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Assessing Knowledge Management Success

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ABSTRACT

This article proposes a framework for assessing knowledge management system (KMS) success models. The framework uses three criteria: how well the model fits actual KMS success factors, the degree to which the model has a theoretical foundation, and if the model can be used for both types of KMSs. The framework is then applied to four KMS success models found in the literature and is determined to be a useful framework for assessing KMS success models.

Keywords: *knowledge management; knowledge management success; knowledge management systems; organizational memory*

INTRODUCTION

Knowledge management systems (KMSs) are systems designed to manage organizational knowledge. Alavi and Leidner (2001) clarify KMSs as IT-based systems developed to support/enhance the processes of knowledge creation, storage/retrieval, transfer, and application. Additionally a KMS supports knowledge management through the creation of network-based organizational memory (OM), and support for virtual project teams and organizations and communities of practice. A final goal of a KMS is to support knowledge/OM creation.

There are several taxonomies of KMSs from Zack's (1999) integrative and interactive KMS to KMS classified according to knowledge lifecycle (Alavi & Leidner, 2001), KM spectrum (Hahn & Subramani, 2000), KM architecture (Borghoff & Pareschi, 1998), and so forth. However, this article classifies KMS by the context captured and the users targeted, resulting in two approaches to building a KMS—the process/task approach and the infrastructure/generic approach. The process/task approach focuses on the use of knowledge/OM by participants in a process, task, or project in order to improve the effectiveness of that process, task, or project. This approach identifies the information and knowledge needs of the process, where they are located, and who needs them. This approach requires the KMS to capture minimal context because users are assumed to understand the milieu of the knowledge that is captured and used.

The infrastructure/generic approach focuses on building a system to capture and distribute knowledge/OM for use throughout the organization. Concern is with capturing context to explain the captured knowledge and the technical details needed to provide good mnemonic functions associated with the identification, retrieval, and use of knowledge/OM. The approach focuses on network capacity, database structure and organization, and knowledge/information classification.

Both approaches may be used to create a complete KMS. The process/task approach supports specific work activities, while the infrastructure/generic approach integrates organizational knowledge into a single system that can be leveraged over the total organization instead of just a process or project. Morrison and Weiser (1996) support the dual approach concept by suggesting that an organization-wide KMS be designed to combine an organization's various task/process-based KMSs into a single environment and integrated system.

Once a KMS is implemented, whichever type it is, its success or effectiveness needs to be determined. Turban and Aronson (2001) list three reasons for measuring the success of a knowledge management system:

- To provide a basis for company valuation
- To stimulate management to focus on what is important
- To justify investments in KM activities

All are good reasons from an organizational perspective. Additionally, from the perspective of KM academics and practitioners, the measurement of KMS effectiveness or success is crucial to understanding how these systems should be built and implemented.

To meet this need, several KMS success/effectiveness models have been proposed. It is the purpose of this article to propose a framework for assessing the usefulness of these models. To do this the article describes an evaluation model based on comparing the KMS success model to KMS success factors, determining the degree to which the model has a theoretical foundation, and determining if the model can be applied to both approaches to building a KMS.

The article will first define the assessment framework. Then four KM/KMS success/effectiveness models will be described, followed by an analysis with respect to how well the models match the assessment framework and a conclusion on the usefulness of the framework. KM/KMS success/effectiveness will not be defined, because we found that each model defines success/effectiveness as part of the model.

METHODOLOGY

The proposed assessment framework consists of three main questions: how well the KMS success model meets KM/KMS success criteria, the degree of the model's theoretical foundation, and if it can be applied to both approaches to building a KMS. Stinchcombe (1968) suggests testing theories by determining how well they reflect observed data and that the more observations that can be compared, the better. The proposed framework does this by comparing the KMS success models to a set of KMS success criteria. The set of KMS success criteria was determined through a literature survey. Several studies were found that reported issues affecting the success of a KMS. The studies used in this article utilize a variety of methods, including surveys, case studies, Delphi studies, and experimentation. A total of 78 projects or organizations were investigated using case studies. Three surveys were administered, and one Delphi study and experiment were performed.

The second criterion is the theoretical foundation of the KMS success model. This criteria is based on being able to generalize the model. It is proposed that a model that is based on accepted theory or other widely supported models will be more generalizable. The theoretical foundation is determined by reviewing the publication the model is presented in. A judgment is made as to the appropriateness of the theoretical foundation.

The third criterion is for the KMS success model to be applicable to both KMS approaches. This criterion is determined by judging the focus of the model to determine if it is specific to either the task/process approach or the generic/infrastructure approach.

KM/KMS SUCCESS FACTORS

A successful KMS should perform the functions of knowledge creation, storage/retrieval, transfer, and application well. However, other factors can influence KMS success. This section creates a KMS success factor framework by reviewing research related to identifying KMS success factors. Additionally, findings from studies looking at knowledge management and organizational memory success are also included. KM is included using a Churchman (1979) view of a KMS which can be defined to include the KM initiative driving the implementation of a KMS (also the counter view is valid, as looking at KM can also include looking at the KMS). OM is included, as Jennex and Olfman (2002) found that KM and OM are essentially the same with the difference being the players. End-users tend to do KM where KM is concerned with the identification and capture of key knowledge. Information systems (IS) personnel tend to be concerned with OM where OM is the storage, search, retrieval, manipulation, and presentation of knowledge. KMS and OMS are the systems built to support KM and OM, and are essentially systems designed to manage organizational knowledge. As stated previously, Alavi and Leidner (2001) clarify KMS as IT-based systems developed to support/enhance the processes of knowledge creation, storage/retrieval, transfer, and application. Additionally a KMS supports knowledge management through the creation of network-based organizational memory, and support for virtual project teams and organizations and communities of practice. A final goal of a KMS is to support knowledge/OM creation. Stein and Zwass (1995) define OMS as the processes and IT components necessary to capture, store, and bring to bear knowledge created in the past on decisions currently being made. Jennex and Olfman (2002), using these definitions of KMS and OMS, along with a Churchman (1979) view of systems, combined the KMS and OMS into a single system.

A success factor framework is constructed by reviewing the literature by author. This is done so that the context resulting in the generation of the success factor can be presented. The identified success factors are then analyzed for similar concepts and combined into composite success factors. The composite success factors are ranked based on the number of authors mentioning the factor. This is problematic, but is done as it implies greater consensus on the existence of the success factor; that is, the more often a success factor is mentioned, the greater the consensus that it is a success factor and the greater the likelihood it is important. Table 1, presented at the end of this discussion, provides the ranked list of composite success factors.

Mandviwalla, Eulgem, Mould, and Rao (1998) summarized the state of the research and described several strategy issues affecting the design of a KMS. These include the focus of the KMS (who are the users), the quantity of knowledge to be captured and in what formats, who filters what is captured, and what reliance and/or limitations are placed on the use of individual memories. Additional technical issues affecting KMS design include knowledge storage/repository considerations, how information and knowledge is organized so that it can be searched and linked to appropriate events and use, and processes for integrating the various repositories, and for reintegrating information and knowledge extracted from specific events. Some management issues include how long the knowledge is useful, access locations as users rarely access the KMS from a single location (leads to network needs and security concerns), and the work activities and processes that utilize the KMS.

Ackerman (1994) studied six organizations that had implemented his Answer Garden system. Answer Garden is a system designed to grow organizational memory in the context of help-desk situations. Only one organization had a successful implementation because expectations of the capabilities of the system exceeded the actual capabilities. Ackerman and Mandel (1996) found that a smaller task-based system was more effective on the sub-organization level because of its narrower expectations. They refer to this narrower system as "memory in the small."

Jennex and Olfman (2000) studied three KM projects to identify design recommendations for building a successful KMS. These recommendations include:

- Develop a good technical infrastructure by using a common network structure, adding KM skills to the technology support skill set, using high-end PCs; integrated databases; and standardizing hardware and software across the organization.
- Incorporate the KMS into everyday processes and IS by automating knowledge capture.
- Have an enterprise-wide knowledge structure.
- Have Senior Management support.
- Allocate maintenance resources for OMS.
- Train users on use and content of the OMS.
- Create and implement a KM strategy/process for identifying/maintaining the knowledge base.
- Expand system models/life cycles to include the KMS, and assess system/process changes for impact on the KMS.
- Design security into the KMS.
- Build motivation and commitment by incorporating KMS usage into personnel evaluation processes, implementing KMS use/satisfaction metrics, and identifying organizational culture concerns that could inhibit KMS usage.

Additionally, Jennex and Olfman (2002) performed a longitudinal study of KM on one of these organizations and found that new members of an organization do not use the computerized KMS due to a lack of context for understanding the knowledge and the KMS. They found that these users needed pointers to knowledge more than codified knowledge.

Jennex, Olfman, and Addo (2003) investigated the need for having an organizational KM strategy to ensure that knowledge benefits gained from projects are captured for use in the organization by surveying Year 2000 (Y2K) project leaders. They found that benefits from Y2K projects were not being captured because the parent organizations did not have a KM strategy/process. Their conclusion was that KM in projects can exist and can assist projects in utilizing knowledge during the project.

Davenport, DeLong, and Beers (1998) studied 31 projects in 24 companies. Eighteen projects were determined to be successful, five were considered failures, and eight were too new to be rated. Eight factors were identified that were common in successful KM projects. These factors are:

- Senior management support
- Clearly communicated KMS purpose/goals
- Linkages to economic performance
- Multiple channels for knowledge transfer
- Motivational incentives for KM users
- A knowledge-friendly culture
- A solid technical and organizational infrastructure
- A standard, flexible knowledge structure

Malhotra and Galletta (2003) identified the critical importance of user commitment and motivation through a survey study of users of a KMS being implemented in a health care organization. They found that using incentives did not guarantee a successful KMS. They created an instrument for measuring user commitment and motivation that is similar to Thompson, Higgins, and Howell's (1991) Perceived Benefit model, but based on self-determination theory that uses the Perceived Locus of Causality.

Ginsberg and Kambil (1999) explored issues in the design and implementation of an effective KMS by building a KMS based on issues identified in the literature and then experimentally implementing the KMS in a field setting. They found knowledge representation, storage, search, retrieval, visualization, and quality control to be key technical issues, and incentives to share and use knowledge to be the key organizational issues.

Alavi and Leidner (1999) surveyed executive participants in an executive development program with respect to what was needed for a successful KMS. They found organizational and cultural issues, associated with user motivation to share and use knowledge, to be the most significant. They also found it important to measure the benefits of the KMS, and to have an integrated and integrative technology architecture that supports database, communication, and search and retrieval functions.

Holsapple and Joshi (2000) investigated factors that influenced the management of knowledge in organizations through the use of a Delphi panel consisting of 31 recognized KM researchers and practitioners. They found leadership and top management commitment/support to be crucial. Resource influences such as having sufficient financial support, skill level of employees, and identified knowledge sources are also important.

Koskinen (2001) investigated tacit knowledge as a promoter of success in technology firms by studying 10 small technology firms. Key to the success of a KMS was the ability to identify, capture, and transfer critical tacit knowledge. A significant finding was that new members take a long time to learn critical tacit knowledge and a good KMS facilitates the transference of this tacit knowledge to new members.

Barna (2003) studied six KM projects with various levels of success (three were successful, two failed, and one was an initial failure turned into a success) and identified two groups of factors important to a successful KMS. The main managerial success factor is creating and promoting a culture of knowledge sharing within the organization by articulating a corporate KM vision, rewarding employees for knowledge sharing, creating communities of practice, and creating a "best practices" repository. Other managerial success factors include obtaining senior management support, creating a learning organization, providing KMS training, and precisely defining KMS project objectives

Design/construction success factors include approaching the problem as an organizational problem and not a technical one; creating a standard knowledge submission process; developing methodologies and processes for the codification, documentation, and storage of knowledge; developing processes for capturing and converting individual tacit knowledge into organizational knowledge, and creating relevant and easily accessible knowledge-sharing databases and knowledge maps.

Cross and Baird (2000) proposed that KM would not improve business performance simply by using technology to capture and share the lessons of experience. It was postulated that for KM to improve business performance, it had to increase organizational learning through the creation of organizational memory. To investigate this, 22 projects were examined. The conclusion was that improving organizational learning improved the likelihood of KM success. Factors that improved organizational learning include:

- Supporting personal relationships between experts and knowledge users
- Providing incentives to motivate users to learn from experience and to use the KMS
- Providing distributed databases to store knowledge and pointers to knowledge
- Providing work processes for users to convert personal experience into organizational learning
- Providing direction to what knowledge the organization needs to capture and learn from

Sage and Rouse (1999) reflected on the history of innovation and technology, and identified the following issues:

- Modeling processes to identify knowledge needs and sources
- Using a KMS strategy for the identification of knowledge to capture and use, as well as who will use it
- Providing incentives and motivation to use the KMS
- Developing an infrastructure for capturing, searching, retrieving, and displaying knowledge
- Displaying an understood enterprise knowledge structure
- Defining clear goals for the KMS
- Measuring and evaluating the effectiveness of the KMS

Yu, Kim, and Kim (2004) explored the linkage of organizational culture to knowledge management success. They found that KM drivers such as a learning culture, knowledge sharing intention, KMS quality, rewards, and KM team activity significantly affected KM performance. These conclusions were reached through a survey of 66 Korean firms.

These studies provide several success factors. As previously discussed, to analyze the factors they have been reviewed and paraphrased into a set of ranked composite success factors where the ranking is based on the number of sources citing them. Table 1 lists the final set of success factors in their rank order. Additionally, success factors SF1 through SF4 are considered the key success factors, as they were mentioned by at least half of the success factor studies.

KNOWLEDGE MANAGEMENT SUCCESS MODELS

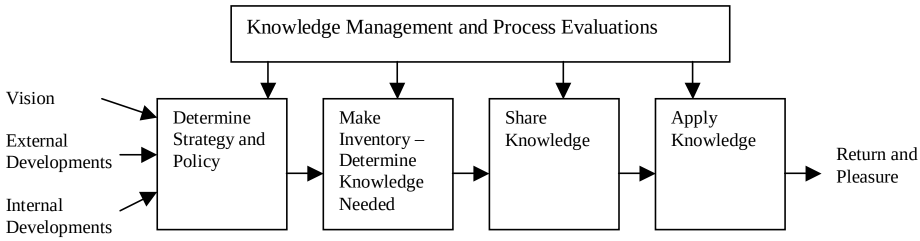
Bots and de Bruijn: Knowledge Value Chain

Bots and de Bruijn (2002) assessed KM and determined that the best way to judge good KM was through a knowledge value chain. In this evaluation process KM is assessed for effectiveness at each step of the knowledge process and is good if each of the indicated activities is performed well, with the ultimate factor being if the

Table 1. KMS success factor summary

ID	Success Factor	Source
SF1	Integrated Technical Infrastructure including networks, databases/repositories, computers, software, KMS experts	Alavi and Leidner (1999), Barna (2002), Cross and Baird (2000), Davenport et al. (1998), Ginsberg and Kambil (1999), Jennex and Olfman (2000), Mandviwalla et al. (1998), Sage and Rouse (1999), Yu et al. (2004)
SF2	A Knowledge Strategy that identifies users, sources, processes, storage strategy, knowledge and links to knowledge for the KMS.	Barna (2002), Ginsberg and Kambil (1999), Holsapple and Joshi (2000), Jennex, Olfman, and Addo (2003), Koskinen (2001), Mandviwalla et al. (1998), Sage and Rouse (1999), Yu et al. (2004)
SF3	A common enterprise wide knowledge structure that is clearly articulated and easily understood	Barna (2002), Cross and Baird (2000), Davenport et al. (1998), Ginsberg and Kambil (1999), Jennex and Olfman (2000), Mandviwalla et al. (1998), Sage and Rouse (1999)
SF4	Motivation and Commitment of users including incentives and training	Alavi and Leidner (1999), Barna (2002), Cross and Baird (2000), Davenport et al. (1998), Ginsberg and Kambil (1999), Jennex and Olfman (2000), Malhotra and Galletta (2003), Yu et al. (2004)
SF5	An organizational culture that supports learning and the sharing and use of knowledge	Alavi and Leidner (1999), Barna (2002), Davenport et al. (1998), Jennex and Olfman (2000), Sage and Rouse (1999), Yu et al. (2004)
SF6	Senior Management support including allocation of resources, leadership, and providing training	Barna (2002), Davenport et al. (1998), Holsapple and Joshi (2000), Jennex and Olfman (2000), Yu et al. (2004)
SF7	Measures are established to assess the impacts of the KMS and the use of knowledge as well as verifying that the right knowledge is being captured	Alavi and Leidner (1999), Davenport et al. (1998), Jennex and Olfman (2000), Sage and Rouse (1999)
SF8	There is a clear goal and purpose for the KMS	Ackerman (1994), Barna (2002), Davenport, et al. (1998), Cross and Baird (2000)
SF9	Learning Organization	Barna (2002), Cross and Baird (2000), Sage and Rouse (1999), Yu et al. (2004)
SF10	The search, retrieval, and visualization functions of the KMS support easy knowledge use	Alavi and Leidner (1999), Ginsberg and Kambil (1999), Mandviwalla et al. (1998)
SF11	Work processes are designed that incorporate knowledge capture and use	Barna (2002), Cross and Baird (2000), Jennex and Olfman (2000)
SF12	Security/protection of knowledge	Jennex and Olfman (2000), Sage and Rouse (1999)

Figure 1. Bots and de Bruijn (2002) KM value chain



KMS enhances competitiveness. Figure 1 illustrates the KM value chain. The model was developed by viewing and contrasting KM through an analytical (technical) perspective and an actor (user) perspective. These perspectives are conflicting, and KM assessment occurs by determining how well the KMS meets each perspective at each step.

Massey, Montoya-Weiss, and Driscoll KM Success Model

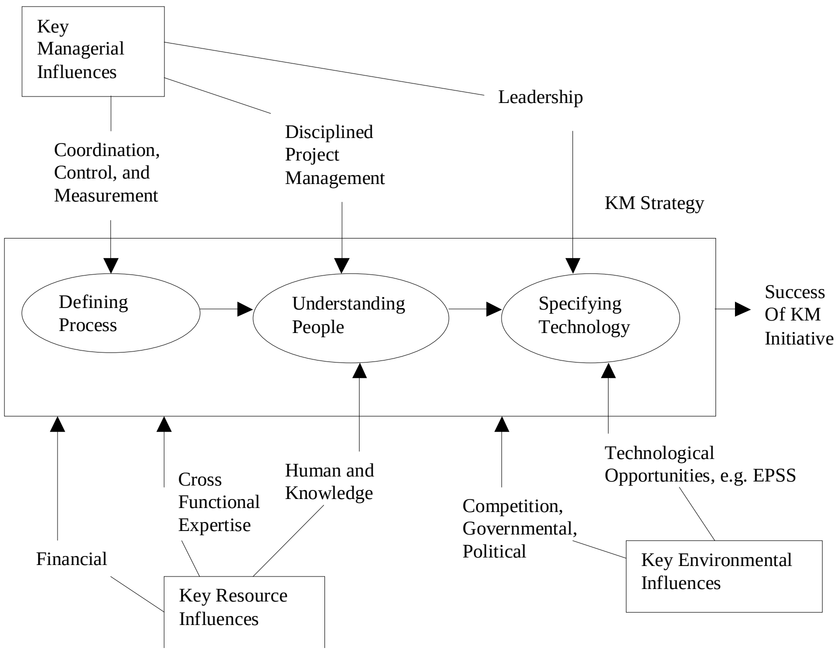
Massey, Montoya-Weiss, and O'Driscoll (2002) present a process-based KM success model derived from their Nortel case study. The case study suggested that KM cannot be applied generically and that a process approach to KM will help an organization to understand how it can apply KM to improve organizational performance. The model is based on the framework proposed by Holsapple and Joshi (2001), and reflects that KM success is based on understanding a process-oriented KM strategy and its effects on the organization, its knowledge users, and how they use knowledge. It recognizes that KM is an organizational change process and KM success cannot separate itself from the organizational change success with the result the KM success is essentially defined as improving organizational or process performance. The model is presented in Figure 2. Key components of the model are:

- *KM Strategy*—defines the processes using knowledge and what that knowledge is; the sources, users, and form of the knowledge; and the technology infrastructure for storing the knowledge.
- *Key Managerial Influences*—defines management support through leadership, allocation, and management of project resources, and oversight of the KMS through coordination and control of resources and the application of metrics for assessing KMS success.
- *Key Resource Influences*—the financial resources and knowledge sources needed to build the KMS.
- *Key Environmental Influences*—describe the external forces that drive the organization to exploit its knowledge to maintain its competitive position.

Lindsey KM Effectiveness Model

Lindsey (2002) proposes a conceptual KM effectiveness model based on combining Organizational Capability Perspective theory (Gold, 2001) and Contingency Perspective Theory (Becerra-

Figure 2. Massey, Montoya-Weiss, and Driscoll (2002) KM success model

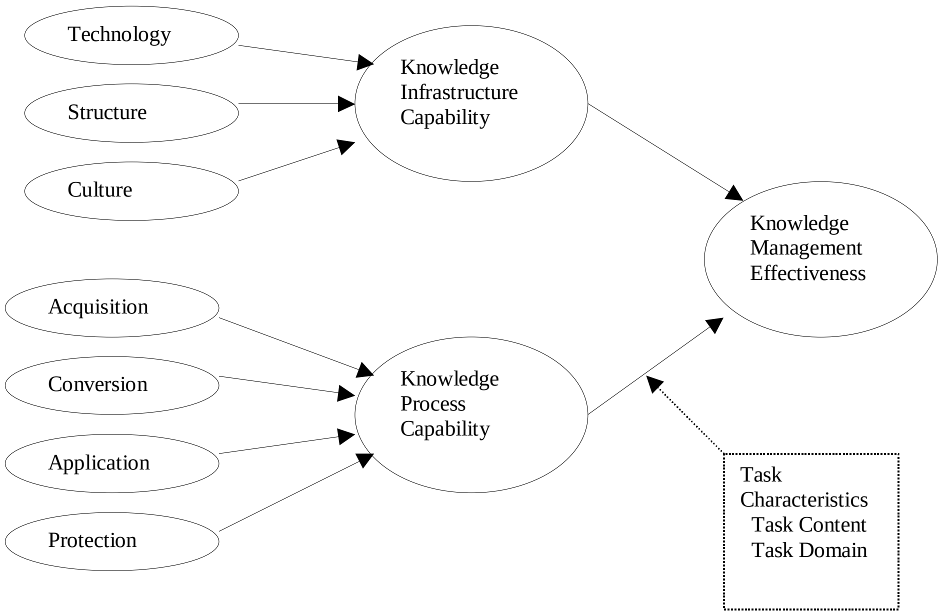


Fernandez & Sabherwal, 2001). The model defines KM effectiveness in terms of two main constructs: *knowledge infrastructure capability* and *knowledge process capability*, with the knowledge process capability construct being influenced by a knowledge task. Knowledge infrastructure capability represents social capital, the relationships between knowledge sources and users, and is operationalized by technology (the network itself), structure (the relationship), and culture (the context in which the knowledge is created and used). Knowledge process capability represents the integration of KM processes into the organization, and is operationalized by acquisition (the capturing of knowledge), conversion (making captured knowledge available), application (degree to which knowledge is useful), and protection (security of the knowledge). Tasks are activities performed by organizational units and indicate the type and domain of the knowledge being used. Tasks ensure the right knowledge is being captured and used. KM success is measured as satisfaction with the KMS and is considered a weak definition of success. It is proposed that research be conducted into KMS effectiveness to find ties into organizational effectiveness. Kaplan and Norton's (1992) Balanced Scorecard may be useful in establishing measures for KMS effectiveness. Figure 3 illustrates the Lindsey model.

KMS Success Models Based on the DeLone and McLean IS Success Model

Jennex and Olfman (2004) present a KMS success model that is based on the respecified DeLone and McLean (2003)

Figure 3. Lindsey (2002) KM effectiveness model



IS success model. The model in Figure 4 was derived from a longitudinal case study, a quantitative study across an industry, and action research applying the model in the field. The model evaluates success as an improvement in organizational effectiveness based on use and impact of the KMS. Descriptions of the dimensions of the model follow.

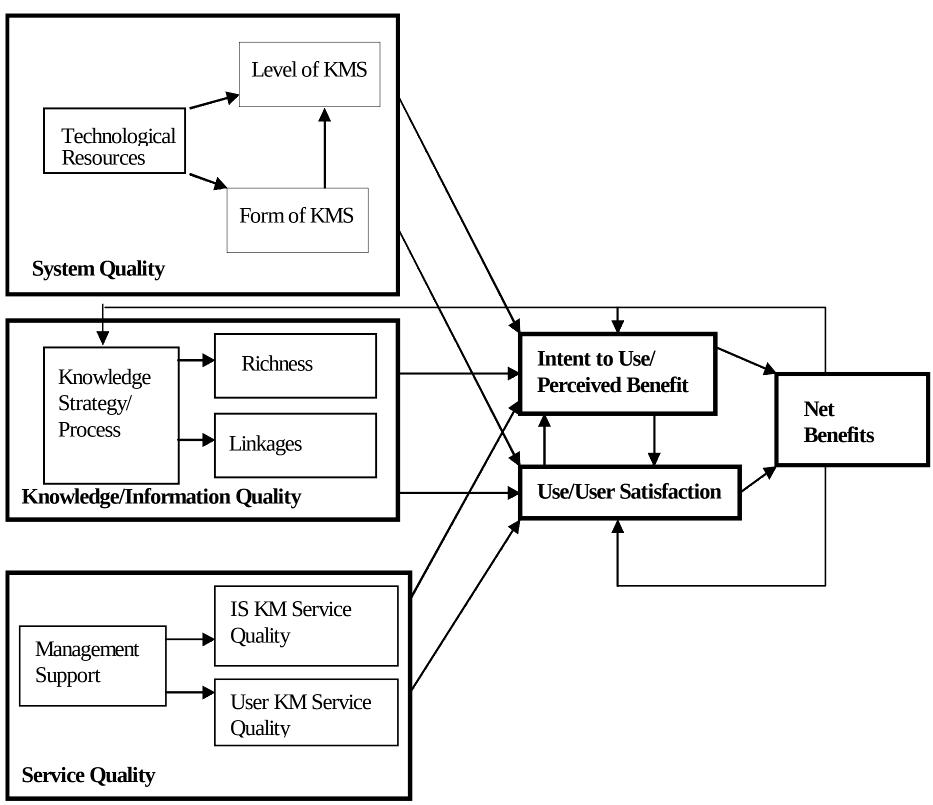
- *System Quality*—defines how well the KMS performs the functions of knowledge creation, storage/retrieval, transfer, and application; how much of the OM is codified and included in the computerized portion of the OM; and how the KMS is supported by the IS staff and infrastructure.
- *Knowledge/Information Quality*—ensures that the right knowledge/OM with sufficient context is captured and available for the right users at the right time.
- *Service Quality*—ensures that the organization has adequate service support from management, user organizations, and the IS organization.
- *Use/User Satisfaction*—indicates actual levels of KMS use, as well as the satisfaction of the KMS users. Actual use is most applicable as a success measure when the use of a system is required. User satisfaction is a construct that measures satisfaction with the KMS by users. It is considered a good complementary measure of KMS use when use of the KMS is required, and effectiveness of use depends on users being satisfied with the KMS.
- *Perceived Benefit*—measures perceptions of the benefits and impact of the KMS by users, and is based on Thompson, Higgins, and Howell's (1991) Per-

ceived Benefit Model. It is good for predicting continued KMS use when use of the KMS is voluntary, and amount and/or effectiveness of KMS use depends on meeting current and future user needs.

- *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. Organizational impact is typically not the summation of individual impact, so the association between individual and organizational impact is often difficult to draw, which is why this construct combines all impact into a single construct. This model recognizes that the use of knowledge/OM may have good or bad benefits and allows for feedback from these benefits to drive the organization to either use more knowledge/OM or to forget specific knowledge/OM.

Maier (2002) also proposes a KMS success model based on the DeLone and McLean IS success model (1992). This model is similar to the Jennex Olfman model. Breakdown of the dimensions into constructs is not provided, but specific measures for each dimension are identi-

Figure 4. Jennex and Olfman (2004) KMS success model



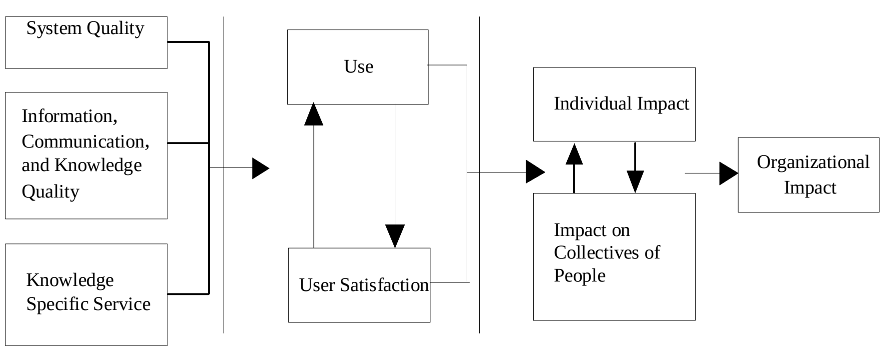
fied. This model is illustrated in Figure 5 and uses the following dimensions:

- *System Quality*—taken directly from DeLone and McLean (1992) and refers to overall quality of the hardware and software.
- *Information, Communication, and Knowledge Quality*—refers to the quality of the stored data, information, and knowledge, and to the quality of knowledge flow methods.
- *Knowledge-Specific Service*—refers to how well subject matter experts and KMS managers support the KMS.
- *System Use/User Satisfaction*—taken directly from DeLone and McLean (1992) and refers to actual KMS use and the satisfaction users have with that use.
- *Individual Impact*—taken directly from DeLone and McLean (1992) and refers to the impact KMS use has on the individual's effectiveness.
- *Impact on Collectives of People*—refers directly to the improved effectiveness within teams, work groups, and/or communities that comes from using the KMS.
- *Organizational Impact*—taken directly from DeLone and McLean (1992) and refers to improved overall organizational effectiveness as a result of KMS use.

APPLICATION OF THE FRAMEWORK

To illustrate the use of the framework, the KMS success models are first analyzed by comparing them to the identified set of success factors and determining how well the models reflect the set of success factors. Table 2 summarizes this comparison. Assessing responsiveness to the top four success criteria finds that the Value Chain, Maier, and Lindsey models are not as good at reflecting the observed data as the Massey et al. and Jennex/Olfman models. Also, the only difference between the Massey et al. and Jennex/Olfman models is SF5, Culture. Given that this would be the next most important success factor, it is determined that the Jennex/Olfman model most closely fits the observed data as reflected by the success factors model. It should be noted that further derivation of the Maier model dimensions may improve its fit to the KMS success factors.

Figure 5. Maier (2002) KMS success model application of the framework



Looking at the theoretical foundation for the KMS success models finds that all four have some theoretical foundation. The Value Chain model uses the commonly used Value Chain approach. The Massey et al. model relies on the Holsapple and Joshi (2001) framework. The Lindsey model utilizes organizational capability perspective theory and contingency perspective theory. The Jennex/Olfman and Maier models utilize the widely accepted DeLone and McLean IS success model. Assessing the ability to generalize from the theory, it can be determined that the Value Chain, Jennex/Olfman, and Maier models are utilizing theory that is more widely utilized for assessing effectiveness. However, the Massey et al. and Lindsey models' theoretical foundation may be proven to be more widely applicable after being applied and studied in a variety of organizations and applications.

Assessing the KM success models for applicability to both approaches for building a KMS, it can be determined that the Jennex/Olfman model has no characteristics that would limit its applicability to either KMS approach, while the Massey et al., Value Chain, Maier, and Lindsey models could be interpreted as being specific to an approach. The Value Chain model is typically applied to organizational systems to determine strategic processes, focusing this model on generic/infrastructure uses of a KMS. The Massey et al., Maier, and Lindsey models specifically incorporate task-specific components that may make it difficult to focus the models on assessing organizational effectiveness. However, it can be concluded that all four

Table 2. KM success models versus KM success factors

Success Factor ID	Value Chain	Massey et al.	Lindsey	Jennex Olfman	Maier
SF1	No clear tie – Share knowledge stage	KM Strategy	Technology construct – networks	Technical Resources and Service Quality Constructs	System Quality and Knowledge Specific Service Quality
SF2	Strategy stage	KM Strategy	Task and Acquisition constructs	KM Strategy /Process Construct	Information, Communication and Knowledge quality
SF3	No clear tie	KM Strategy	Structure and Conversion constructs	Form Construct	Information, Communication and Knowledge quality
SF4	Weak – Apply knowledge stage	Key Management Influences	No clear tie	Perceived Benefit Construct	No clear tie
SF5	No clear tie	No clear tie	Culture construct	Perceived Benefit Construct	No clear tie
SF6	Implied – no clear tie	Key Management Influences	No clear tie	Perceived Benefit Construct	No clear tie
SF7	Return stage	Key Management and Environmental Influences	Task construct	Net Impacts Construct	Impact dimensions, Information, Communication and Knowledge quality
SF8	Strategy stage	KM Strategy	Task construct	KM Strategy/ Process Construct	Information, Communication and Knowledge quality
SF9	No clear tie	No clear tie	No clear tie	No clear tie	No Clear Tie
SF10	Share knowledge and Apply knowledge stages	KM Strategy	Conversion and Task constructs	Level Construct	System Quality
SF11	Apply knowledge stage	KM Strategy	Application construct	Perceived Benefit Construct	No Clear Tie
SF12	No clear tie	No clear tie	Protection Construct	No clear tie	No Clear Tie

models could be applied to both KMS approaches if the user is aware of the differences between the approaches and the limitations of the models.

In summary, the proposed framework provides a user a measuring stick for selecting a KMS success model. Users wanting a model based on widely accepted success models and one that fits the observed data (as expressed in the KMS success factors) would rank the models in order of preference as Jennex/Olfman, Massey et al., Value Chain, Lindsey, and Maier. Users wanting a model specifically for assessing a project/task KMS may opt for the Massey et al., Maier, or Lindsey models. Users focusing on generic/infrastructure KMS may opt for the Value Chain model. Users implementing both types of KMS and wanting a single KMS effectiveness model may opt for the Jennex/Olfman model.

CONCLUSION

The proposed framework for assessing KMS success models appears to be useful. It allows users to validate that the KMS success model they are using reflects observed factors that have been found to affect KMS success. The use of the KMS success factors to assess this fit is very powerful and is the major contribution of this article. The KMS success factors were identified from a large number of studies, projects, and KMSs providing a broad view of KMS success.

The use of the other two criteria of the framework is less powerful but still important. It is important to determine that a KMS success model has a theoretical foundation, as otherwise it could simply be a reflection of a single data point's success criteria and may not be applicable to the KMS to be assessed. Additionally, it is also important to ensure that the KMS success model being used applies to the approach of the KMS under consideration. It is inappropriate to apply an organizational effectiveness model to a task/process KMS and vice versa.

REFERENCES

Ackerman, M. (1994). Definitional and contextual issues in organizational and group memories. *Proceedings of the 27th Annual Hawaii International Conference on System Sciences* (pp. 191-200). IEEE Computer Society Press.

Ackerman, M. & Mandel, E. (1996). Memory in the small: An application to provide task-based organizational memory for a scientific community. *Proceedings of the 29th Annual Hawaii International Conference on System Sciences* (pp. 323-332). IEEE Computer Society Press.

Alavi, M. & Leidner, D.E. (1999). Knowledge management systems: Emerging views and practices from the field. *Proceedings of the 32nd Hawaii International Conference on System Sciences.* IEEE Computer Society.

Alavi, M. & Leidner, D.E. (2001). Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly, 25*(1), 107-136.

Barna, Z. (2003). *Knowledge management: A critical e-business strategic factor.* Unpublished Masters Thesis, San Diego State University, USA.

Becerra-Fernandez, I. & Sabherwal, R. (2001). Organizational knowledge management: A contingency perspective. *Journal of Management Information Systems, 18*(1), 23-55.

Borghoff, U.M. & Pareschi, R. (1998). *Information technology for knowledge management*. Berlin: Springer-Verlag.

Bots, P.W.G. & de Bruijn, H. (2002). Effective knowledge management in professional organizations: Going by the rules. *Proceedings of the 35th Hawaii International Conference on System Sciences*. IEEE Computer Society Press.

Churchman, C.W. (1979). *The systems approach* (revised and updated). New York: Dell Publishing.

Cross, R. & Baird, L. (2000). Technology is not enough: Improving performance by building organizational memory. *Sloan Management Review, 41*(3), 41-54.

Davenport, T.H., DeLong, D.W., & Beers, M.C. (1998). Successful knowledge management projects. *Sloan Management Review, 39*(2), 43-57.

DeLone, W.H. & McLean, E.R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research, 3*, 60-95.

DeLone, W.H. & McLean, E.R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems, 19*(4), 9-30.

Ginsberg, M. & Kambil, A. (1999). Annotate: A Web-based knowledge management support system for document collections. *Proceedings of the 32nd Hawaii International Conference on System Sciences*. IEEE Computer Society Press.

Gold, A.H., Malhotra, A., & Segars, A.H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems, 18*(1), 185-214.

Hahn, J. & Subramani, M.R. (2000). A framework of knowledge management systems: Issues and challenges for theory and practice. *Proceedings of the 21st International Conference on Information Systems* (pp. 302-312). Association for Information Systems.

Holsapple, C.W. & Joshi, K.D. (2000). An investigation of factors that influence the management of knowledge in organizations. *Journal of Strategic Information Systems, 9*, 235-261.

Holsapple, C.W. & Joshi, K.D. (2001). Knowledge management: A three-fold framework. *The Information Society, 18*(1), 47-64.

Jennex, M.E. & Olfman, L. (2000). Development recommendations for knowledge management/organizational memory systems. *Proceedings of the Information Systems Development Conference 2000*.

Jennex, M.E. & Olfman, L. (2002). Organizational memory/knowledge effects on productivity, a longitudinal study. *Proceedings of the 35th Hawaii International Conference on System Sciences* (HICSS35). IEEE Computer Society.

Jennex, M.E. & Olfman, L. (2004). Modeling knowledge management success. *Proceedings of the Conference on Information Science and Technology Management* (CISTM).

Jennex, M.E., Olfman, L., & Addo, T.B.A. (2003). The need for an organizational knowledge management strategy. *Proceedings of the 36th Hawaii International Conference on System Sciences* (HICSS36). IEEE Computer Society.

Kaplan, R. & Norton, D. (1992). The balanced scorecard—measures that drive performance. *Harvard Business Review, 70*(1), 71-79.

Koskinen, K.U. (2001). Tacit knowledge as a promoter of success in technology firms. *Proceedings of the 34th Hawaii*

International Conference on System Sciences. IEEE Computer Society.

Lindsey, K. (2002). Measuring knowledge management effectiveness: A task-contingent organizational capabilities perspective. *Proceedings of the 8th Americas Conference on Information Systems* (pp. 2085-2090).

Malhotra, Y. & Galletta, D. (2003). Role of commitment and motivation as antecedents of knowledge management systems implementation. *Proceedings of the 36th Hawaii International Conference on System Sciences*. IEEE Computer Society.

Mandviwalla, M., Eulgem, S., Mould, C., & Rao, S.V. (1998). Organizational memory systems design. Unpublished Working Paper for the Task Force on Organizational Memory. In F. Burstein, G. Huber, M. Mandviwalla, J. Morrison, & L. Olfman (Eds.), *Proceedings of the 31st Annual Hawaii International Conference on System Sciences*.

Maier, R. (2002). *Knowledge management systems: Information and communication technologies for knowledge management*. Berlin: Springer-Verlag.

Massey, A.P., Montoya-Weiss, M.M., & O'Driscoll, T.M. (2002). Knowledge management in pursuit of performance: Insights from Nortel Networks. *MIS Quarterly, 26*(3), 269-289.

Morrison, J. & Weiser, M. (1996). A research framework for empirical studies in organizational memory. *Proceedings of the 29th Annual Hawaii International Conference on System Sciences*. IEEE Computer Society Press.

Sage, A.P. & Rouse, W.B. (1999). Information systems frontiers in knowledge management. *Information Systems Frontiers, 1*(3), 205-219.

Stinchcombe, A.L. (1968). *Constructing social theories* (republished in 1987). Chicago: The University of Chicago Press.

Thompson, R.L., Higgins, C.A., & Howell, J.M. (1991). Personal computing: Toward a conceptual model of utilization. *MIS Quarterly, 15*(1), 125-143.

Turban, E. & Aronson, J.E. (2001). *Decision support systems and intelligent systems* (6th edition). Englewood Cliffs, NJ: Prentice-Hall.

Yu, S.-H., Kim, Y.-G., & Kim, M.-Y. (2004). Linking organizational knowledge management drivers to knowledge management performance: An exploratory study. *Proceedings of the 37th Hawaii International Conference on System Sciences* (HICSS36). IEEE Computer Society.

Zack, M.H. (1999). Managing codified knowledge. *Sloan Management Review, 40*(4), 45-58.

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