# Towards Measuring Knowledge Management Success

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## Abstract

*Discussions at previous HICSS conferences have revealed that there is no general agreement on definitions of knowledge management (KM) and knowledge management system (KMS) success. We developed these concepts and presented them earlier this year. Using an expert panel approach followed by two exploratory surveys, we identify KM success measures. The research demonstrates that measures for KM success are required on multiple dimensions. This paper thus also presents a set of dimensions with measures that can be used to determine if KM in an organization is successful.*

## 1. Introduction

Knowledge management (KM) and knowledge management system (KMS) success is an issue that requires exploration. During the Knowledge Management Foundations workshop held at the Hawaii International Conference on System Sciences (HICSS-39) in January 2006, it was agreed that for the credibility of the KM discipline, it is important to define KM success. Additionally, HICSS-40 hosted a minitrack focused on presenting research on KM success and measurement. Jennex, Smolnik, and Croasdell presented a definition of KM success based on two exploratory surveys generated from the literature [17]. The definition presented was: *KM success is a multidimensional concept. It is defined by capturing the right knowledge, getting the right knowledge to the right user, and using this knowledge to improve organizational and/or individual performance. KM success is measured by means of the dimensions: impact on business processes, strategy, leadership, the efficiency and effectiveness of KM processes, the efficiency and effectiveness of the KM system, organizational culture, and knowledge content.* The purpose of this paper is to analyze the comments from the exploratory surveys of the various dimensions, and to measures and incorporate them into a refined KM success definition, as well as into a list of dimensions and measures. Furthermore, the paper will begin to identify instruments that can be used to operationalize these measures. Besides presenting some background on KM success, the paper also offers a series of perspectives on KM/KMS success. These perspectives were derived from an analysis of academics and practitioners' definitions of KM/KMS success.

## 2. Background on KM Success

After summarizing various definitions of KM, Jennex defined KM success as reusing knowledge to improve organizational effectiveness by providing the appropriate knowledge to those who need it when it is needed [13]. KM is expected to have a positive impact on the organization that improves organizational effectiveness. DeLone and McLean use the terms success and effectiveness interchangeably; one of the perspectives proposed in this paper does likewise in respect of KM [7], [8].

Jennex and Olfman summarized and synthesized the literature on KM/KMS's critical success factors (CSF) into an ordered set of 12 KM CSFs identified from 17 studies of more than 200 KM projects [15]. These CSFs were thereafter sequentially ordered according to the number of studies identifying them:

- A knowledge strategy that identifies users, sources, processes, storage strategy, knowledge, and links to knowledge for the KMS;
- Motivation and commitment of users, including incentives and training;
- Integrated technical infrastructure, including networks, databases/repositories, computers, software, and KMS experts;
- An organizational culture and structure that supports learning and the sharing and use of knowledge;
- A common enterprise-wide knowledge structure that is clearly articulated and easily understood;
- Senior management support, including allocation of resources, leadership, and training;
- Learning organization;
- The KMS has a clear goal and purpose;

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- Measures are established to assess the impacts of the KMS and the use of knowledge, as well as verification that the right knowledge is being captured;
- The search, retrieval, and visualization functions of the KMS support facilitated use of knowledge;
- Work processes are designed that incorporate knowledge capture and use; and
- Knowledge is secured / protected.

However, these CSFs do not define KM/KMS success or arrange these factors into an acceptable theoretical framework. In this paper, they are merely used to identify what is required to successfully assist with the analysis of KM/KMS success dimensions. Without a definition of KM/KMS success, it is difficult to measure actual success.

## 3. Perspectives on KM/KMS Success

The KM workshop at the 2006 HICSS found that there were several perspectives on KM success. Jennex, Smolnik, and Croasdell examined opinions on these perspectives and identified those on which there was consensual agreement [17]. This section briefly summarizes these perspectives and the findings on them.

### 3.1. KM Success and Effectiveness

One perspective on KM success is that KM success and KM effectiveness are interchangeable and refer to the same construct or variable. This is based on the view that effectiveness is a manifestation of success. An example would be increasing decision-making effectiveness to generate a positive impact on the organization, which would result in successful KM. This perspective uses both process and outcome measures. This perspective was supported, included in the definition of KM success and uses the term success interchangeably with effectiveness [17].

### 3.2. KM and KMS Success as Interchangeable

Another perspective is that KM and KMS success is interchangeable. KMS success can be defined as making KMS components more effective by improving search speed, accuracy, etc. An example is a KMS that enhances search and retrieval functions, thus enhancing decision-making effectiveness by improving the ability of the decision maker to find and retrieve appropriate knowledge in a more timely manner. The implication is that by increasing KMS effectiveness, KMS success is enhanced and decision-making capability is enhanced, which leads to positive impacts on the organization. The definition of KM success thus includes this. The conclusion is that enhancing KMS effectiveness makes the KMS more successful, as well as being a reflection of KM success. The Jennex and Olfman KM Success Model [16], based on the DeLone and McLean IS Success Model [8], combines KM and KMS success interchangeably and utilizes this perspective. This perspective was neither endorsed nor denied [17]. However, a review of the survey results and discussions at HICSS-40 suggested that the view on this perspective depends on how a KMS is viewed.

Although KM has been defined previously, it is important to emphasize that KM is an action discipline that supports decision-making. It is a fusion of technical, organizational, and social issues. This is furthered by Jennex [13], who defines a KMS by using Churchman's view of systems and not only including the processes and users as a part of the KMS but also the IT components [4]. The KMS consists of users, processes and technologies for identifying and capturing knowledge, knowledge repositories, and processes for storing, searching, retrieving, and displaying knowledge. The KMS need not be computer-based and in many cases, repositories consist of "in-the-head" knowledge. It is this Churchman view of a KMS that those, who consider KM and KMS success interchangeable, use [4]. Those do not tend to have a purely technical view of a KMS. This paper takes the view that KM and KMS success are interchangeable.

### 3.3. KM and KMS Success as Separate Measures

Contrary to that in the previous section, this perspective views KM and KMS success as separate measures. This is based on a narrow system view that allows for KMS success that does not translate into KM success. KMS are often regarded as a sub-function of KM, comprising technical and organizational instruments with which to implement KM. Thus, KMS success addresses implementation and operation factors in terms of system or process metrics, whereas KM success is an assessment of the value that these systems and processes provide to an organization. KM therefore focuses more on the outcome, while KMS focus more on the process. These perspectives are introduced in the following sections. This perspective was also neither confirmed nor denied, although the above discussion on KMS perspective was the determiner for favoring this perspective.

### 3.4. KM Success as a Process Measure

This perspective views KM success as a result of an effective and successful KM process. KM success could therefore determiner described in terms of the efficient achievement of well-defined organizational and process goals by means of the systematic employment of organizational instruments and information and communication technologies for a targeted creation and utilization of knowledge, as well as for making knowledge available. KM is a support function to improve knowledge-intensive business processes. An example would be supporting the technology forecasting process in an IT consulting firm through the technical components of a KMS [11]. Likewise, the effective implementation of knowledge processes (i.e. acquisition, creation, sharing, and codification) is regarded as a part of KM success. Consequently, this perspective focuses on measuring how much KM contributes to improving the effectiveness of business and knowledge processes. This perspective was not, however, endorsed as the only perspective on KM success.

### 3.5. KM Success as an Outcome Measure

In contrast, this perspective views KM success as an outcome measure. KM success is therefore regarded as a measure of the various outcomes of knowledge process capabilities within an organization as a result of the KM initiatives undertaken. Typical outcomes in terms of organizational performance are the enhancement of:

- product and service quality,
- productivity,
- innovative ability and activity,
- competitive capacity and position in the market,
- proximity to customers and customer satisfaction,
- employee satisfaction,
- communication and knowledge sharing, and
- knowledge transparency and retention.

This perspective too could not be confirmed as a sole perspective on KM success.

### 3.6. KM Success as a Combination of Process and Outcome Measures

The last perspective views KM success as a combination of process and outcome measures. Respective descriptions of KM success focus on improved process effectiveness (see section 3.4.), as well as on achieving actionable outcomes (see section 3.5). Sections 3.1 and 3.3 present examples of this combined approach. This perspective was supported and is used in this paper as a basis for defining KM success.

## 4. KM/KMS Success Models

Jennex and Olfman summarized the various KM/KMS success models and compared how well they incorporated the previously mentioned CSFs [15]. The Jennex Olfman KM Success Model (see figure 1) was found to be one of the better models at placing the CSFs into a theoretical framework that explained how they led to KM success. This model is used to analyze and refine the dimension and measures in the proposed KM success definition, and is briefly discussed below.

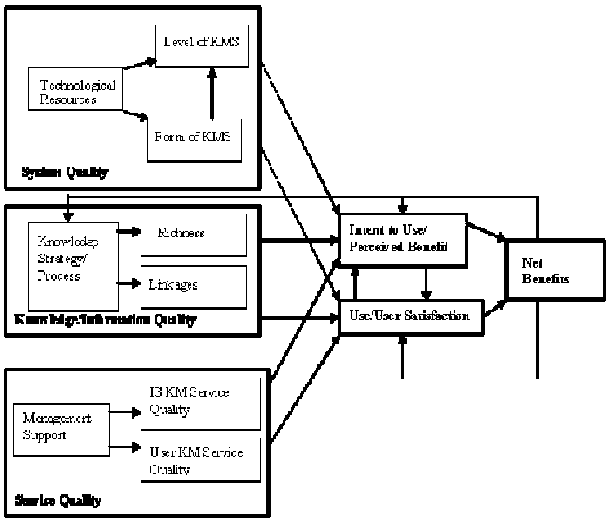


**Figure 1. Jennex Olfman KM Success Model [16]**

The Jennex Olfman KM Success Model [16] was based on several case studies and quantitative research studies and is theoretically grounded on the DeLone and McLean IS Success Model [8], which has been accepted for several years and has been validated by several studies [7]. DeLone and McLean have also made various additions suggested by the case studies [8]. The Jennex Olfman KM Success Model is considered a better description of KM success due to its strong theoretical grounding, its reflection of observed phenomena, and its close fit with the set of the 12 CSFs. Reflecting security aspects in this model furthermore generates a theoretical grounding for KM security research.

The Jennex Olfman KM Success Model [16] is a causal model. It has three basic dimensions as antecedents to KM success: system quality, which deals with the technical infrastructure; knowledge/ information quality, which deals with KM strategy for

identifying critical knowledge and how that knowledge is stored; and service quality, which deals with management support and allocation of resources. The model also includes the dimensions perceived benefit, user satisfaction, and net benefits. These dimensions deal with ensuring that the KM initiative meets the needs of the users and the organization.

## 5. Methodology

This paper is exploratory research with the goal of guiding the KM community towards a consensus definition of KM success. The paper builds on the results of an exploratory and a confirmatory survey (discussed below) reported in Jennex, Smolnik, and Croasdell [17]. These survey results included a definition of KM success and identification of a set of dimensions and measures. As part of the confirmatory survey, respondents were asked what dimensions/measures they would add or delete from a list of those presented. This paper analyzes these comments by tallying them and then putting them into context by comparing the KM success definition dimensions and measures to the Jennex Olfman KM Success Model [16].

The exploratory survey was generated through an expert panel approach. The 30 members of the editorial review board of the International Journal of Knowledge Management were asked to provide their definitions of KM success. Thirteen responses were received. These responses were used to generate an exploratory survey of KM success, which used 5-point Likert scale items to solicit agreement on various perspectives and proposed KM success definitions. The perspectives were generated through an analysis of the expert board responses that distinguished two groups. The first grouping examined the measures used to determine KM success. Three subgroups were then observed: process-based measures, outcome-based measures, and a combination of process and outcome based measures. The second grouping of responses provided two subgroups: those that combined KM and KMS success measures and those that viewed KM and KMS success as separate measures. A final observation was that many proposed definitions used success and effectiveness interchangeably.

The exploratory survey also collected data on the KM expertise and focus of the respondents. Furthermore, the survey offered text boxes that allowed for free form input of additional KM success factors or measures, KM success definitions, and thoughts on the differences between KM and KMS success.

The exploratory survey was administered using a web form with the data being collected and stored automatically. Survey respondents were solicited via broadcast emails to the ISWorld and DSI email list servers, to lists of KM researchers maintained by the authors, to the editorial review board of the International Journal of Knowledge Management, and to its list of authors. An initial request was sent followed by a second request approximately one week later.

One hundred and three usable survey responses were received. Thirteen were from KM practitioners, 70 were from KM researchers, 6 were from KM students, and 14 were from academics interested in KM but not active KM researchers. Likert items were analyzed using means and standard deviations as no hypotheses had been proposed.

The results of the exploratory survey were used to generate a second survey. This survey presented a composite definition of KM success and a set of measures for each of the indicated dimensions. A 7-point Likert scale was used to solicit agreement on the composite definition and each set of measures. Similar to the exploratory survey, items were also provided to collect data on the respondents' KM expertise and focus. Furthermore, each set of measures offered text boxes in which the respondents could indicate measures that they wanted to add or have deleted from each set of measures.

The second survey was also administered by means of a web form with respondents solicited in the same manner as the exploratory survey. One hundred and ninety-four usable survey responses were received. Sixteen were from KM practitioners, 114 were from KM researchers, 23 from KM students, and 41 were from others, including academics interested in KM but not active KM researchers. Likert items were analyzed using means and standard deviations as no hypotheses had been proposed.

## 6. Findings

The comments were useful to adjust the measures identified in the survey. However, a simple tallying of the comments and adjusting the measures based on this tally was not useful. Instead, the comments suggested that the entire list of dimensions and measures in the context of a KM success model and CSFs had to be reviewed. These findings are discussed in the following paragraphs.

**The impact on business processes dimension**. The comments suggested adding innovation and agility as measures. They also supported removing labor-saving measures, refining learning through mistakes or

insights, and clarifying the differences between action and outcome measures.

**The strategy dimension**. In this study, strategy refers to KM that is designed to support organization-wide, strategic systems and initiatives. The comments first questioned the meaning of strategy. They also suggested that social network analysis measures should be added to provide indicators of cohesiveness, centrality, and the strength of ties. Additionally issues were raised with respect to strategy or alignment to strategy also impacting employee performance, and the way in which social capital and knowledge integration measure strategy.

**The leadership dimension**. The comments suggested adding social network analysis measures that provide indicators of cohesiveness, centrality, and the strength of ties.

**The KM process efficiency and effectiveness dimension**. The comments questioned whether the measures should be lifecycle based rather than process based. Additionally, they suggested considering scalability, changing "safe and effective storage of knowledge" to "secure, private, and reliable storage of knowledge". However, these terms have conceptual definitions that differ from "safe", while "effective" in terms of storage is difficult to define. The comments furthermore questioned whether increased collaboration is a true measure for this dimension.

**The KMS effectiveness and efficiency dimension**. The comments queried the synonymous use of usability and adaptability, questioned whether this dimension does in fact differ from KM process, and suggested that measures like maintenance costs and system measures such as maintainability and availability should be added.

**The learning culture dimension**. The comments questioned change in leadership culture as a leadership measure, and suggested adding organizational learning as well as incentive measures.

**The knowledge content dimension**. The comments questioned whether retrieval does in fact differ from KMS retrieval and suggested adding integrity, temporal, lifecycle, visualization, and multifacetness measures. They furthermore suggested that knowledge creation measures should be part of the KM process dimension.

The questions raised by the comments suggest that there may be issues with the dimensions. This drove the analysis of the dimensions with the CSFs and the Jennex Olfman KM Success Model.

An inspection of the list of CSFs reveals conflicts that can affect the success dimensions. CSFs such as organizational culture, learning organization, and senior management support are regarded as necessary for KM to succeed. This in turn raises the question whether a dimension can be a CSF and, simultaneously, a reflection of success. We conclude that this is not likely, that CSFs are indeed necessary for KM success to occur, but are not reflections of KM success in and of themselves. This is borne out by the Jennex Olfman KM Success Model [16], as it is a causal model. This suggests that the success dimensions leadership and learning organization should be removed. Moreover, the success dimensions in the Jennex Olfman KM Success Model [16] leads us to question whether a KMS effectiveness and efficiency dimension and perhaps even a KM process efficiency and effectiveness dimension are required as reflections of KM success. The following section provides a discussion that leads to the final definition of the dimensions of KM success.

## 6. Discussion

As this is exploratory research, few conclusions can be drawn. However, the two surveys have allowed us to reach some consensus on a KM success definition and a preliminary set of success measures. The consensus KM success definition is:

"KM success is a multidimensional concept. It is defined by capturing the right knowledge, getting the right knowledge to the right user, and using this knowledge to improve organizational and/or individual performance. KM success is measured by means of the dimensions: impact on business processes, strategy, leadership, the efficiency and effectiveness of KM processes, the efficiency and effectiveness of the KM system, organizational culture, and knowledge content."

The preliminary set of success dimensions must be examined critically, though, as previous discussions have shown that there is conflict between what is regarded as an antecedent and thus necessary for success, and what is regarded as a reflection of success. This is made more complex as factors that are antecedents to KM need to remain to sustain continued KM success. We therefore start this discussion by examining the research behind the CSF of organizational and learning cultures.

In an executive development program, Alavi and Leidner surveyed executive participants with respect to what was required for a successful KMS [1]. They found that organizational and cultural issues associated with user motivation to share and use knowledge are the most significant. Yu et al. find that KM drivers such as a learning culture, knowledge sharing intention, KMS quality, rewards, and KM team activity significantly affect KM performance [23]. These conclusions were deduced from a survey of 66 Korean

firms. Cross and Baird propose that KM will not improve business performance by simply using technology to capture and share the lessons of experience [5]. They postulate that for KM to improve business performance, it had to increase organizational learning through the creation of organizational memory. Subsequently, 22 projects were examined to investigate this. The conclusion is that improving organizational learning improves the likelihood of KM success. Chan and Chau deduce lessons learned from a failed case of KM in a Hong Kong organization and find a need for a knowledge-sharing culture [3]. In their study of KM abandonment in four KM projects, Lam and Chua identify CSFs for KM from the literature, including a learning culture [10], [18], [20], [24].

The above research examined successful and failed KM and, on the whole, concludes that an appropriate organizational culture and learning culture are necessary antecedents to KM success, but are not an outcome of KM success although. Nevertheless, it can also be concluded that successful KM should lead to the strengthening of organizational and learning cultures. However, it is difficult to quantify measurements of change in culture, which leads to the decision that organizational and learning cultural measures of KM success should be dropped and used only as CSFs.

Leadership is an interesting concept. The CSF of senior management support can be considered leadership and it has been found to be necessary for KM to succeed, but can leadership also be a reflection of KM success? In their above-mentioned study, one of Chan and Chau's key findings is the need for continued top management support and involvement [3]. Davenport et al. studied 31 projects in 24 companies (18 were successful, five were considered failures, and eight were too new to be rated) [6]. Eight CSFs, including senior management support, were common in successful KM projects. Jennex and Olfman studied three KM projects and also observed senior management support as a CSF [14]. In their above-mentioned study, Lam and Chua also identify continuous top management support (as also identified by Storey and Barnett, [22]) as a CSF [18]. Holsapple and Joshi investigate factors that influenced the management of knowledge in organizations by using a Delphi panel consisting of 31 recognized KM researchers and practitioners and find leadership and top management commitment/support to be crucial [12] This finding is also supported by Bals et al.'s study on key success factors for a successful KM initiative in a global bank [2]. Furthermore, several researchers have demonstrated the need to create incentives and motivation within the organization to create and reuse knowledge [6], [9], [14], [18], [21], [23]. Finally, Malhotra and Galletta identify the critical importance of user commitment and motivation through a survey study of users of a KMS implemented in a health care organization [19].

The above research found that continuous senior management support is a CSF and also necessary for sustaining KM success. Leadership indicates support for KM, providing the management environment that encourages KM through knowledge creation and reuse by members of the organization, and providing adequate resources for the KM/KMS initiative. This is an antecedent to KM success and also an outcome of KM success as successful KM reinforces knowledge leadership.

Why do we argue that culture is a CSF but not an output of KM success, while leadership is argued to be both? It is our opinion that culture is not changed quickly, that it takes much time to effect cultural changes but that individuals can be changed quickly, and that success breeds success, i.e. that successful KM will encourage senior management to push KM even more.

Strategy as a dimension can be discussed briefly as the only point of contention is what it actually refers to. This dimension refers to the impact of KM on organizational strategy. This can occur through impacts on organizational and/or strategic systems, on strategic intelligence gathering, or merely on fulfilling strategy. This dimension differentiates between impacts on business systems and strategic systems; it examines organizational impacts instead of localized impacts. The decision is therefore that this dimension needs to be renamed and is thus changed to "impacts on strategy".

The next dimensions needing discussion are KM and KMS efficiency and effectiveness. Since this paper takes the perspective that KM and KMS success are essentially similar, it follows that as success dimensions they should be similar. However, should they even be success dimensions? It is clear that they are antecedents to KM success, but are improvements in efficiency and effectiveness resultants and measures of KM success? Using the Jennex Olfman KM Success Model [16], we determine that these two dimensions are not measures of KM success. While it is agreed that improving KM/KMS effectiveness and efficiency will enhance KM and knowledge reuse in an organization, we reject the notion that simply being more effective or efficient in KM/KMS is a reflection of KM success.

The final dimension needing discussion is knowledge content. At first, it seems as if this dimension should be treated the same as KM/KMS effectiveness and efficiency. This is, however, rejected. Instead, we accept that knowledge content is a

reflection and measure of KM success, as well as being an antecedent to KM success. The Jennex Olfman KM Success Model [16] is the basis for this determination. The knowledge quality dimension is an antecedent to KM success; however, there is also a feedback process from the impact of KM use to guide further knowledge content and quality. Much like leadership, it is anticipated that KM success will be reflected in the increased quantity and quality of knowledge content; and that a lack of KM success will also be reflected in a decrease in the quantity and quality of knowledge content.

## 7. Conclusions

It is difficult to reach any quantitatively proven conclusions with this research as no hypotheses were proposed. This is acceptable, as the purpose of this paper is to start a focused discussion on KM and KMS success. The response to the exploratory survey, as well as the minitrack focused on KM and KMS success and measurement at the Hawaii International Conference on System Sciences, HICSS, demonstrate this will indeed occur.

This analysis of comments and success dimensions has led to a refined definition of KM success that examines only four success dimensions:

*"KM success is a multidimensional concept. It is defined by capturing the right knowledge, getting the right knowledge to the right user, and using this knowledge to improve organizational and/or individual performance. KM success is measured by means of the dimensions: impact on business processes, impact on strategy, leadership, and knowledge content."*

Measures are now being determined for each of these dimensions and will be presented at a later date.

It is expected that it will take a great deal of research before consensus is reached on what KM and KMS success are. This paper and the findings from the exploratory survey are, however, a good starting point for this discussion.

There are some limitations to this research. It is quite possible that the reason that so little consensus has been observed in determining KM success and success dimensions is because KM and KMS success are complex constructs whose complexity makes operationalizing it in a survey difficult. KM success is also multidimensional. However, we have reduced the dimensions from seven to four. It is quite likely that the exploratory survey used for this research, while generated using an expert panel, probably did not capture the multidimensional nature of the provided KM success definitions and therefore made it difficult for respondents to find statements with which they fully agreed. This limitation was considered when generating the second survey and it appears that this has improved consensus regarding the KM success definition generated from the first survey. However, we still recognize that a quantitative study is required to confirm this model.

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