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# Investigating the Relation Between Knowledge Map Fit and Kms Success

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**Abstract:** The shift from a product-based to a knowledge-based economy has resulted in an increasing demand for organizations to implement knowledge management systems (KMS) at an accelerating pace**.** However, factors influencing success of KMS have seldom been empirically examined by prior research. Knowledge map is an effective knowledge management tool that enables visualizing knowledge and relationship in a clear form via a way so that features of the knowledge can be clearly highlighted. The present study was to investigate the relation between knowledge map fit and the success of knowledge management system. We first studied the success measures for knowledge management system based on previous studies and the effect of the knowledge map on these measures was summarized in a model. That model was evaluated and corrected based on the expert opinion. We then evaluated the role of knowledge map fit on System quality, knowledge quality, service quality, user satisfaction, perceived KMS benefits, perceived ease of use and KMS use, in three Iranian firms were evaluated. The statistical analysis using correlation coefficient and Friedman test indicated statistically significant relation between knowledge map fit with all above mentioned measures and the success of knowledge management system as a whole.

**Key words:** knowledge Management Systems (KMS), Knowledge Map Fit, Success of Knowledge Management System.

## INTRODUCTION

In all types of firms, from professional services to retailing and manufacturing, competitive advantage is garnered through possession of unique knowledge and the organization's ability to leverage it to their advantage. Because knowledge is usually difficult to imitate, transfer, and replicate, such characteristics endow it with strategic importance (Wu and Wang, 2006). Developments in Information Technology, coupled with increasing awareness of the importance of organizational knowledge, have lead to the development of a variety of Information Systems (IS) that attempt to manage this knowledge (Kimble and Bourdon, 2008). 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 (Tseng, 2008).

KM and KMS holistically combine organizational and technical solutions to achieve the goals of knowledge retention and reuse to ultimately improve organizational and individual decision making (Mercado, 2010). Knowledge map is a tool or technique of KMS that enables visualizing knowledge and relationship in a clear form via a way so that the relevant features of the knowledge can be clearly highlighted (Vail, 1999). It can play a key role in facilitating more effective KMS and has become an important issue in the KM domain.

However, factors influencing success of KMS have seldom been empirically examined by prior research, we studied the measures of KMS Success in the literature review, and we then evaluated the role of knowledge map fit on this dimension.

### *Knowledge Management Systems and Tools:*

Knowledge management systems (KMS) refer to a class of information systems applied to manage organizational knowledge. That is, they are IT-based systems developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer, and application. While not all KM initiatives involve an implementation of IT, and admonitions against an emphasis on IT at the expense of the social and cultural facets of KM are not uncommon (Alavi and Leidner, 2001). There are two approaches to building a KMS. A process/task based approach and an infrastructure/generic system based approach. The process/task based approach focuses on the use of knowledge by participants in a process, task or project in order to improve the effectiveness of that process, task or project. The infrastructure/generic system based approach focuses on building a base system to capture and distribute knowledge for use throughout the organization. Concern is with the technical details needed to provide good mnemonic functions associated with the identification, retrieval, and use of knowledge. Both approaches may be used to create a complete organization wide KMS (Jennex, 2005).

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KM tools are also referred to as an enabler of business processes that create, store, maintain and disseminate knowledge (Tsui, 2003). For a KM tool to be considered effective, it should perform each part of the KM process. Therefore, the tools should be able to capture, store, organize and index information, ensure that the information is secure, establish a workflow process and distribute information (Ngai and Chan, 2005). Technologies are the key enabler of the implementation of KM (Mc Campbell *et al*., 1999). The most frequently utilized types of technology in KM tools are: Intranets, content management systems, document management systems, relational and object databases, groupware and workflow systems, data warehousing systems and data mining systems (Duffy, 2001; Lee and Hong, 2002).

***Knowledge map and Knowledge map fit:***

The term ‘‘knowledge map’’ and a form of knowledge maps have been used in the literature of thinking and communication since a decade ago (Hall, *et al*., 1992). Knowledge map is a basic tool for knowledge users to retrieve necessary knowledge and analyze the relationships between knowledge. Knowledge map functions as a representation tool to visualize knowledge representations and relationships between them (Kang *et al*., 2003).

While this definition adequately describes the purpose of knowledge mapping, it does not distinguish the various types of knowledge maps that can be used in a corporate context. Below (Eppler, 2001) provide such a distinction with the aforementioned five types of knowledge maps:

***Knowledge source maps:***

They structure a population of company experts along relevant search criteria, such as their domains of expertise, proximity (for an example of such a knowledge map, without hypertext links behind the map however), seniority, or regional distribution Knowledge source maps answer questions such as “where can I find somebody who knows how to calculate a company valuation” or “do we have people who have run large e-commerce projects?

***Knowledge asset maps:***

This type of map visually qualifies the existing stock of knowledge of an individual, a team, a unit, or a whole organization. It provides a simplified, graphic ‘balance sheet’ of a company's intellectual capital.

***Knowledge structure maps:***

These maps outline the global architecture of a knowledge domain and how its parts relate to one another.

***Knowledge application maps:***

These maps show which type of knowledge has to be applied at a certain process stage or in a specific business situation. Usually these maps also provide pointers to locate that specific knowledge (documents, specialists, databases).

***Knowledge development maps:***

These diagrams can be used to depict the necessary stages to develop a certain competence, either individually, as a team, or as an organizational entity. (Eppler, 2001)

A knowledge map typically consists of two main parts: a *ground layer* which represents the context for the mapping, and the *individual elements* that are mapped within this context. The elements which are mapped onto such a shared context range from experts, project teams, or communities of practice to more explicit and codified forms of knowledge such as white papers or articles, patents, lessons learned (e.g., after action reviews or project debriefings), events (i.e., trainings), databases or similar IT applications, such as expert systems or simulations. Knowledge maps group these elements to show their relationships, locations, or other attributes. (Eppler, 2006)

Hence, a new construct knowledge map fit (KMF), representing the consistency between users’ cognition and knowledge map, was pro- posed and supposedly argued that it is an important factor affecting the success of KMS. (Lai, *et al*., 2009). In this study, knowledge map refers to the hierarchical taxonomies or structure of knowledge artifacts stored in knowledge repositories. In addition, the KMF, herein defined as the extent to which a person believes that the knowledge map is easily understood and consistent with her/his cognition, is proposed and supposed to influence success of KMS.

***Measures of KMS Success:***

DeLone and McLean discuss the difficulties researchers have applying the DeLone and McLean Information System Success Model to specific research contexts. (Jennex, *et al*., 1998) adopted the generic framework of the D&M IS Success Model and customized and operationalized the dimensions to reflect the System Quality and Use constructs needed for an organizational memory information system, KMS. (Jennex and Olfman, 2002) expanded this KMS Success Model to include constructs for Information Quality and

applied and operationalized the model to reflect knowledge management context. (Jennex and Olfman, 2004) modified the model to include suggestions from DeLone and McLean. Figure 1 shows the resulting KMS Success Model.

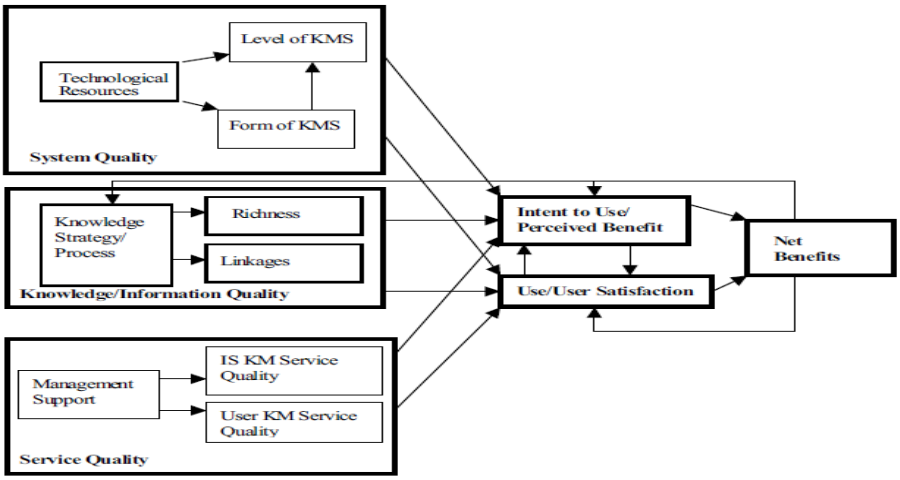


**Fig. 1:** Jennex& Olfman, Model.

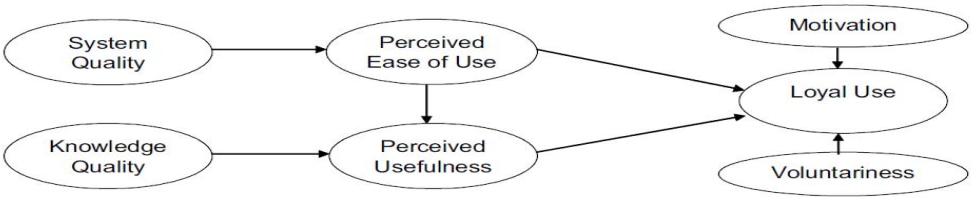


**Fig. 2: (**Clay, *et al*., 2005)Model.

This model evaluates success as an improvement in organizational effectiveness based on use of and impacts from the KMS. The dimensions are *System quality* - defines how well the KMS performs the functions of knowledge creation, storage/retrieval, transfer, and application; how much of the knowledge is codified, and how the KMS is supported by the IS staff and infrastructure**.** *Knowledge/Information quality* - ensures that the right knowledge with sufficient context is captured and available for the right users at the right time*. Use/User Satisfaction* - indicates actual levels of KMS use as well as the satisfaction of the KMS users. User satisfaction is a good complementary measure of KMS use when effectiveness of use depends on users being satisfied with the KMS. *Perceived Benefit measures* perceptions of the benefits and impacts of the KMS by users and is based on the Perceived Benefit Model**.** *Net Impact* - An individual's use of a KMS will produce an impact on that person's performance in the workplace. Each individual impact will in turn have an effect on the performance of the whole organization. **(**Clay, *et al*., 2005) developed a model of the factors affecting the Loyal Use of a KMS. (Figure 2)

Perceived Usefulness was found to be the strongest factor influencing Loyal Use. Extrinsic Motivation and perceived Voluntariness were also important but perceived ease of use played only a minor role. The quality of the system and quality of the knowledge were found to be key drivers of Perceived Usefulness. (Clay, *et al.*, 2005)

**(**Wu and Wang, 2006) defined five variables (system quality, knowledge or information quality, perceived KMS benefits, user satisfaction, and system use) as dependent variables in evaluating KMS success, and their inter relationships were suggested and empirically tested.

The results provide an expanded understanding of the factors that measure KMS success and implications of this work are discussed. (Wu and Wang, 2006)

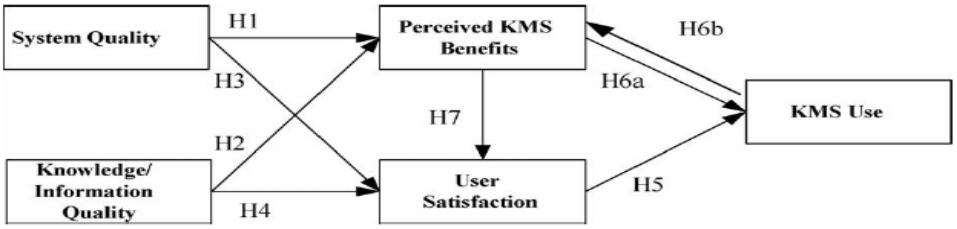


**Fig. 3:** (Wu and Wang, 2006) KMS Success Model.

The ten constructs derived from social capital theory, resource-based view and IS success model are integrated into the Irene research model. Twenty-one hypotheses derived from the research model are empirically validated using afield survey of KMS users. The results suggest that social capital and organizational IT capability are important preconditions of the success of knowledge management systems (Irene, 2008).

(Lai, *et al*., 2009) attempted to propose a more comprehensive model describing what factors affect employee satisfaction with KMS by considering KMF and personalization in addition to ease of use and usefulness.

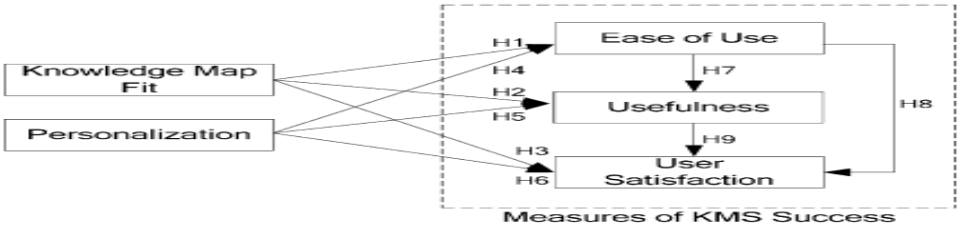


**Fig. 4: (**Lai, *et al*., 2009) Model.

The result shows that KMS with a higher level of knowledge map fit and personalization will satisfy employees directly or indirectly through the mediation effects of increased perceptions of ease of use and usefulness of KMS. Our findings could serve as useful references for researchers and practitioners interested in investigating issues related to the successful implementation of KMS.

***Research Model:***

We identify measures of KMS success based on previous studies. These measures were summarized in a table.

**Table 1:** Summarized measures of KMS Success.

| | user satisfaction | Perceived KMS benefits | perceived ease of use | KMS use | service quality | knowledge quality | System quality |
|---|---|---|---|---|---|---|---|
| Jennex & Olfman,2004 | * | * | - | - | * | * | * |
| Clay *et al*,2005 | - | * | * | - | - | * | * |
| Wu& Wang,2006 | * | * | - | * | - | * | * |
| Irene,2008 | * | * | - | - | * | * | * |
| Lai *et al*,2009 | * | * | * | - | - | - | - |
| Current Model | * | * | * | * | * | * | * |

* This item is be in research

- This item is not be in research

In this table, *User satisfaction* is an affective state representing an emotional reaction to the KMS use experience. Some scholars (Jennex and Olfman, 2004; Irene, 2008) suggested that *perceived KMS benefit* can substitute for perceived usefulness in the KMS context. The new dimension not only captures IS effectiveness but also retains the concept of the degree to which a person believes that use of the system enhances his/her job performance. *Ease of use* refers to the degree to which the KMS is easy to use.

A KMS has two sets of users, end users who use the knowledge stored in the system and contributory user who contribute knowledge to the system. Users may belong to both groups simultaneously. To support a discussion on *KMS use* data needs to be collected on each group's actual system use and the factors that led to

this use. *Knowledge quality* substitutes for information quality and refers to the quality of the knowledge/information delivered by the KMS. *System quality* is the performance of a KMS in terms of the consistency of the user interface, ease of use, response rates in interactive systems, and the accuracy of the codified business processes. *Service quality* means how well subject matter experts and KMS managers support the KMS. Many researchers (Masrek, *et al.,* 2007) found that top management support is a very critical factor in ensuring IS success implementation.

We study the relation between knowledge map fit with these measures in according blow model. The KMF herein defined as the extent to which a person believes that the knowledge map is easily understood and consistent with her/his cognition. Research initial question: Is there any meaningful relationship between the knowledge map fit and knowledge management system success?

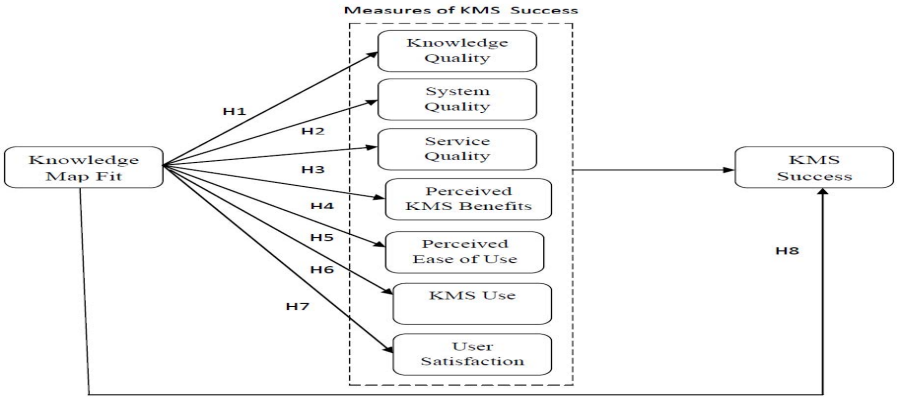


**Fig. 5:** Research Model.

***Hypotheses:***

A knowledge map management system facilitates knowledge navigation, knowledge seeking, and advisory learning (Lin and Hsueh, 2006), and then Knowledge map can benefit employees as mentioned earlier and then satisfy employees when interacting with KMS. Knowledge Map Fit (KMF) will benefit employees' perception of ease of use with KMS because it can save users' efforts in accessing knowledge. In the contexts of KMS, knowledge users usually employ one of the two strategies to locate knowledge of interest, namely searching and browsing. Providing hierarchical subject categories or knowledge maps (knowledge structures represented by a map metaphor) has been shown to be an effective way to support browsing behaviors (Ong et al., 2005). KMF is related to knowledge quality by increasing the content quality of knowledge, and increasing context and linkage quality. One of the measures of knowledge map fit is its compatibility to recognition of person, which by making the culture of trust and sharing of knowledge, increases the service quality. The relationship between knowledge map fit and system quality can be described by the response time, unity, and trustworthiness of knowledge management system.

Therefore, the following hypotheses are made in this study:

H1: There is a significant relationship between Knowledge Map Fit and Knowledge Quality.
H2: There is a significant relationship between Knowledge Map Fit and System Quality.
H3: There is a significant relationship between Knowledge Map Fit and Service Quality.
H4: There is a significant relationship between Knowledge Map Fit and perceived KMS benefits**.**
H5: There is a significant relationship between Knowledge Map Fit and perceived Ease of use.
H6: There is a significant relationship between Knowledge Map Fit and KMS Use.
H7: There is a significant relationship between Knowledge Map Fit and User satisfaction.
H8: There is a significant relationship between Knowledge Map Fit and KMS Success.

***Method:***

Research model was evaluated and corrected based on the expert opinion. Then data for this study were collected, using a questionnaire survey administered in three project- base companies in Iran. A Five-point Likert scale ranging from "strongly disagree" to "strongly agree" is used to get the responses. Since KMS implementation limited among Iranian companies, the target group of the research was focused on the user of Knowledge management system. We sent out 170 questionnaires to the respondents and received 101 completed questionnaires**.** The response rate was thus 59.4%.

Cronbach ´s alpha value calculated by the SPSS software is 0.874 (larger than 0.7), it represents that the test has reasonable reliability. In this study content validity and construct validity has been studied: the opinion of a

number of professors and expert of knowledge management has been used to measure the content validity. We used correlation coefficient for hypotheses testing and Friedman test used to priorities the measures of KMS success.

### *Research findings:*

Results show that statistical sample consists of 57.4% males and the main part of responders is in the age group of 20-40 (20-30 years: 43.6% and 30-40 years: 50.5%). In the statistical sample, most of the users of knowledge management system have M.A education (62.4%). Results show that the average time of using the knowledge management system by responders of statistical sample are about 30 minutes a day.

The relation between the knowledge map fit and each one of the seven factors of knowledge management system success was investigated separately with Pearson correlation test. The variable of knowledge management system was considered as the sum of the factors of knowledge management system success and then correlation between the knowledge map fit and knowledge management system success was investigated and the correlation coefficient of (0.643) between them showed that knowledge map fit has effect on the knowledge management system success. The results of hypothesis testing are shown on Table 2. Prioritizing of KMS success criteria and measures of knowledge map fit based on Friedman test are also shown on Table 3 and 4.

**Table 1:** Summery of Findings.

| Hypotheses | | correlation coefficient | sig | Result |
|---|---|---|---|---|
| H1 | There is a statistically significant relation between knowledge map fit with Knowledge Quality. | 0.580 | 0.000 | Supported |
| H2 | There is a statistically significant relation between knowledge map fit with System Quality. | 0644 | 0.000 | Supported |
| H3 | There is a statistically significant relation between knowledge map fit with Service quality. | 0.513 | 0.000 | Supported |
| H4 | There is a statistically significant relation between knowledge map fit with perceived KMS benefits. | 0.615 | 0.000 | Supported |
| H5 | There is a statistically significant relation between knowledge map fit with perceived Ease of use. | 0.332 | 0.001 | Supported |
| H6 | There is a statistically significant relation between knowledge map fit with KMS Use. | 0.506 | 0.000 | Supported |
| H7 | There is a statistically significant relation between knowledge map fit with User satisfaction. | 0.408 | 0.000 | Supported |
| H8 | There is a statistically significant relation between knowledge map fit with KMS Success. | 0.643 | 0.000 | Supported |

**Table 2:** Ranking measures of KMS Success.

| Measures of KMS success | Mean Rank |
|---|---|
| perceived KMS benefits | 5.87 |
| Knowledge Quality | 5.19 |
| KMS use | 4.49 |
| perceived Ease of use | 4.32 |
| System Quality | 2.88 |
| Service quality | 2.64 |
| User satisfaction | 2.62 |

**Table 3:** Ranking KMF Measures.

| KMF | Mean Rank |
|---|---|
| Easily understood | 1.63 |
| Consistent with her/his cognition | 1.37 |

### *Discussion and conclusions:*

According to the correlation coefficients, gained from the investigated organizations, knowledge map fit with correlation coefficient of (0.644) has the most effect on knowledge quality. One of the interesting results of this research is that knowledge map fit has the least correlation coefficient (0.332) with perceived KMS benefits; Based on Friedman test perceived KMS benefits are considered as one of the first priorities of factors of knowledge success in this research that shows knowledge map fit had the less perceived KMS benefits for users. This result can be obtained from the higher priority of clarity and comprehensibility of knowledge map, in

comparison to compatibility to recognition of person of his own duties. The correlation coefficient of knowledge map and ease of use were same (0.615), which approves this result and shows that knowledge map fit has great effect on the users' perceived ease of use.

Given to these results, Users can save much time and cognitive efforts on searching information and filtering the knowledge by the help of increased knowledge map fit. Moreover, knowledge map fit has been found to be the most important determinant of KMS success, showing the largest total effects on user satisfaction in addition to ease of use and usefulness. From a managerial perspective, a good knowledge map fit not only enables knowledge workers to acquire knowledge and understand domain concepts better but can also facilitate knowledge diffusion, sharing, and creation. In addition, decision-making, problem- solving processes, and response time for knowledge workers could be improved through providing a fitted knowledge map.

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