What Is a Knowledge Management System ... and Why Should I Care?

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In this article...

Gain new insights about knowledge management systems, including various approaches to putting the knowledge to work in health care.

The literature is awash with articles about managing knowledge in organizations: knowledge management, knowledge management systems, organizational learning and learning organizations. All of these concepts are confusing. For the sake of clarity, we propose some definitions.

- Knowledge management (KM) is how an organization manages its collective expertise and subject matter knowledge. This activity contains several elements, specifically: acting, monitoring, evaluating, planning, and decision making, all of which allow an organization to use and transfer knowledge among its workforce (referred to as the Decision Execution Cycle.)[1]
- A knowledge management system (KMS) is the planned workplace linkage of specific process steps or domains within an organization. A KMS allows an organization to systematically manage knowledge in order for its workforce to acquire, create and use knowledge to innovate and compete in the marketplace. Functionally, a KMS is a complex set of systematically coordinated human and organizational processes. Most organizations have ways to manage their knowledge, even if those ways are under-used or even unrecognized. But a truly effective management of knowledge requires the construction of an organizational system, a KMS. A diagram of a KMS can be seen in Figure 1.
- Organizational learning describes the act of learning within an organization, including both the acquisition of knowledge and its dissemination within the organization.
- Learning organizations are organizations that use data (KM) in a systematic way (KMS) to create knowledge in order to shape the future of the organization.[2] It is important to distinguish between organizational learning and a learning organization.[3] Any organization may have ongoing organizational learning, yet only a few can be called learning organizations.

In 1999, Liebowitz suggested that there were six critical elements that defined a learning organization.[4] These elements included:

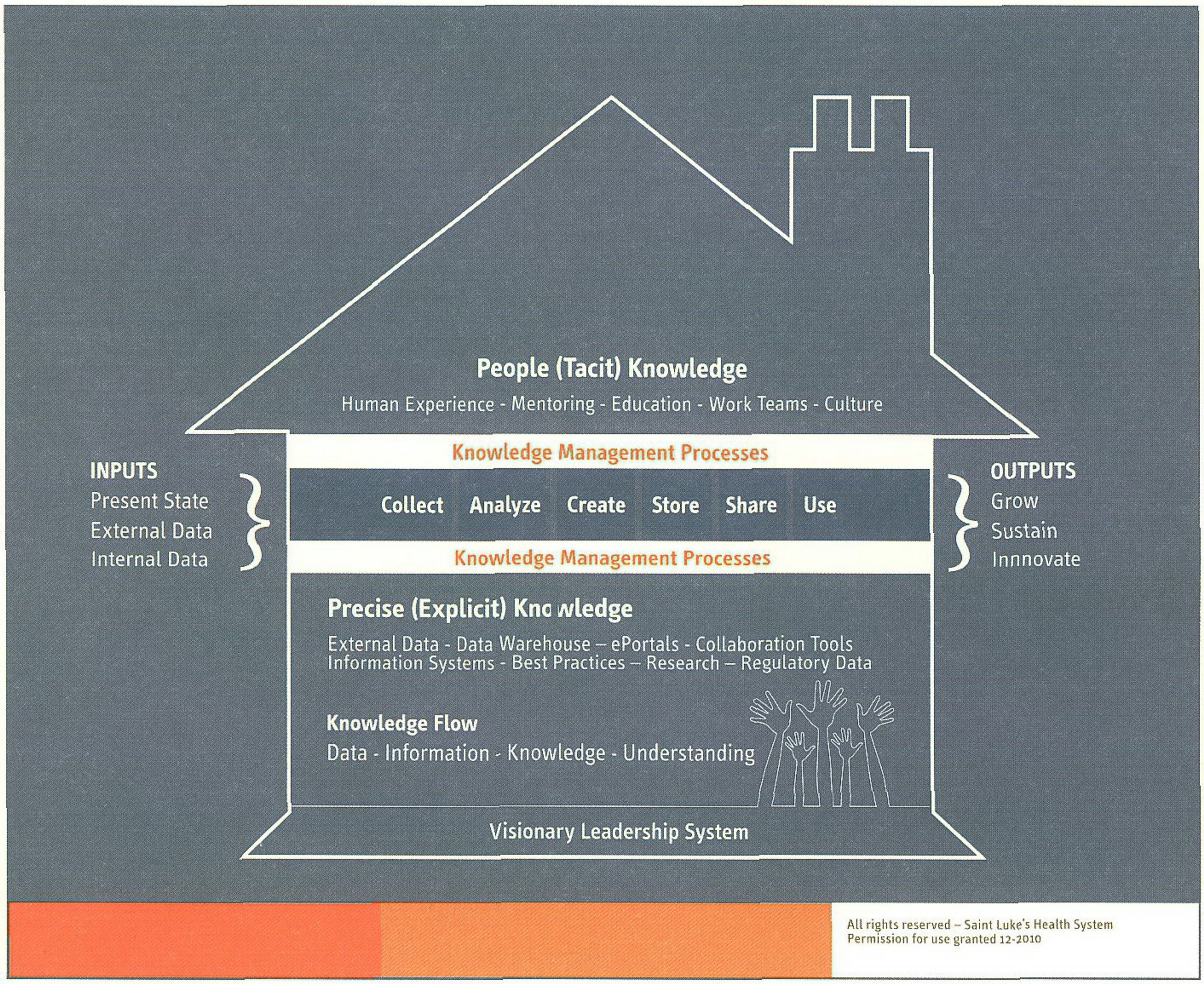
1. Continuous learning of the workforce and integration of knowledge into routine organizational processes
2. Effective knowledge generation and sharing among people
3. Critical systems thinking
4. A culture of learning
5. An institutional spirit of flexibility and experimentation
6. An organizational culture that valued its workforce

Our operational view is that a KMS creates the organizational framework for its workforce to learn and compete, and it is these additional characteristics, suggested by Liebowitz, that characterize the learning organization.

In 1990, Peter Senge authored a national best-selling book, *The Fifth Discipline,* in which he described the attributes of a learning organization.[2] This seminal work described Senge's realization that the only sustainable source of competitive advantage for an organization is its ability to learn faster than its competitors. This is critical in today's changing health care environment.

Senge felt that there were five developing and enabling technologies that began to converge almost 20 years ago,

Figure 1 Knowledge Management System



which, if mastered, would propel an organization to higher levels of performance. These enabling technologies were:

1. Systems thinking (seeing the big picture and how work processes are linked)
2. Personal mastery (individual commitment of employees to life-long learning)
3. Mental models (managing preconceived ideas that could hinder new insights and ideas)
4. Building shared visions with employees (a vision that will survive both the good and bad times)
5. Team learning (an important component in that organizations cannot learn and improve if the team members cannot learn and improve).

One could argue that these five enabling technologies can be organizationally grouped under one common strategic initiative: the ability to innovate for the future.

Culture counts

Theoretically, an organization that has a functional KMS has the structural framework in place for learning, but still more is required in order for it to be a learning organization.

It also has to have a culture that allows it to learn as a unit. This culture, or cultural soul, is created by the mission, vision and core values of the organization, but must also be fostered and directed by its senior leaders. However, organizational culture is somewhat beyond the discussion of this paper.

So let us explore the *components* of a knowledge management system which is the functional framework necessary for an organization to become a learning organization.

The first question that might be asked is: "What is knowledge?"

This question is not as simple as it sounds, and the answer is fundamental to our understanding of a KMS. To give a definition, knowledge is the awareness or understanding that comes from the acquisition of facts that are processed into information and includes human values, insight, experience and contextual information.[5, 6]

In other words, knowledge is more than a set of facts on a spread sheet. Knowledge concerns the whole of the human experience. Some believe that a KMS is no more than a robust computer data system, but knowledge is more than data on a hard drive.

In the last 20 years, KM has become a discipline worthy of study and research. KM has become an important component of an organization's strategy, its measurement architecture, and its innovation.[7]

Nonaka and Takeuchi further clarified the concept of knowledge by noting that it exists in two types, namely explicit knowledge and tacit knowledge.[8] Explicit knowledge is codified knowledge that can be stored as bits of information in paper files or on computer databases. Tacit knowledge is internal to an individual and is stored as a person's experience, information or talent.

Acquisition of both forms of knowledge is important to the success of an organization. Because knowledge is composed of both data and human experience, it must be managed using a systems approach. This is particularly important in the health care industry, which is being challenged with ever-increasing new knowledge, greater specialization, and advancing technology.

Over the last 20 years there has been a wide range of proposed concepts or models in an effort to define KM. The components of KM that appear to make the most sense were offered by Spender and Scherer, who defined KM as consisting of:

1. People
2. Processes
3. Technology
4. Culture
5. Structure[9]

The five constituent components of KM suggested by Spender and Scherer represent, in our view, the foundation of a KMS. *How do* these components of KM fit into an organization's systems approach of managing knowledge on a day in and day out basis? Clearly, it is more than just the totality of systems in an information technology department. It requires an organization to consciously create a KMS.

How should you approach the process of creating a KMS for your organization? Numerous approaches have been suggested in the literature. Abdullah, and others best summarized eight separate approaches or frameworks for understanding a KMS.[5] Two approaches described by Abdullah seem to be the most understandable to us. These were suggested by Arthur Anderson in 1996[10] and by Alavi and Leidner in 1999.[11]

These two approaches are summarized in Table 1. We have added a third approach described by Firestone and McElroy, which they term the knowledge life cycle (KLC).[1] In each of these approaches one can detect a common theme of acquiring knowledge, using methods to turn the knowledge into information, storing the knowledge and information for later retrieval and then using that knowledge and information to innovate.

TABLE 1

Proposed Knowledge Management Systems Process Steps

	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7
Arthur Anderson[10]	Share	Create	Identify	Collect	Adapt	Organize	Apply
Alavi and Leidner[11]	Acquire	Index	Filter	Link	Distribute	Apply	
Firestone and McElroy[1]	Individual and Group Learning	Knowledge Claim Formulation	Information Acquisition	Knowledge Validation	Knowledge Integration		

In each of these three approaches, the steps noted are individual processes, linked systematically and sequenced from left to right. These processes require the establishment of sub-processes that depend on active organizational development and management. Despite the differences in terms between these three approaches, the process steps can be functionally organized into three organizational activities:

1. Finding or creating knowledge (input stage)
2. Storing knowledge (organizing stage)
3. Using the knowledge (output stage)[5,12]

Firestone and McElroy further noted that these organizational approaches can be further grouped into two fundamentally higher processes:

1. Knowledge production (or organizational learning), either external or internal to the organization
2. Knowledge integration (organizational behavior), which ensures that knowledge is delivered to the workforce and embedded into daily work[1]

Using KMS

Functionally, how do organizations develop their KMS?

Many organizations have made an effort to practice KM using specific approaches, tools or techniques without actually using a systems approach. Some of these approaches/techniques and tools are: information technology (IT), content management, customer relationship management (CRM), data warehousing, social network analysis (SNA), storytelling, communities of practice (CoP), data mining, quality management (QM), business intelligence (BI), and online analytical processing (OAP), just to name a few of the more common organizational initiatives.[1]

Some of these techniques are intended to enable organizational behavior, such as CoP or CRM. Others are enabling technologies, such as data warehousing or OAP. Many hospitals have used one or more of these techniques and tools to further their KM. These initiatives, by themselves, represent activities that may feed into a KMS, but should not be considered a substitute for an over-arching approach to an organizational KMS.

A KMS is an evolving organizational approach to the management and use of knowledge and information that involves human, social and corporate capital aligned in a systematic structure and supported by visionary leaders.

How do senior leaders attempt to communicate and embed a KMS into their organization? The first step is for senior leaders to achieve agreement as to what is a KMS and how it should be structured, embedded, and used. Sometimes a picture is worth a thousand words.

To illustrate our view of a functional KMS, we have used a KMS model that was developed by the Saint Luke's Health System of Kansas City about three years ago (Figure 1). It was constructed based upon senior leaders' interpretation of numerous existing models and modified for use for this article. The model is framed using the outline of a house, because KM is always internal to an organization.

The model depends on external inputs into the KMS (such as scientific, technical, regulatory, environmental, economic, and social data), in addition to internal inputs (to name a few, customer satisfaction, data warehousing, quality, information technology, human resource and best practices data).

These external and internal data inputs define the "present state" and allow the organization to function within a dynamic health care environment. The health system then uses six process steps (collect, analyze, create, store, share, and use) to create a path from enterprise knowledge to information flow.

Framing the KM process steps is the use of both people and precise knowledge. The people (tacit knowledge) consist of human experiences, mentoring, external and internal education of the workforce, teams and committees and a culture of continuous learning.

The precise (explicit) knowledge consists of external and internal data, data warehousing, e-portals, collaboration tools, various information systems, research data, best practices, etc. This architecture drives the outputs of the KMS toward a future state.

The purpose of defining a focus on the future is to grow, innovate and sustain the organization. None of this can be accomplished without visionary leadership that demands continual use of data to create knowledge that then drives the organization to be the best it can be. One can view a robust KMS as the instrument of its leaders to drive growth and provide for innovation and organizational sustainability.

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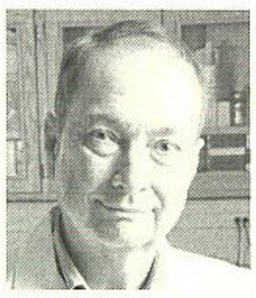

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