 2

Interviewees stated their companies seldom to help their employees make connections between their jobs and business goals. If the company wishes to extract the knowledge that is available from employees, management will have to identify that as a goal, and support appropriate behaviors. They also explained that during the implementation of their KMS, the frequency of use of the knowledge repository system is very high. Moreover, the knowledge repository system penetrates the whole KM process, thus playing the following three roles: first, as a resource for knowledge conversion during the capture of new knowledge; second, for providing staff with systematized knowledge during the process of knowledge diffusion; third, as a knowledge repository at the stage of knowledge storage. Although current IT has limited capabilities in terms of the externalization of an enterprise's competitiveness, as perceived by its upper management, this process can still be assisted by the implementation of a knowledge repository system. Furthermore, the need of incessant knowledge and system updates continuously stimulates the cognition and innovation of the organization. According to the results summarized from the interviews, the primary causes for Gap 2 can be described as follow:

- The managers should set goals for knowledge management planning.
- Knowledge repository systems can be developed in order to assist managers in establishing knowledge management planning.
- Knowledge updates are crucial.

Hence, we generalize the main influential factors on Gap 2 as follows:

(1) Setting goals for KM: The ultimate goal of KM is to create value through the use of knowledge (Wu & Lee, 2007). Thus, it is important to confirm that the goals of KM are application, classification, modification, sharing, etc. (Kim, Yu, & Lee, 2003; Ndlela & Toit, 2001). When management clearly establishes goals, employees are more able to optimize their efforts in the process of achieving their targets because they can better assess the value of certain information and knowledge.

(2) Establishment of knowledge repository systems: knowledge repository techniques contribute to the effectiveness of knowledge retrieval and distribution. The creation of a knowledge repository involves the integration of knowledge across multiple information sources (Oppong, Yen, & Merhout, 2005). That is, knowledge repository systems can help an enterprise externalize knowledge management planning, intensify organizational learning, and improve planning and decision-making. The whole process of establishing such systems includes building the knowledge platform, storing information, transforming tools, and managing content (Chen, Chen, Wang, Chu, & Tsai, 2005; Keeley, 2004).

(3) Continuous updating of dynamic knowledge: Knowledge comes not only from internal employees, but also including from external environments. Moreover, it is important to incessant update and share knowledge in order to conquer the problem of knowledge inertia (Wu & Lee, 2007). Continuous updating of dynamic knowledge can facilitate the processes of socialization, externalization, combination and internalization (SECI) of knowledge (Nonaka, Toyama, & Konno, 2000). Furthermore, it can encourage knowledge sharing and transmission, ignite creativity, and enhance effectiveness (Choi & Lee, 2003).

### 4-2-3- GAP 3

Interviewees clearly point out that KMS can improve organizational learning since it can be used as a tool to transform tacit knowledge into explicit knowledge (externalization) as well as to convert explicit knowledge into tacit knowledge (internalization). In the meantime, they also stated that there is a difference between planning and implementing KM since implied are the employees' willingness to share their knowledge and the evaluation of the effectiveness of KM plans. The underlying assumption is that it would be easier for employees to perceive the advantages of KM such as improving working abilities and self learning by actually establishing a KMS. On the other hand, it would also be easier for managers to instantly control the progress of the planning via a KMS. According to the results summarized from the interviews, the primary causes for Gap 3 can be described as follows:

- In order to enhance the effectiveness of KM plans, it is necessary to implement a KMS.
- KMS can enhance knowledge sharing, inquiring, and controlling, as well as other functions.

Hence, we generalize the main influential factors on Gap 3 as follows:

(1) Implementation of KMS: KMS are viewed as novel methods to the stimulation of creativity and innovation in post-industrial organization (Butler, 2003; Kanter, 1999) [10]. Such systems allow employees to inquire about information directly, and encourage them to share their knowledge with others, thus enhancing business competitiveness and creating an environment with knowledge authorization (Schroeder, 1999).

(2) The monitoring and controlling of the KMS: KMS is a key instrument for the creation, codification, storage, communication, analysis, diffusion and systematization of information and knowledge (Ruiz- Mercader et al., 2006). Thus, managers can monitor and control the implementation of KM planning in order to enhance the management performance (Soter O'Neil & Patrick, 2004).

### 4-2-4- GAP 4

Interviewees strongly indicate that un-human-friendly KM tools are not appealing to their users. If these tools were for the blind and functioned as lead-ins to KMS, they would not create business value, which, in turn, would increase the knowledge that was missed. That is, IT acts as a supporting tool to provide a friendly environment to standardize and store the knowledge, as well as to do the communication for the knowledge between employees or different parties. In addition, interviewees also stated that a complete measurement system needs to be developed in order to evaluate whether the company will enable the enterprise to enhance their competitiveness after the implementation of KMS. Simultaneously, they share the opinion that the results of KM do not always meet business expectations. Thus, comprehensive planning and designing are required in order to establish user-friendly KM tools and measurement systems. According to the results summarized from the interviews, the primary causes for Gap 4 can be described as follows:

- IT always requires planning and user-friendly applications.
- Knowledge measurement systems can be utilized to evaluate the effectiveness of KMS.

Hence, we generalize the main influential factors on Gap 4 as follows:

(1) Application of IT: IT can play an important role in successful KM initiatives (Edwards, Shaw, & Collier, 2005). There is a necessity for the well-planned development of technologies, such as easy-to-use knowledge maps, workflow software, decision support systems, and so on, which are capable of supporting each procedure involved in KM controlling and implementing, and of boosting business competitiveness (Nilakanta, Miller, & Zhu, 2006). (2) Knowledge measurement systems: The realization of value by an enterprise is related to its past performances, as reflected on the stock market (Sabherwal & Sabherwal, 2005). Besides, it is difficult to evaluate the creation of value based merely on general financial statements. Rather, such an evaluation is based on the capability of the enterprise which will face challenges in the future. In order to evaluate the follow up on KM, the evaluation the relationship between value realization and value creation can be performed by applying certain tools, such as a balanced score card and a strategy map (Boedker, Guthrie, & Cuganesan, 2005; Du, Ai, & Ren, 2007; Fincham & Roslender, 2003).

### 4-2-5- GAP 5

Interviewees point out that managers and employees play different roles. Hence, each group has different requirements regarding knowledge. In the meantime, due to lack of trust, the knowledge workers do not tell the executives what they really think and keep their concerns to themselves. The critical role for IT lies in its ability to support communication, collaboration, and coordination. Besides, traditional hierarchical organizational structures may impede knowledge sharing and innovative activities, therefore causing a knowledge gap in terms of KM between managers and employees. In other words, the implementation of cross hierarchical interconnectivity requires a holistic approach, making changes in many elements of corporate management systems. According to the results summarized from the interviews, the primary causes for Gap 5 can be described as follows:

- There is neither collaborative teamwork nor cooperative network systems to allow vertical communication in the organization.
- If a knowledge community were created in the active pursuit and sharing of knowledge, this would encourage the vertical and horizontal knowledge transmission of knowledge in the corporation.

Hence, we generalize the main influential factors on Gap 5 as follows:

(1) Communication and collaboration: IT, such as groupware, group decision support systems, workflow software, video conferencing, and intranet, can facilitate internal information exchanges, group discussions and communication in organizations. In addition, conventional hand-written and oral communications can easily be replaced by information technologies in order to facilitate communication and reduce errors (Hornik, Chen, Klein, & Jiang, 2003; Nilakanta et al., 2006).

(2) Knowledge community: IT, such as virtual communities, e-mail, electronic bulletin boards, long-distance learning technology and extranet, can facilitate cross-functional communication, external information searches and knowledge transmission among internal divisions of the same company. Developments in IT, especially the universalization of the internet and global telecommunications, have resulted in easily established support mechanisms for KMS (Fliaster, 2004; Liao, 2003).

### 4-2-6- GAP 6

The interviewees indicated that the KM activities could be facilitated by cooperation and collaboration between members. For example, marketing experts will be more willing to share and apply new marketing knowledge with each other within their department than with those outside their field. However, if sharing the knowledge with others will hurt benefit, efficient sharing of knowledge is usually impossible. Upper management should convey simple and definite messages to all employees, demonstrating that sharing knowledge is a critical requirement in day-to-day jobs as well as for obtaining rewards. Based on the results of the analysis, two key reasons that induce the occurrence of gap 6 are described as follows:

- employees do not feel that they are encouraged to share the existing knowledge and there isn't any suitable systems for this; and

- employees are deluged with highly specific knowledge that may be difficult to communicate to others.

The power of knowledge for each employee comes from what one knows. So the knowledge workers usually do not want to share their intellectual assets with others. If employees do not feel that they are encouraged to share existing knowledge in the organization, they may refuse to participate in the implementation of the KMS (Martin and Oliver, 2000).

Hence, we generalize the main influential factors on Gap 6 as follows:

(1) Knowledge communities: The organization should establish an atmosphere providing a friendly and effectively and more communication channel like email, communicator systems like live chat, knowledge portal and further emphasizing the sharing of knowledge and innovation explicitly, so that the employees will be more willing to share and apply new knowledge with each other (Bhatt, 2002) and IT can help them to promote these actions and make a friendly environment for employees. Enterprises should draw their expertise and establish a community of common professions before implementing the KMS (Ardichvili et al., 2003).

(2) Reward system: By encouraging employees to form a sharing culture through a reward system (Goh, 2002). The firm should take step to foster a trust culture by establishing an incentive system for sharing knowledge between employees (Barrett et al., 2004).

## 5- Questionnaire Analysis

The results of the analyses of this case study are summarized in Table 1. These results were then used as a reference to design and develop a questionnaire aimed at quantifying the roles and effects of IT on KMS. The content and validity of the draft questionnaire was evaluated by performing interviews in the IKCO; afterwards, minor modifications of the wording of some items in the questionnaire were carried out. The questionnaire was then mailed to senior managers or directors of who are involve with knowledge management because they tend to play key roles in organizational activities (James, Stoner, Freeman, Daniel, & Gilbert, 1995) and researchers. Research constructs were operationalized by means of related studies and a pilot test. Through the application of a five-point Likert-type scale, multi-item scales were used for measure the research variables. We sent a questionnaire to each of the chosen 500 participants, among which 81 responded. There were 73 complete questionnaires considered usable for analysis. The effective response rate was 14.6%.

| Theoretical constructs | | Relevant problems | Remark |
|---|---|---|---|
| Gap1: | Insights into an enterprise's problems | Can IThelp you to gain insight into the enterprise's core problems? | Campbell (2003), Sher and Lee (2004) |
| | The recognition of IT | Does the company provide proper recognition knowledge for IT? | Spira (2005), Gravill et al. (2006) |
| | | Do you think that IT supports the abilities that the higher value of knowledge-creating has more limited? | |
| Gap 2: | Setting goals for KM | Can you assure the goal of KM for your firm? | Ndlela and Toit (2001), Kim et al. (2003), Wu and Lee (2007) |
| | Establishment of knowledge repository Systems | Do you think that knowledge repository systems can support your firm in defining its KM plan? | Keeley (2004), Chen et al. (2005), Oppeng et al. (2005) |
| | Continuous updating of dynamic knowledge | Do you think that knowledge is derived not only from internal employees, but also from external environments? | Choi and Lee (2003), Nonaka et al. (2000), Wu and Lee (2007) |
| | | Do you think that continuously updating dynamic knowledge can facilitate knowledge sharing and ignite creativities? | |
| Gap3: | Implementation of KMS | Do you think that your firm's KMS allows employees to inquire about information directly? | Schroeder (1999), Karrer (1999), Butler (2003). |
| | | Do you think that your firm's KMS can encourage you to share your knowledge with others? | Soteg O'Neil and Patrick (2004), Ruiz- Mercader et al. (2006). |
| | The monitoring and controlling of the KMS | Do you think that your firm's KMS can help to monitor and control the implementation of KM planning? | Edwards et al. (2005), Nilakanta et al. (2006) |
| Gap 4: | Application of IT | Do you think that your firm has well-planned IT to support the implementation of KM? | Fincham and Roslender (2003), Boedker et al. (2005), Du et al. (2007). |
| | Knowledge measurement system | Do you think that your firm possesses an objective knowledge measurement system to evaluate the effectiveness of KM? | Hemik et al. (2003), Khandelwal and Gottschalk (2003), Nilakanta et al. (2006) |
| Gap 5: | Communication and collaboration | Do you think that your firm's information system can support communication and collaboration within your department? | |
| | | Do you think that your firm's information system can help to decrease the probability of repetitive errors in the enterprise? | Alavi and Leidner (2001), Fiaster (2004) |
| | Knowledge community | Do you think that your firm's information system can support communication and collaboration within your communities? | |
| Gap 6: | knowledge communities | Can knowledge communities be mapped on to the existing organizational structure? Do top managers support the knowledge communities? | |
| | Reward systems | Does the firm provide enough incentives and resources to stimulate employees to build up the skills that they need in implementation? Do the employees continuously improve their knowledge and skills under current reward system? | |

**Table1. Theoretical Constructs and Relevant Problems Associated With KMS**

Table 2 outlines the results of the reliability and validity tests performed on the survey items. Internal consistency measures (Cronbach's alpha) were obtained in order to assess the reliability of the measurement instruments. The item-to-total correlation, which was calculated between each individual item and the sum of the remaining items, was used to determine the convergent validity. In each case, when the item-to-total correlation score was lower than 0.4, the case was eliminated from further analysis. The reliability is more than acceptable (i.e., the minimum Alpha is 0.70). The content validity of the instruments was established by adopting the constructs that have already been validated by other researchers.

According to the analyses mentioned above, it is found that our conceptual framework and the survey items on each gap, which were derived from interviews and a review of the literature, are all effective. Based on the survey findings from these questionnaires, the mean values of the theoretical constructs for each KM gap, which measure the influence factor of each item, are summarized in Table 3. The interview and survey responses provided a strong basis for developing our research model, which is validated to some extent by the results of the survey. As seen from Table 3, we found:

1. Almost all of the KM gaps scored higher than 3.872 on a scale of 1–5, indicating that the measurement instrument is good enough to quantify the exploratory study.
2. Among the influence factors of Gaps 1–5, the recognition of IT, setting goals for KM, establishment of knowledge repository systems and implementation of KMS have lower concurrence scores, but are still above 3.562, meaning that the influence factors identified in this study are valid.
3. There are lower concurrence scores on Gap 2 and Gap 3. These gaps concern disparities between KM plan devised by the management and the employees' execution of these plans. This phenomenon seems simple, but it implies the internalization and externalization of corporate knowledge in KMS. In other words, top managers are unable to perceive the knowledge that the enterprise needs to convey concretely into the implementation plan for the KMS (Lin & Tseng, 2005a); moreover, employees may not fully understand what KMS is or are afraid that their personal value might be negatively affected after sharing their knowledge. As a result, employees' unwillingness to share their own knowledge or their inability to understand exactly KMS. Therefore, top managers should help the employees to understand their KM plan and employees must absorb the KM plan so that it becomes tacit knowledge, thus allowing them to correctly implement this plan. This is the hardest part of KM (Nomura, 2002), and therefore it is difficult for IT to support all the factors that influence these two gaps.

**Table2. Reliability and Validity Test Results for Measures**

| Measure single factors | Items | Reliability (Cronbach's alpha) | Convergent validity (correlation of item with total score-item) |
|---|---|---|---|
| IT effect | | | |
| Gap1 | 3 | 0.825 | 0.708; 0.563; 0.803 |
| Gap2 | 4 | 0.814 | 0.654; 0.725; 0.632; 0.523 |
| Gap3 | 3 | 0.823 | 0.770; 0.707; 0.581 |
| Gap4 | 2 | 0.737 | 0.583; 0.583 |
| Gap5 | 3 | 0.824 | 0.709; 0.664; 0.660 |
| Gap6 | 2 | 0.727 | 0.758; 0.697 |

**Table3. The Means of Gaps in Information Technology**

| Construct | Influence factors | Items | Item mean | Gap mean |
|---|---|---|---|---|
| Gap 1 | 1. Insights into an enterprise's problems | 3 | 4.644 | 4.133 |
| | 2. The recognition of IT | | 4.014 | |
| Gap2 | | 4 | 3.740 | 3.908 |
| | 1. Setting goals for KM | | 3.644 | |
| | 2. Establishment of knowledge repository system | | 3.630 | |
| | | | 4.151 | |
| | | | 4.206 | |
| Gap3 | 3. Continuous updating of dynamic knowledge | 3 | 3.562 | 3.872 |
| Gap4 | 1. Implementation of KMS | 2 | 3.726 | 4.466 |
| | 2. The monitoring and | | 4.329 | |
| Gap5 | controlling of KMS | 3 | 4.343 | 4.249 |
| | 1. Application of IT | | 4.589 | |
| | 2. Knowledge measurement | | 4.219 | |
| | system | | 4.082 | |
| | 1. Communication and | | 4.466 | |
| | collaboration | | | |
| | 2. Knowledge community | | | |
| Gap6 | 1. Knowledge community | | 5.5 | 5.54 |
| | 2. Reward Systems | | 5.58 | |

## 6- Conclusion

Companies have long recognized the value of harnessing the data and information that reside and are created within the organization; thus, information management has been practiced for a long time primarily through the implementation and use of IT (Ford & Chan, 2003). Every organization has its own way of dealing with data, information and knowledge, and creates its own structures, jobs and systems for that purpose (Nonaka et al., 2000). Therefore, there is no standard method for introducing KM into a company. The best way to achieve this is to start with existing structures and methods, and then apply them effectively to reach the company's knowledge goals (Hall & Andriani, 2002). This study is based on the KM gap model (Lin & Tseng, 2005b) [1] and explores the roles and effects of IT on KMS. After conducting a review of the literature, expert interviews and questionnaire analyses, a clear picture emerged. To elucidate this picture, the factors critical to the improvement of the quality of KMS by means of IT are presented in Fig. 2. Due to knowledge is a more nebulous resource than data and information, tacit knowledge cannot be converted into explicit knowledge (Sabherwal & Sabherwal, 2005). As a result, people cannot articulate what they know (McDermott, 1999). The implication is that knowledge can never be effectively shared through IT that involves a static repository – such as an intranet – because as static information, such knowledge can never convey the richness of the context in which it was applied (Currie & Kerrin, 2004; Hayes & Walsham, 2000; Mackinlay, 2002). Therefore, it is difficult for IT to support all the factors that influence on KMS (Ford & Chan, 2003). Hence, although IT is the foundation for managing knowledge assets and enables people from different departments to cooperate in its implementation, it is merely a tool to assist in the implementation of a KMS. The key to implementing KM is the people

themselves (Edwards et al., 2005; Lin & Tseng, 2005a)[1].

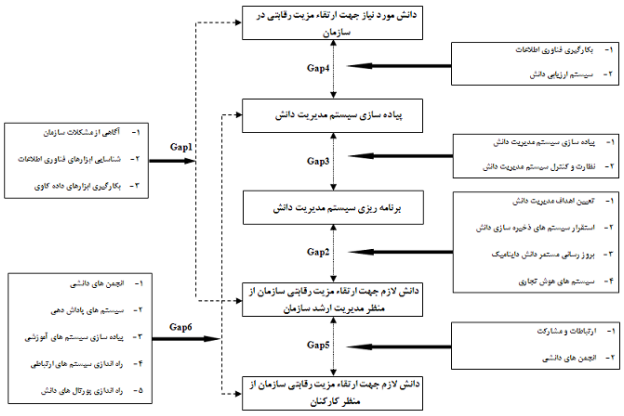


**Figure (2): The Critical Factors of KMS**

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