1 Introduction to Knowledge Management

A light bulb in the socket is worth two in the pocket.
—Bill Wolf (1950–2001)

This chapter provides an introduction to the study of knowledge management (KM). A brief history of knowledge management concepts is outlined, noting that much of KM existed before the actual term came into popular use. The lack of consensus over what constitutes a good definition of KM is addressed and the concept analysis technique is described as a means of clarifying the conceptual confusion that still persists over what KM is or is not. The multidisciplinary roots of KM are enumerated together with their contributions to the discipline. The two major forms of knowledge, tacit and explicit, are compared and contrasted. The importance of KM today for individuals, for communities of practice, and for organizations are described together with the emerging KM roles and responsibilities needed to ensure successful KM implementations.

Learning Objectives

1. Use a framework and a clear language for knowledge management concepts.
2. Define key knowledge management concepts such as intellectual capital, organizational learning and memory, knowledge taxonomy, and communities of practice using concept analysis.
3. Provide an overview of the history of knowledge management and identify key milestones.
4. Describe the key roles and responsibilities required for knowledge management applications.

Introduction

The ability to manage knowledge is crucial in today's knowledge economy. The creation and diffusion of knowledge have become increasingly important factors in competitiveness. More and more, knowledge is being thought of as a valuable commodity that is embedded in products (especially high-technology products) and embedded in the tacit knowledge of highly mobile employees. While knowledge is increasingly being viewed as a commodity or intellectual asset, there are some paradoxical characteristics of knowledge that are radically different from other valuable commodities. These knowledge characteristics include the following:

- Using knowledge does not consume it.
- Transferring knowledge does not result in losing it.
- Knowledge is abundant, but the ability to use it is scarce.
- Much of an organization's valuable knowledge walks out the door at the end of the day.

The advent of the Internet, the World Wide Web, has made unlimited sources of knowledge available to us all. Pundits are heralding the dawn of the Knowledge Age supplanting the Industrial Era. Forty-five years ago, nearly half of all workers in industrialized countries were making or helping to make *things*. By the year 2000, only 20 percent of workers were devoted to industrial work—the rest was knowledge work (Drucker 1994; Barth 2000). Davenport (2005, p. 5) says about knowledge workers that "at a minimum, they comprise a quarter of the U.S. workforce, and at a maximum about half." Labor-intensive manufacturing with a large pool of relatively cheap, relatively homogenous labor and hierarchical management has given way to knowledge-based organizations. There are fewer people who need to do more work. Organizational hierarchies are being put aside as knowledge work calls for more collaboration. A firm only gains sustainable advances from what it collectively knows, how efficiently it uses what it knows, and how quickly it acquires and uses new knowledge (Davenport and Prusak 1998). An organization in the Knowledge Age is one that learns, remembers, and acts based on the best available information, knowledge, and know-how.

All of these developments have created a strong need for a deliberate and systematic approach to cultivating and sharing a company's knowledge base—one populated with valid and valuable lessons learned and best practices. In other words, in order to be successful in today's challenging organizational environment, companies need to learn from their past errors and not reinvent the wheel. Organizational knowledge is

not intended to replace individual knowledge but to complement it by making it stronger, more coherent, and more broadly applied. Knowledge management represents a deliberate and systematic approach to ensure the full utilization of the organization's knowledge base, coupled with the potential of individual skills, competencies, thoughts, innovations, and ideas to create a more efficient and effective organization.

> Increasingly, companies will differentiate themselves on the basis of what they know. A relevant variation on Sidney Winter's definition of a business firm *as an organization that knows how to do things* would define a business firm that thrives over the next decade as *an organization that knows how to do new things well and quickly*. (Davenport and Prusak 1998, 13)

Knowledge management was initially defined as the process of applying a systematic approach to the capture, structuring, management, and dissemination of knowledge throughout an organization to work faster, reuse best practices, and reduce costly rework from project to project (Nonaka and Takeuchi, 1995; Pasternack and Viscio 1998; Pfeffer and Sutton, 1999; Ruggles and Holtshouse, 1999). KM is often characterized by a *pack rat* approach to content: "save it, it may prove useful some time in the future." Many documents tend to be warehoused, sophisticated search engines are then used to try to retrieve some of this content, and fairly large-scale and costly KM systems are built. Knowledge management solutions have proven to be most successful in the capture, storage, and subsequent dissemination of knowledge that has been rendered explicit—particularly lessons learned and best practices.

The focus of intellectual capital management (ICM), on the other hand, is on those pieces of knowledge that are of *business value* to the organization—referred to as intellectual capital or assets. Stewart (1997) defines intellectual capital as "organized knowledge that can be used to produce wealth." While some of these assets are more visible (e.g., patents, intellectual property), the majority consists of know-how, know-why, experience, and expertise that tends to reside within the head of one or a few employees (Klein 1998; Stewart 1997). ICM is characterized less by content—because content is filtered and judged, and only the best ideas re inventoried (the top ten for example). ICM content tends to be more representative of the real thinking of individuals (contextual information, opinions, stories) because of its focus on actionable knowledge and know-how. The outcome is less costly endeavors and a focus on learning (at the individual, community, and organizational levels) rather than on the building of systems.

A good definition of knowledge management would incorporate both the capturing and storing of knowledge perspective, together with the valuing of intellectual assets. For example:

Knowledge management is the deliberate and systematic coordination of an organization's people, technology, processes, and organizational structure in order to add value through reuse and innovation. This is achieved through the promotion of creating, sharing, and applying knowledge as well as through the feeding of valuable lessons learned and best practices into corporate memory in order to foster continued organizational learning.

When asked, most executives will state that their greatest asset is the knowledge held by their employees. "When employees walk out the door, they take valuable organizational knowledge with them" (Lesser and Prusak 2001, 1). Managers also invariably add that they have no idea how to manage this knowledge! Using the intellectual capital or asset approach, it is essential to identify knowledge that is of value and is also at risk of being lost to the organization through retirement, turnover, and competition.. As Lesser and Prusak (2001, 1) note: "The most knowledgeable employees often leave first." In addition, the selective or value-based knowledge management approach should be a three-tiered one, that is, it should also be applied to three organizational levels: the individual, the group or community, and the organization itself. The best way to retain valuable knowledge is to identify intellectual assets and then ensure legacy materials are produced and subsequently stored in such a way as to make their future retrieval and reuse as easy as possible (Stewart 2000). These tangible by-products need to flow from individual to individual, between members of a community of practice and, of course, back to the organization itself, in the form of lessons learned, best practices, and corporate memory.

Many knowledge management efforts have been largely concerned with capturing, codifying, and sharing the knowledge held by people in organizations. Although there is still a lack of consensus over what constitutes a good definition of KM (see next section), there is widespread agreement as to the goals of an organization that undertakes KM. Nickols (2000) summarizes this as follows: "the basic aim of knowledge management is to leverage knowledge to the organization's advantage." Some of management's motives are obvious: the loss of skilled people through turnover, pressure to avoid reinventing the wheel, pressure for organization-wide innovations in processes as well as products, managing risk, and the accelerating rate with which new knowledge is being created. Some typical knowledge management objectives would be to:

- Facilitate a smooth transition from those retiring to their successors who are recruited to fill their positions
- Minimize loss of corporate memory due to attrition and retirement
- Identify critical resources and critical areas of knowledge so that the corporation *knows what it knows and does well—and why*

• Build up a toolkit of methods that can be used with individuals, with groups, and with the organization to stem the potential loss of intellectual capital

What Is Knowledge Management?

An informal survey conducted by the author identified over a hundred published definitions of knowledge management and of these, at least seventy-two could be considered to be very good! Carla O'Dell has gathered over sixty definitions and has developed a preliminary classification scheme for the definitions on her KM blog (see http://blog.simslearningconnections.com/?p=279) and what this indicates is that KM is a multidisciplinary field of study that covers a lot of ground. This should not be surprising as applying knowledge to work is integral to most business activities. However, the field of KM does suffer from the "Three Blind Men and an Elephant" syndrome. In fact, there are likely more than three distinct perspectives on KM, and each leads to a different extrapolation and a different definition.

Here are a few sample definitions of knowledge management from the business perspective:

Strategies and processes designed to identify, capture, structure, value, leverage, and share an organization's intellectual assets to enhance its performance and competitiveness. It is based on two critical activities: (1) capture and documentation of individual explicit and tacit knowledge, and (2) its dissemination within the organization. (*The Business Dictionary*, http://www.business-dictionary.com/definition/knowledge-management.html)

Knowledge management is a collaborative and integrated approach to the creation, capture, organization, access, and use of an enterprise's intellectual assets. (Grey 1996)

Knowledge management is the process by which we manage human centered assets . . . the function of knowledge management is to guard and grow knowledge owned by individuals, and where possible, transfer the asset into a form where it can be more readily shared by other employees in the company. (Brooking 1999, 154)

Further definitions come from the intellectual or knowledge asset perspective:

Knowledge management consists of "leveraging intellectual assets to enhance organizational performance." (Stankosky 2008)

Knowledge management develops systems and processes to acquire and share intellectual assets. It increases the generation of useful, actionable, and meaningful information, and seeks to increase both individual and team learning. In addition, it can maximize the value of an organization's intellectual base across diverse functions and disparate locations. Knowledge management maintains that successful businesses are a collection not of products but of distinctive knowledge bases. This intellectual capital is the key that will give the company a competitive

advantage with its targeted customers. Knowledge management seeks to accumulate intellectual capital that will create unique core competencies and lead to superior results. (Rigby 2009)

A definition from the cognitive science or knowledge science perspective:

Knowledge—the insights, understandings, and practical know-how that we all possess—is the fundamental resource that allows us to function intelligently. Over time, considerable knowledge is also transformed to other manifestations—such as books, technology, practices, and traditions—within organizations of all kinds and in society in general. These transformations result in cumulated [sic] expertise and, when used appropriately, increased effectiveness. Knowledge is one, if not THE, principal factor that makes personal, organizational, and societal intelligent behavior possible. (Wiig 1993)

Two diametrically opposed schools of thought arise from the library and information science perspective: the first sees very little distinction between information management and knowledge management, as shown by these two definitions:

KM is predominantly seen as information management by another name (semantic drift). (Davenport and Cronin 2000, 1)

Knowledge management is one of those concepts that librarians take time to assimilate, only to reflect ultimately "on why other communities try to colonize our domains." (Hobohm 2004, 7)

The second school of thought, however, does make a distinction between the management of information resources and the management of knowledge resources.

Knowledge management "is understanding the organization's information flows and implementing organizational learning practices which make explicit key aspects of its knowledge base. . . . It is about enhancing the use of organizational knowledge through sound practices of information management and organizational learning." (Broadbent 1997, 8–9)

The process-technology perspective provides some sample definitions, as well:

Knowledge management is the concept under which information is turned into actionable knowledge and made available effortlessly in a usable form to the people who can apply it. (Patel and Harty, 1998)

Leveraging collective wisdom to increase responsiveness and innovation. (Carl Frappaolo, Delphi Group, Boston, http://www.destinationkm.com/articles/default.asp?ArticleID=949)

A systematic approach to manage the use of information in order to provide a continuous flow of knowledge to the right people at the right time enabling efficient and effective decision making in their everyday business. (Steve Ward, Northrop Grumman, http://www.destinationkm.com/articles/default.asp?ArticleID=949)

A knowledge management system is a virtual repository for relevant information that is critical to tasks performed daily by organizational knowledge workers. (What is KM? http://www.knowledgeshop.com)

> The tools, techniques, and strategies to retain, analyze, organize, improve, and share business expertise. (Groff and Jones 2003, 2)

> A capability to create, enhance, and share intellectual capital across the organization . . . a shorthand covering all the things that must be put into place, for example, processes, systems, culture, and roles to build and enhance this capability. (Lank 1997)

> The creation and subsequent management of an environment that encourages knowledge to be created, shared, learnt [*sic*], enhanced, organized and utilized for the benefit of the organization and its customers. (Abell and Oxbrow 2001)

Wiig (1993, 2002) also emphasizes that, given the importance of knowledge in virtually all areas of daily and commercial life, two knowledge-related aspects are vital for viability and success at any level. These are knowledge *assets* that must be applied, nurtured, preserved, and used to the largest extent possible by both individuals and organizations; and knowledge-related *processes* to create, build, compile, organize, transform, transfer, pool, apply, and safeguard knowledge. These knowledge-related aspects must be carefully and explicitly managed in all affected areas.

> Historically, knowledge has always been managed, at least implicitly. However, effective and active knowledge management requires new perspectives and techniques and touches on almost all facets of an organization. We need to develop a new discipline and prepare a cadre of knowledge professionals with a blend of expertise that we have not previously seen. This is our challenge! (Wiig, in Grey 1996)

Knowledge management is a surprising mix of strategies, tools, and techniques—some of which are nothing new under the sun: storytelling, peer-to-peer mentoring, and learning from mistakes, for example, all have precedents in education, training, and artificial intelligence practices. Knowledge management makes use of a mixture of techniques from knowledge-based system design, such as structured knowledge acquisition strategies from subject matter experts (McGraw and Harrison-Briggs 1989) and educational technology (e.g., task and job analysis to design and develop task support systems; Gery 1991).

This makes it both easy and difficult to define what KM is. At one extreme, KM encompasses everything to do with knowledge. At the other extreme, KM is narrowly defined as an information technology system that dispenses organizational know-how. KM is in fact both of these and much more. One of the few areas of consensus in the field is that KM is a highly multidisciplinary field.

Multidisciplinary Nature of KM

Knowledge management draws upon a vast number of diverse fields such as:

- Organizational science
- Cognitive science
- Linguistics and computational linguistics
- Information technologies such as knowledge-based systems, document and information management, electronic performance support systems, and database technologies
- Information and library science
- Technical writing and journalism
- Anthropology and sociology
- Education and training
- Storytelling and communication studies
- Collaborative technologies such as Computer-Supported Collaborative Work (CSCW) and groupware as well as intranets, extranets, portals, and other web technologies

The above is by no means an exhaustive list but serves to show the extremely varied roots that KM grew out of and continues to be based upon today. Figure 1.1 illustrates some of the diverse disciplines that have contributed to KM.

The multidisciplinary nature of KM represents a double-edged sword: on the one hand, it is an advantage as almost anyone can find a familiar foundation upon which to base an understanding and even practice of KM. Someone with a background in

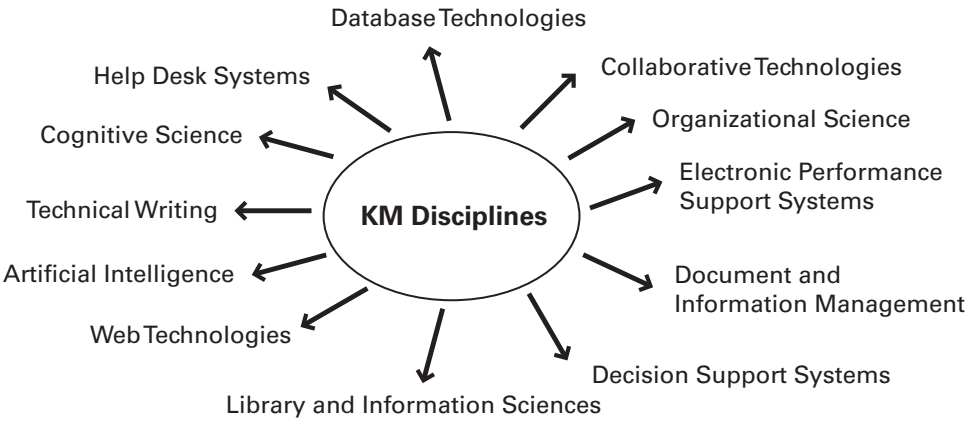

Figure 1.1
Interdisciplinary nature of knowledge management

journalism, for example, can quickly adapt this skill set to capture knowledge from experts and reformulate this knowledge as organizational stories to be stored in corporate memory. Someone coming from a more technical database background can easily extrapolate his or her skill set to design and implement knowledge repositories that will serve as the corporate memory for that organization. However, the diversity of KM also results in some challenges with respect to boundaries. Skeptics argue that KM is not and cannot be said to be a separate discipline with a *unique* body of knowledge to draw upon. This attitude is typically represented by statements such as "KM is just IM" or "KM is nonsensical—it is just good business practices." It becomes very important to be able to list and describe what attributes are necessary and in themselves sufficient to constitute knowledge management both as a discipline and as a field of practice that can be distinguished from others.

One of the major attributes lies in the fact that KM deals with knowledge as well as information. Knowledge is a more subjective way of knowing, typically based on experiential or individual values, perceptions, and experience. Consider the example of planning for an evening movie to distinguish between data, information, and knowledge.

Data Content that is directly observable or verifiable: a fact; for example, movie listings giving the times and locations of all movies being shown today—I download the listings.

Information Content that represents analyzed data; for example, I can't leave before 5, so I will go to the 7 pm show at the cinema near my office.

Knowledge At that time of day, it will be impossible to find parking. I remember the last time I took the car, I was so frustrated and stressed because I thought I would miss the opening credits. I'll therefore take the commuter train. But first, I'll check with Al. I usually love all the movies he hates, so I want to make sure it's worth seeing!

Another distinguishing characteristic of KM, as opposed to other information management fields, is the fact that knowledge in all of its forms is addressed: tacit knowledge and explicit knowledge.

The Two Major Types of Knowledge: Tacit and Explicit

We know more than we can tell.

—Polanyi 1966

Tacit knowledge is difficult to articulate and difficult to put into words, text, or drawings. Explicit knowledge represents content that has been captured in some

Table 1.1
Comparison of properties of tacit versus explicit knowledge

Properties of tacit knowledge	Properties of explicit knowledge
Ability to adapt, to deal with new and exceptional situations	Ability to disseminate, to reproduce, to access and re-apply throughout the organization
Expertise, know-how, know-why, and care-why	Ability to teach, to train
Ability to collaborate, to share a vision, to transmit a culture	Ability to organize, to systematize, to translate a vision into a mission statement, into operational guidelines
Coaching and mentoring to transfer experiential knowledge on a one-to-one, face-to-face basis	Transfer knowledge via products, services, and documented processes

tangible form such as words, audio recordings, or images. Tacit knowledge tends to reside within the heads of *knowers*, whereas explicit knowledge is usually contained within tangible or concrete media. However, it should be noted that this is a rather simplistic dichotomy. In fact, the property of *tacitness* is a property of the knower: that which is easily articulated by one person may be very difficult to externalize by another. The same content may be explicit for one person and tacit for another.

There is also somewhat of a paradox at play here: highly skilled, experienced, and expert individuals may find it harder to articulate their know-how. Novices, on the other hand, are more apt to easily verbalize what they are attempting to do because they are typically following a manual or how-to process. Table 1.1 summarizes some of the major properties of tacit and explicit knowledge.

Typically, the more tacit knowledge is, the more valuable it tends to be. The paradox lies in the fact that the more difficult it is to articulate a concept such as *story*, the more valuable that knowledge may be. This is often witnessed when people make reference to knowledge versus know-how, or knowing something versus knowing how to do something. Valuable tacit knowledge often results in some observable action when individuals understand and subsequently make use of knowledge. Another perspective is that explicit knowledge tends to represent the final end product whereas tacit knowledge is the know-how or all of the processes that were required in order to produce that final product.

> We have a habit of writing articles published in scientific journals to make the work as finished as possible, to cover up all the tracks, to not worry about the blind alleys or how you had the wrong idea at first, and so on. So there isn't any place to publish, in a dignified manner, what you actually did in order to do the work. (Feynman 1966).

A popular misconception is that KM focuses on rendering that which is tacit into more explicit or tangible forms, then storing or archiving these forms somewhere, usually some form of intranet or knowledge portal. The "build it and they will come" expectation typifies this approach: Organizations take an exhaustive inventory of tangible knowledge (i.e., documents, digital records) and make them accessible to all employees. Senior management is then mystified as to why employees are not using this wonderful new resource. In fact, knowledge management is broader and includes leveraging the value of the organizational knowledge and know-how that accumulates over time. This approach is a much more holistic and user-centered approach that begins not with an audit of existing documents but with a needs analysis to better understand how improved knowledge sharing may benefit specific individuals, groups, and the organization as a whole. Successful knowledge-sharing examples are gathered and documented in the form of lessons learned and best practices and these then form the kernel of organizational stories.

There are a number of other attributes that together make up a set of what KM should be all about. One good technique for identifying these attributes is the concept analysis technique.

The Concept Analysis Technique

Concept analysis is an established technique used in the social sciences (i.e., philosophy and education) in order to derive a formula that in turn can be used to generate definitions and descriptive phrases for highly complex terms. We still lack a consensus on knowledge management–related terms, and these concepts do appear to be complex enough to merit the concept analysis approach. A great deal of conceptual complexity derives from the fact that a word such as *knowledge* is necessarily subjective in nature, not to mention value laden in interpretation.

The concept analysis approach rests on the obtaining consensus around three major dimensions of a given concept (shown in figure 1.2).

1. A list of key attributes that must be present in the definition, vision, or mission statement
2. A list of illustrative examples
3. A list of illustrative nonexamples

This approach is particularly useful in tackling multidisciplinary domains such as intellectual capital, because clear criteria can be developed to enable sorting into categories such as knowledge versus information, document management versus knowledge management, and tangible versus intangible assets. In addition, valuable

Concept Name		
Key Attributes	Examples	Nonexamples
1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____	1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____	1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____

Figure 1.2
Illustration of the Concept Analysis Technique

contributions to the organization's intellectual capital are derived through the production of ontologies (semantic maps of key concepts), identification of core competencies, and identification of knowledge, know-how, and know-why at risk of being lost through human capital attrition.

Concept analysis is a technique used to visually map out conceptual information in the process of defining a word (Novak 1990, 1991). This is a technique derived from the fields of philosophy and science education (Bareholz and Tamir 1992; Lawson 1994) and is typically used in clearly defining complex, value-laden terms such as *democracy* or *religion*. It is a graphical approach to help develop a rich, in-depth understanding of a concept. Figure 1.2 outlines the major components of this approach.

Davenport and Prusak (1998) decry the ability to provide a definitive account of knowledge management since "epistemologists have spent their lives trying to understand what it means to know something." In his 2008 keynote address, Michael Stankosky reiterated this disappointment that we still "don't know what to call it!" If

you can't manage what you cannot measure, then you can't measure what you cannot name. Knowledge management, due to this still ongoing lack of clarity and lack of consensus on a definition, presents itself as a good candidate for this approach. In visioning workshops, this is the first activity that participants are asked to undertake. The objective is to agree upon a list of key attributes that are both necessary and sufficient in order for a definition of knowledge management to be acceptable. This is completed by a list of examples and nonexamples, with justifications as to why a particular item was included on the example or nonexample list. Semantic mapping (Jonassen, Beissner, and Yacci 1993; Fisher 1990) is the visual technique used to extend the definition by displaying words related to it. Popular terms to distinguish clearly from knowledge management include document management, content management, portal, knowledge repository, and others. Together, the concept and semantic maps visually depict a model-based definition of knowledge management and its closely related terms.

In some cases, participants are provided with lists of definitions of knowledge management from a variety of sources can so they can *try out* their concept map of knowledge management by analyzing these existing definitions. Definitions are typically drawn from the knowledge management literature as well as internally, from their own organization. The use of concept definition through concept and semantic mapping techniques can help participants rapidly reach a consensus on a *formulaic* definition of knowledge management, that is, one that focuses less on the actual text or words used but more on which key concepts need to be present, what comprises a necessary and sufficient (complete) set of concepts, and rules of thumb to use in discerning what is and what is not an illustrative example of knowledge management.

Ruggles and Holtshouse (1999) identified the following key attributes of knowledge management:

- Generating new knowledge
- Accessing valuable knowledge from outside sources
- Using accessible knowledge in decision making
- Embedding knowledge in processes, products and/or services
- Representing knowledge in documents, databases, and software
- Facilitating knowledge growth through culture and incentives
- Transferring existing knowledge into other parts of the organization
- Measuring the value of knowledge assets and/or impact of knowledge management

Some key knowledge management attributes that continue to recur include:

• Both tacit and explicit knowledge forms are addressed; tacit knowledge (Polanyi 1966) is knowledge that often resides only within individuals, knowledge that is difficult to articulate such as expertise, know-how, tricks of the trade, and so on.

• There is a notion of added-value (the *so what?* of KM).

• The notion of application or use of the knowledge captured, codified, and disseminated (the impact of KM).

It should be noted that a *good enough* or sufficient definition of knowledge has been shown to be effective (i.e., settling for *good enough* as opposed to optimizing; when 80 percent is done because the incremental cost of completing the remaining 20 percent is disproportionately expensive and/or time-consuming in relation to the expected additional benefits). Norman (1988, 50–74) noted that knowledge might reside in two places—in the minds of people and/or in the world. It is easy to show the faulty nature of human knowledge and memory. For example, when typists were given caps for typewriter keys, they could not arrange them in the proper configuration—yet all those typists could type rapidly and accurately. Why the apparent discrepancy between the precision of behavior and the imprecision of knowledge? Because not all of the knowledge required for precise behavior has to be in the mind. It can be distributed—partly in the mind, partly in the world, and partly in the constraints of the world. Precise behavior can thus emerge from imprecise knowledge (Ambur 1996). It is for this reason that once a satisfactory working or operational definition of knowledge management has been arrived at, then a knowledge management strategy can be confidently tackled.

It is highly recommended that each organization undertake a concept analysis exercise to clarify their understanding of what KM means in their own context. The best way to do this would be to work as a group in order to achieve a shared understanding at the same time that a clearer conceptualization of the KM concept is developed. Each participant can take a turn to contribute one good example of what KM is and another example of what KM is not. The entire group can then discuss this example/nonexample pair in order to identify one (or several) key KM attributes. Miller's (1956) magic number can be used to define the optimal number of attributes a given concept should have—namely, seven plus or minus two attributes. Once the group feels they have covered as much ground as they are likely to, the key attributes can be summarized in the form of a KM concept *formula* such as:

In our organization, knowledge management must include the following: both tacit and explicit knowledge; a framework to measure the value of knowledge assets; a process for managing knowledge assets . . .

The lack of agreement on one universal formulation of a definition for knowledge management makes it essential to develop one for each organization (at a very minimum). This *working* or *operational* definition, derived through the concept analysis technique, will render explicit the various perceptions people in that company may have of KM and bring them together into a coherent framework. It may seem strange that KM is almost always defined at the beginning of any talk or presentation on the topic (imagine if other professionals such as doctors, lawyers, or engineers began every talk with "here is a definition of what I do and why") but this is the reality we must deal with. Whether the lack of a definition is due to the interdisciplinary nature of the field and/or because it is still an emerging discipline, it certainly appears to be highly contextual. The concept analysis technique allows us to continue in both research and practice while armed with a common, validated, and clear description of KM that is useful and adapted to a particular organizational context.

History of Knowledge Management

Although the term *knowledge management* formally entered popular usage in the late 1980s (e.g., conferences in KM began appearing, books on KM were published, and the term began to be seen in business journals), philosophers, teachers, and writers have been making use of many of the same techniques for decades. Denning (2002) related how from "time immemorial, the elder, the traditional healer, and the midwife in the village have been the living repositories of distilled experience in the life of the community"(http://www.stevedenning.com/ knowledge_management.html).

Some form of narrative repository has been around for a long time, and people have found a variety of ways to share knowledge in order to build on earlier experience, eliminate costly redundancies, and avoid making at least the same mistakes again. For example, knowledge sharing often took the form of town meetings, workshops, seminars, and mentoring sessions. The primary vehicle for knowledge transfer was people themselves—in fact, much of our cultural legacy stems from the migration of different peoples across continents.

Wells (1938), while never using the actual term *knowledge management*, described his vision of the *World Brain* that would allow the intellectual organization of the sum total of our collective knowledge. The World Brain would represent "a universal organization and clarification of knowledge and ideas" (Wells 1938, xvi). Wells in fact anticipated the World Wide Web, albeit in an idealized manner, when he spoke of "this wide gap between . . . at present unassembled and unexploited best thought and knowledge in the world . . . we live in a world of unused and misapplied knowledge and skill" (p. 10). The World Brain encapsulates many of the desirable features of the

intellectual capital approach to KM: selected, well-organized, and widely vetted content that is maintained, kept up to date, and, above all, put to use to generate value to users, the users' community, and their organization.

What Wells envisioned for the entire world can easily be applied within an organization in the form of an intranet. What is new and termed *knowledge management* is that we are now able to simulate rich, interactive, face-to-face knowledge encounters virtually through the use of new communication technologies. Information technologies such as an intranet and the Internet enable us to knit together the intellectual assets of an organization and organize and manage this content through the lenses of common interest, common language, and conscious cooperation. We are able to extend the depth and breadth or reach of knowledge capture, sharing and dissemination activities, as we had not been able to do before and find ourselves one step closer to Wells' (1938) "perpetual digest . . . and a system of publication and distribution" (pp. 70–71) "to an intellectual unification . . . of human memory" (pp. 86–87).

Drucker was the first to coin the term *knowledge worker* in the early 1960s (Drucker 1964). Senge (1990) focused on the *learning organization* as one that can learn from past experiences stored in corporate memory systems. Dorothy Barton-Leonard (1995) documented the case of Chapparal Steel as a knowledge management success story. Nonaka and Takeuchi (1995) studied how knowledge is produced, used, and diffused within organizations and how this contributes to the diffusion of innovation.

The growing importance of organizational knowledge as a competitive asset was recognized by a number of people who saw the value in being able to measure intellectual assets (see Kaplan and Norton; APQC 1996; Edvinsson and Malone 1997, among others). A cross-industry benchmarking study was led by APQC's president Carla O'Dell and completed in 1996. It focused on the following KM needs:

- Knowledge management as a business strategy
- Transfer of knowledge and best practices
- Customer-focused knowledge
- Personal responsibility for knowledge
- Intellectual asset management
- Innovation and knowledge creation (APQC 1996)

The Entovation timeline (available at http://www.entovation.com/timeline/timeline.htm) identifies a variety of disciplines and domains that have blended together to emerge as knowledge management. A number of management theorists have contributed significantly to the evolution of KM such as Peter Drucker, Peter

Figure 1.3
A summary timeline of knowledge management

Senge, Ikujiro Nonaka, Hirotaka Takeuchi, and Thomas Stewart. An extract of this timeline is shown in figure 1.3.

The various eras we have lived through offer another perspective on the history of KM. Starting with the industrial era in the 1800s, we focused on transportation technologies in 1850, communications in 1900, computerization beginning in the 1950s, and virtualization in the early 1980s, and early efforts at personalization and profiling technologies beginning in the year 2000 (Deloitte, Touche, Tohmatsu 1999). Figure 1.4 summarizes these developmental phases.

With the advent of the information or computer age, KM has come to mean the systematic, deliberate leveraging of knowledge assets. Technologies enable valuable knowledge to be *remembered*, via organizational learning and corporate memory; as well as enabling valuable knowledge to be *published*, that is, widely disseminated to all stakeholders. The evolution of knowledge management has occurred in parallel with a shift from a retail model based on a catalog (e.g., Ford's famous quote that you can have a car in any color you like—as long as it is black) to an auction model (as exemplified by eBay) to a personalization model where real-time matching of user needs and services occur in a win-win exchange model.

In 1969, the launch of the ARPANET allowed scientists and researchers to communicate more easily with one another in addition to being able to exchange large data sets they were working on. They came up with a network protocol or language that would allow disparate computers and operating systems to network together

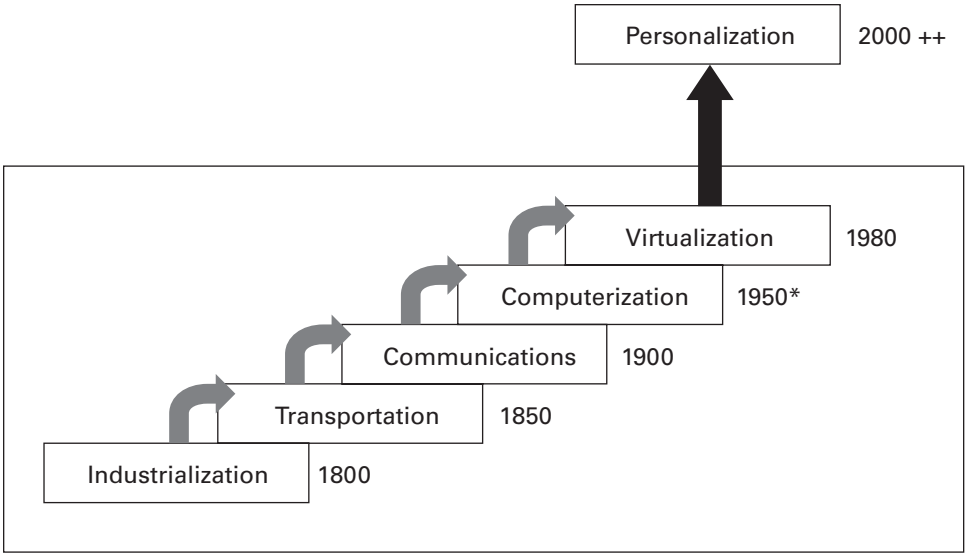

Figure 1.4
Developmental phases in KM history

across communication lines. Next, a messaging system was added to this data file transfer network. In 1991, the nodes were transferred to the Internet and World Wide Web. At the end of 1969, only four computers and about a dozen workers were connected.

In parallel, there were many key developments in information technologies devoted to knowledge-based systems: expert systems that aimed at capturing *experts on a diskette*, intelligent tutoring systems aimed at capturing *teachers on a diskette* and artificial intelligence approaches that gave rise to knowledge engineering, someone tasked with acquiring knowledge from subject matter experts, conceptually modeling this content, and then translating it into machine-executable code (McGraw and Harrison-Briggs 1989). They describe knowledge engineering as "involving information gathering, domain familiarization, analysisand design efforts. In addition, accumulated knowledge must be translated into code, tested and refined" (McGraw and Harrison Briggs, 5). A knowledge engineer is "the individual responsible for structuring and/or constructing an expert system" (5). The design and development of such knowledge-based systems have much to offer knowledge management that also aims at the capture, validation, and subsequent technology-mediated dissemination of valuable knowledge from experts.

Table 1.2
Knowledge management milestones

Year	Entity	Event
1980	DEC, CMU	XCON Expert System
1986	Dr. K. Wiig	Coined KM concept at UN
1989	Consulting Firms	Start internal KM projects
1991	HBR article	Nonaka and Takeuchi
1993	Dr. K. Wiig	First KM book published
1994	KM Network	First KM conference
Mid 1990s	Consulting Firms	Start offering KM services
Late 1990s	Key vertical industries	Implement KM and start seeing benefits
2000–2003	Academia	KM courses/programs in universities with KM texts
2003 to present	Professional and Academic Certification	KM degrees offered by universities, by professional institutions such as KMCI (Knowledge Management Consortium International; information available at: http://www.kmci.org/) and PhD students completing KM dissertations

By the early 1990s, books on knowledge management began to appear and the field picked up momentum in the mid 1990s with a number of large international KM conferences and consortia being developed. In 1999, Boisot summarized some of these milestones. Table 1.2 shows an updated summary.

At the 24th World Congress on Intellectual Capital Management in January 2003, a number of KM gurus united in sending out a request to academia to pick up the KM torch. Among those attending the conference were Karl Sveiby, Leif Edvinsson, Debra Amidon, Hubert Saint-Onge, and Verna Allee. They made a strong case that KM had up until now been led by practitioners who were problem-solving by the seat of their pants and that it was now time to focus on transforming KM into an academic discipline, promoting doctoral research in the discipline, and providing a more formalized training for future practitioners. Today, over a hundred universities around the world offer courses in KM, and quite a few business and library schools offer degree programs in KM (Petrides and Nodine 2003).

From Physical Assets to Knowledge Assets

Knowledge has increasingly become more valuable than the more traditional physical or tangible assets. For example, traditionally, an airline organization's assets included the physical inventory of airplanes. Today, however, the greatest asset possessed by

an airline is the SABRE reservation system, software that enables the airline to not only manage the logistics of its passenger reservations but also to implement a seat-yield management system. The latter refers to an optimization program that is used to ensure maximum revenue is generated from each seat sold—even if each and every seat carried a distinct price. Similarly, in the manufacturing sector, the value of non-physical assets such as just-in-time (JIT) inventory systems is rapidly proving to provide more value. These are examples of *intellectual assets*, which generally refer to an organization's recorded information, and human talent where such information is typically either inefficiently warehoused or simply lost, especially in large, physically dispersed organizations (Stewart 1991).

This has led to a change in focus to the useful lifespan of a valuable piece of knowledge—when is some knowledge of no use? What about knowledge that never loses its value? The notion of knowledge obsolescence and archiving needs to be approached with a fresh lens. It is no longer advisable to simply discard items that are *past their due date*. Instead, content analysis and a cost-benefit analysis are needed in order to manage each piece of valuable knowledge in the best possible way.

Intellectual capital is often made visible by the difference between the book value and the market value of an organization (often referred to as *goodwill*). Intellectual assets are represented by the sum total of what employees of the organization know and know how to do. The value of these knowledge assets is at least equal to the cost of recreating this knowledge. The accounting profession still has considerable difficulty in accommodating these new forms of assets. Some progress has been made (e.g., Skandia was the first organization to report intellectual capital as part of its yearly financial report), but there is much more work to be done in this area. As shown in figure 1.5, intellectual assets may be found at the strategic, tactical, and operational levels of an organization.

Some examples of intellectual capital include:

Competence The skills necessary to achieve a certain (high) level of performance

Capability Strategic skills necessary to integrate and apply competencies

Technologies Tools and methods required to produce certain physical results

Core competencies are the things that an organization knows how to do well, that provide a competitive advantage. These are situated at a tactical level. Some examples would be a process, a specialized type of knowledge, or a particular kind of expertise that is rare or unique to the organization. Capabilities are found at a more strategic level. Capabilities are those things that an individual knows how to do well, which, under appropriate conditions, may be aggregated to organizational competencies.

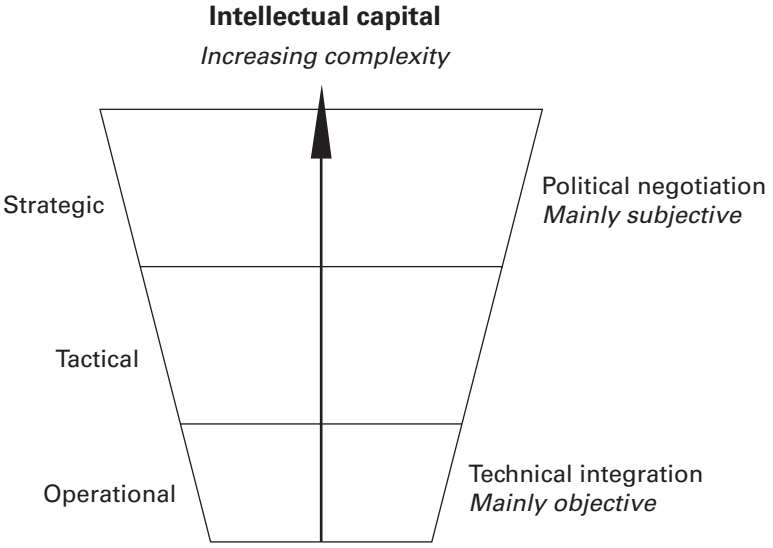

Figure 1.5
Three levels of intellectual capital

Capabilities are potential core competencies and sound KM practices are required in order for that potential to be realized. A number of business management texts discuss these concepts in greater detail (e.g., Hamel and Prahalad 1990). It should be noted that the more valuable a capability is, and the less it is shared among many employees, then the more vulnerable the organization becomes should that employee leave.

Organizational Perspectives on Knowledge Management

Wiig (1993) considers knowledge management in organizations from three perspectives, each with different horizons and purposes:

Business perspective Focusing on why, where, and to what extent the organization must invest in or exploit knowledge. Strategies, products and services, alliances, acquisitions, or divestments should be considered from knowledge-related points of view.

Management perspective Focusing on determining, organizing, directing, facilitating, and monitoring knowledge-related practices and activities required to achieve the desired business strategies and objectives

Hands-on perspective Focusing on applying the expertise to conduct explicit knowledge-related work and tasks

The business perspective easily maps onto the strategic nature of knowledge management, the management perspective to the tactical layer, and the hands-on perspective may be equated with the operational level.

Library and Information Science (LIS) Perspectives on KM

Although not everyone in the LIS community is positively inclined toward KM (tending to fall back on arguments that IM is enough and that KM is encroaching upon this territory, as shown in some of the earlier definitions), others see KM as a means of enlarging the scope of activities that information professionals can participate in. Gandhi (2004) notes that knowledge organization has always been part of the core curriculum and the professional toolkit of LIS; and Martin et al. (2006, 15) point out that LIS professionals are also expert in content management. The authors go on to state that

> Libraries and information centers will continue to perform access and intermediary roles which embrace not just information but also knowledge management (Henczel 2004). The difference today is that these traditional roles could be expanded if not transformed . . . through activities aimed at helping to capture tacit knowledge and by turning personal knowledge into corporate knowledge that can be widely shared through the library and applied appropriately.

Blair (2002) notes that the primary differences between traditional information management practiced by LIS professional and knowledge management consist of collaborative learning, the transformation of tacit knowledge into explicit forms, and the documentation of best practices (and presumably their counterpart, lessons learned). The author often uses the phrase "connecting people to content and connecting people to people" to highlight the addition of non-document-based resources that play a critical role in KM.

As with KM itself, there is no *best* or *better* perspective; instead, the potential added value is to combine the two perspectives in order to get the most out of KM. One of the easiest ways of doing so would be to ensure that both perspectives—and both types of skill sets—are represented on your KM team.

Why Is KM Important Today?

The major business drivers behind today's increased interest and application of KM lie in four key areas:

1. *Globalization of business* Organizations today are more global—multisite, multilingual, and multicultural in nature.

2. *Leaner organizations* We are doing more and we are doing it faster, but we also need to work smarter as knowledge workers—increased pace and workload.

3. *Corporate amnesia* We are more mobile as a workforce, which creates problems of knowledge continuity for the organization, and places continuous learning demands on the knowledge worker—we no longer expect to work for the same organization for our entire career.

4. *Technological advances* We are more connected—information technology advances have made connectivity not only ubiquitous but has radically changed expectations: we are expected to be *on* at all times and the turnaround time in responding is now measured in minutes, not weeks.

Today's work environment is more complex due to the increase in the number of subjective knowledge items we need to attend to every day. Filtering over two hundred e-mails, faxes, and voice mail messages on a daily basis should be done according to good time management practices and filtering rules, but more often than not, workers tend to exhibit a Pavlovian reflex to beeps announcing the arrival of new mail or the ringing of the phone that demands immediate attention. Knowledge workers are increasingly being asked to think on their feet with little time to digest and analyze incoming data and information, let alone time to retrieve, access, and apply relevant experiential knowledge. This is due both to the sheer volume of tasks to attend to, as well as the greatly diminished turnaround time. Today's expectation is that everyone is *on* all the time—as evidenced by the various messages embodying annoyance at not having connected, such as voice mails asking why you have not responded to an e-mail, and e-mails asking why you have not returned a call!

Knowledge management represents one response to the challenge of trying to manage this complex, information overloaded work environment. As such, KM is perhaps best categorized as a science of complexity. One of the largest contributors to the complexity is that information overload represents only the tip of the iceberg—only that information that has been rendered explicit. KM must also deal with the yet to be articulated or tacit knowledge. To further complicate matters, we may not even be aware of all the tacit knowledge that exists—we may not *know that we don't know*. Maynard Keynes (in Wells 1938, 6) hit upon a truism when he stated "these . . . directive people who are in authority over us, know scarcely anything about the business they have in hand. Nobody knows very much, but the important thing to realize is that they do not even know what is to be known." Though he was addressing politics and the economic consequences of peace, today's organizational leaders have echoed his words countless times.

In fact, we are now entering the third generation of knowledge management, one devoted to content management. In the first generation, the emphasis was placed on containers of knowledge or information technologies in order to help us with the dilemma exemplified by the much quoted phrase "if only we knew what we know" (O'Dell and Grayson 1998). The early adopters of KM, large consulting companies that realized that their primary product was knowledge and that they needed to inventory their knowledge stock more effectively, exemplified this phase. A great many intranets and internal knowledge management systems were implemented during the first KM generation. This was the generation devoted to finding all the information that had up until then been buried in the organization with commonly produced by-products encapsulated as reusable best practices and lessons learned.

Reeling from information overload, the second generation swung to the opposite end of the spectrum, to focus on people; this could be phrased as "if only we knew who knows about." There was growing awareness of the importance of human and cultural dimensions of knowledge management as organizations pondered why the new digital libraries were entirely devoid of content (i.e., information junkyards) and why the usage rate was so low. In fact, the information technology approach of the first KM generation leaned heavily toward a top-down, organization-wide monolithic KM system. In the second generation, it became quite apparent that a bottom-up or grassroots adoption of KM led to much greater success and that there were many grassroots movements—which were later dubbed *communities of practice*. Communities of practice are good vehicles to study knowledge sharing or the movement of knowledge throughout the organization to spark not only reuse for greater efficiency but knowledge creation for greater innovation.

The third stage of KM brought about an awareness of the importance of content—how to describe and organize content so that intended end users are aware it exists, and can easily access and apply this content. This phase is characterized by the advent of metadata to describe the content in addition to the format of content, content management, and knowledge taxonomies. After all, if knowledge is not put to use to benefit the individual, the community of practice, and/or the organization, then knowledge management has failed. Bright ideas in the form of light bulbs in the pocket are not enough—they must be *plugged in* and this can only be possible if people know what there is to be known, can find it when they need, can understand it, and, perhaps most important, are convinced that this knowledge should be put to work. A slogan for this phase might be something like: "taxonomy before technology" (Koenig 2002, 3).

KM for Individuals, Communities, and Organizations

Knowledge management provides benefits to individual employees, to communities of practice, and to the organization itself. This three-tiered view of KM helps emphasize why KM is important today (see figure 1.6).

For the individual, KM:

- Helps people do their jobs and save time through better decision making and problem solving
- Builds a sense of community bonds within the organization
- Helps people to keep up to date
- Provides challenges and opportunities to contribute

For the community of practice, KM:

- Develops professional skills
- Promotes peer-to-peer mentoring
- Facilitates more effective networking and collaboration
- Develops a professional code of ethics that members can adhere to
- Develops a common language

For the organization, KM:

- Helps drive strategy
- Solves problems quickly
- Diffuses best practices
- Improves knowledge embedded in products and services
- Cross-fertilizes ideas and increases opportunities for innovation
- Enables organizations to better stay ahead of the competition
- Builds organizational memory

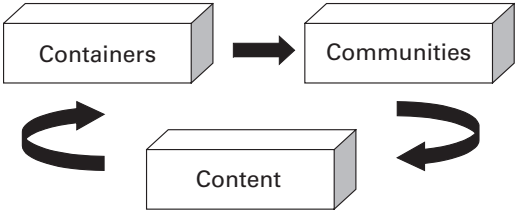

Figure 1.6
Summary of the three major components of KM

Some critical KM challenges are to manage content effectively, facilitate collaboration, help knowledge workers connect, find experts, and help the organization to learn to make decisions based on complete, valid, and well-interpreted data, information, and knowledge.

In order for knowledge management to succeed, it has to tap into what is important to knowledge workers, what is of value to them and to their professional practice as well as what the organization stands to gain. It is important to get the balance right. If the KM initiative is too big, it risks being too general, too abstract, too top-down, and far too remote to catalyze the requisite level of buy-in from individuals. If the KM initiative is too small, however, then it may not be enough to provide sufficient interaction between knowledge workers to generate synergy. The KM technology must be supportive and management must commit itself to putting into place the appropriate rewards and incentives for knowledge management activities. Last but not least, participants need to develop KM skills in order to participate effectively. These KM skills and competencies are quite diverse and varied, given the multidisciplinary nature of the field, but one particular link is often neglected, and that is the link between KM skills and information professionals' skills. KM has resulted in the emergence of new roles and responsibilities. Many of these new roles can benefit from a healthy foundation from not only information technology (IT) but also information science. In fact, KM professionals have a crucial role to play in all processes of the KM cycle, which is described in more detail in chapter 2.

Key Points

- KM is not necessarily something completely new but has been practiced in a wide variety of settings for some time now, albeit under different monikers.
- Knowledge is more complex than data or information; it is subjective, often based on experience, and highly contextual.
- There is no generally accepted definition of KM, but most practitioners and professionals concur that KM treats both tacit and explicit knowledge with the objective of adding value to the organization.
- Each organization should define KM in terms of the business objective; concept analysis is one way of accomplishing this.
- KM is all about applying knowledge in new, previously unencumbered or novel situations.
- KM has its roots in a variety of different disciplines.

• The KM generations to date have focused first on containers, next on communities, and finally on the content itself.

Discussion Points

1. Use concept analysis to clarify the following terms:

a. Intellectual capital versus physical assets

b. Tacit knowledge versus explicit knowledge

c. Community of practice versus community of interest

2. "Knowledge management is not anything new." Would you argue that this statement is largely true? Why or why not? Use historical antecedents to justify your arguments.

3. What are the three generations of knowledge management to date? What was the primary focus of each?

4. What are the different types of roles required for each of the above three generations?

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Knowledge management – An Overview

Preamble

In the present day market scenario of intense competition, organizations need to know what they know and be able to leverage on it's knowledge base to gain competitive advantage. In this knowledge era, organisations can create and sustain competitive advantage through initiation of appropriate knowledge management processes. The organisations that can leverage technology to exploit the data will realize the benefits by creating a competitive advantage for itself. The competitive advantage could be in the form of identifying trends, unusual patterns, and hidden relationships. The recent emphasis on knowledge management arises out of the need for organizations to manage resources more effectively in a hyper-competitive, global economy. The need for emphasis on knowledge management is also stressed by Nonaka and Takeuchi in their statement ' In an economy where the only certainty is uncertainty, the one sure source of lasting competitive advantage is knowledge. Successful companies are those that consistently create new knowledge, disseminate it widely throughout the organization, and quickly embody it in new technologies and products'.

Knowledge in knowledge management

The importance of knowledge has been stressed by many management researchers and authors. Peter Drucker has declared that knowledge is just not another resource like labor, capital, but is the only important resource today. Toffler subscribes to the views of Drucker, by proclaiming that knowledge is the source of the highest-quality power and is the key to the powershift that lies ahead.
Quinn shares a similar view while stating that the economic and the producing power of modern organisations lies more in its' intellectual assets and capabilities more than the other tangible assets.
Nonaka and Takeuchi have focused on how Japanese companies have leveraged their knowledge assets to gain competitive advantage and industry leadership.

The paradox in knowledge management is that we are trying to manage what cannot be managed. Before we set about managing knowledge, we need to understand what the term knowledge refers to and the various classifications of knowledge.
Davenport has defined knowledge as a 'fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of the owners of knowledge. In organizations, it often becomes embedded not only in documents or repositories, but also in organizational routines, processes, practices and norms'

Ryle, in one of his works, has explained the different categories of knowledge. First, knowledge is referred to what is gained through the understanding of concepts and frameworks, generally referred to as 'knowing why'. Another classification of knowledge, what Peter Senge termed as ' capacity for action', refers to an understanding of the facts and procedures required for making things happen. Knowledge also refers to the codification of 'factual knowledge based on prior experience' , which is generally tacit knowledge and is termed as 'knowing that'. The

next usage of knowledge refers to codification of 'factual knowledge which is acquired knowledge' and this could be tacit or explicit. This term is also used while referring to 'social knowledge of networks' indicating the persons known. This, in general terms, is referred to as 'knowing who'. Knowledge also refers to the cultural knowledge facilitating communication, which in common terms is termed as 'knowledge of meaning'.

Why knowledge management

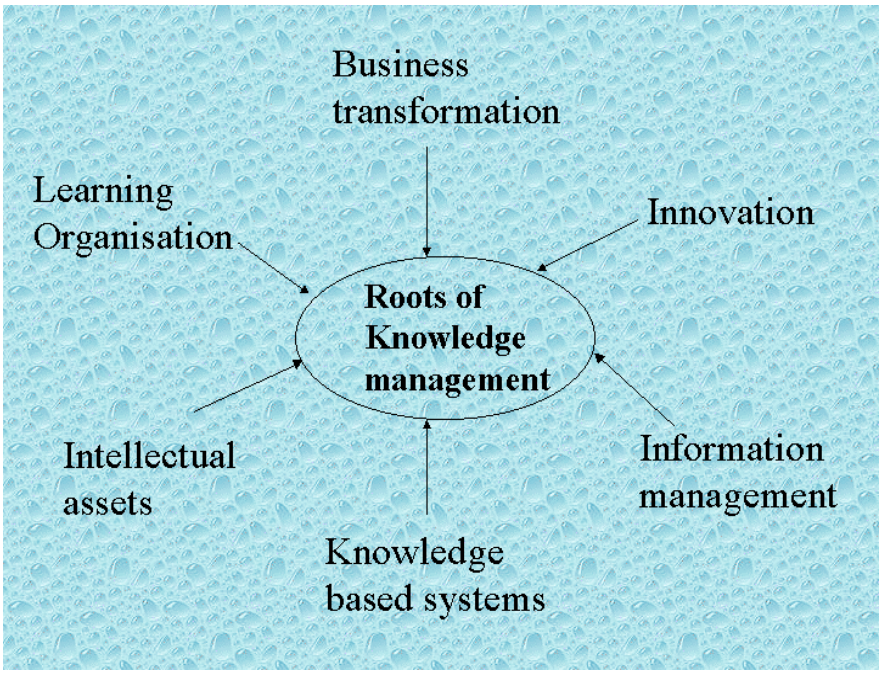
The field of knowledge management has gained currency in recent times due to a wide variety of reasons. Some of them are

- The speed of change in the market place has become so rapid that the time available for organisations to gain experience and acquire knowledge has diminished. Organisations are required to differentiate their product or produce them in fastest possible time and the lowest possible cost.
- Competition in the market place has forced organisations to reduce costs. One of the methods followed is reduction in manpower. This has led to early retirements and increasing mobility of work force resulting in a loss of knowledge
- Organisations are forced to compete on the basis of knowledge
- Market place is increasingly competitive
- Reduction is staffing create a need to replace informal knowledge with formal methods
- Reduction in work force due to competitive pressure
- Need for life-long learning is an inescapable reality
- Increasing dominance of knowledge as a basis for organisational effectiveness
- The failure of financial models to represent the dynamics of knowledge
- The failure of information technology by itself to achieve substantial benefits for organisations for organizations
- The diffusion of global capabilities causing developed countries to become service-based economies depending on labor from developing countries
- The unintended consequences of universal information access.
- The importance attached to this subject in management schools.

The importance of knowledge management is also corroborated by various research studies.

- A survey by Pricewaterhouse Coopers and World economic forum found that 95% of CEO's saw KM as an essential ingredient foe the success of their company.
- According to the International Data Corporation, companies worldwide are expected to dramatically increase their knowledge management expenditure from $2 million in 1999 to $12 million in 2003

Roots of knowledge management



Learning organisation :

If an organisation conforms to the required norms and can be termed as a learning organisation, then it becomes one of the start point of knowledge management.

Intellectual assets :

The intellectual assets in an organisation is in the people have gained expertise through years of work experience and is tacit in nature. This knowledge has to made explicit and managed in order to leverage on it and gain competitive advantage.

Knowledge based systems

The systems that are evolved in an organization to facilitate the smooth functioning of the organization should facilitate harnessing the existing knowledge in the organization. These systems could be a basis of knowledge management.

Information management

Information is the core of knowledge management, since information combined with experience and intuition leads to knowledge. Hence, proper information management systems can result in an effective knowledge management system.

Innovation

Creativity and innovation are methods by which new knowledge is created. Innovation comes out of increment changes to existing products or processes and a radical change, which is different from the original process or product.
Radical changes give a new dimension to the existing knowledge base and incremental changes result in changes in perceptions and line of thinking leading to new knowledge insights.

Business transformation

Business transformation acts as another catalyst for knowledge management. Organisations respond to the various changes in the market place through transformation processes like business process re-engineering.

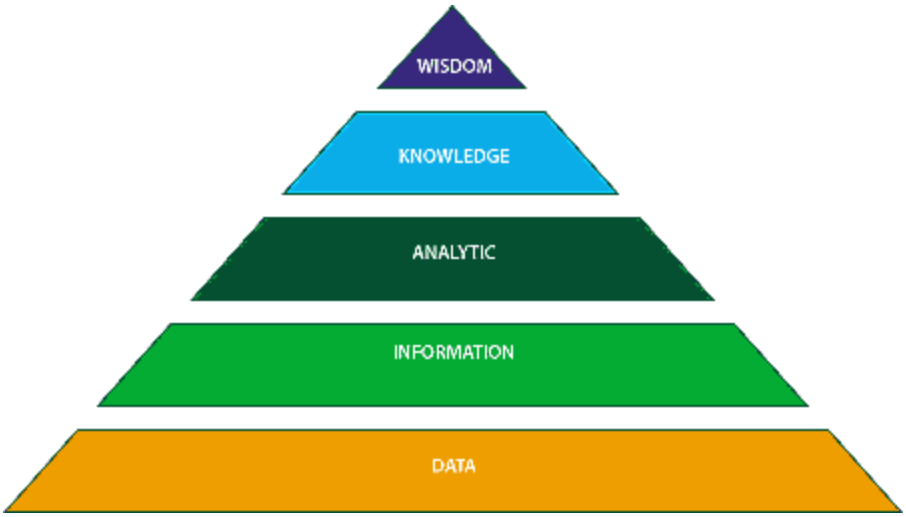
Evolution of Knowledge management

Historic developments may be portrayed by the following stages of dominant economic activities and foci leading to the evolution of knowledge management.

Agrarian economics	creating products for consumption and exchange
Natural resource economics	natural resource exploitation dominate while customer intimacy was pursued separately by expert tradesmen and guilds.
Product revolution	Continued focus on operational excellence and product leadership
Knowledge revolution	New focus on customer intimacy

Hierarchy of Business Intelligence

Realising the benefits from raw data goes through a number of stages as depicted in the following figure.



Data

The basic element of information in an organisation is in the form of data. Organisations collect, summarise and analyse this data to identify patterns and trends. Most of the data thus collected is associated with the functional processes of the organisation.

Information

Each data element is a component of a transaction and does not provide much information unless they are presented in conjunction with other data elements. The accumulation of data into a meaningful context provides information.

Analytic

The information gathered in the previous stage, although provides much insight, separating or regrouping this information and analysis extends the value of the information. Applications with analytical processing capabilities provide users with the ability to analyse information and determine relationships, patterns.

Knowledge

Knowledge is different from data, information or analytics in that it can be created from any one of those layers or it can be created from existing knowledge using logical inferences.

Wisdom

Wisdom is the utilization of accumulated knowledge to create a higher level of understanding of the data.

An example would help in understanding the distinction better. Mere numerals like 41, 42 are termed as data. This data, if read in the context of temperature would give an indication of the weather in that part of the world. The fact that these numbers indicate the temperature is information. Knowledge refers to the understanding that this temperature indicates summer. The decision to venture out or not in this weather, or an understanding of the effects of this weather is wisdom.

Definition of KM

There are as many definitions for knowledge management as there are people who are working on this subject. Given below, are some of the most commonly used definitions

KM is to understand, focus on, and manage systematic, explicit, and deliberate knowledge building, renewal, and application – that is, manage effective knowledge processes (EKP).

Knowledge management is knowledge creation followed by interpretation, knowledge dissemination and use, and knowledge retention and refinement

De Jarnett

Powerful environmental forces are reshaping the world of the manager of the 21st century. These forces call for a fundamental shift in organisation process and hr strategy. This is knowledge management

Taylor

Knowledge management is the process of critically managing knowledge to meet existing needs, to identify and exploit existing and acquired knowledge assets and to develop new opportunities

Quintas

The crux of the issue is not information, information technology. the answer turns out to lie more with psychology and marketing of knowledge within the family than bits and bytes

Peters

Knowledge management is the activity, which is concerned with strategy and tactics to manage human centered assets.

Brooking

"Knowledge management is about enhancing the use of organisational knowledge through sound practices of information management and organisational learning."

Source: Broadbent (1998)

"A learning organization ... is proficient at creating, acquiring, organizing, and sharing knowledge, and at applying this knowledge to develop its behavior, position, or objectives. [The essential goal of knowledge management is] ... to harness the organization's information resources and information capabilities to enable it to learn and adapt to its changing environment."

Source: Choo (1998a)

"The ultimate corporate resource has become information - the ultimate competitive advantage is the ability to use it - the sum of the two is knowledge management."

Source:** Oxbrow & Abell **(1998)

Systematic approaches to help information and knowledge flow to the right people at the right time so they can act more efficiently and effectively.

'Explicit and systematic management of vital knowledge and its associated processes of creating, gathering, organising, diffusion, use and exploitation of organisational objectives'.

Source:Knowledge networking - Creating a collaborative enterprise – David Skyrme

Thomas Davenport et all give a more comprehensive definition of knowledge management and it's implications.
' Knowledge management is concerned with the exploitation and development of the knowledge assets of an organization with a view to furthering the organization's objectives. The knowledge to be managed includes explicit, documented knowledge and tacit, subjective knowledge. Management of this knowledge entails all the processes associated with the identification, sharing and creation of knowledge. This requires systems for the creation and maintenance of knowledge repositories, and to cultivate and facilitate the sharing of knowledge and organization learning. Organizations that succeed in knowledge management are likely to view knowledge as an asset and to develop organizational norms and values, which support the creation, and sharing of knowledge.'

Understanding from definitions

- KM relates to both theory and practice
- Definitions are not predicated on information technology
- KM is multi-disciplinary
- People and learning issues are central to KM
- Technology is a useful enabler rather than a central tenet at the heart of KM.

Categories of Knowledge Management models

a. Nonaka and Takeuchi

These types of models categorise knowledge into discrete elements. Nonaka and Takeuchi look at the process of knowledge management as a knowledge creation process

		To Tacit	Explicit
From	Tacit	Socialisation	Externalization
	Explicit	Internalisation	Combination

The transforming processes are assumed to be socialization, externalization, internalization and normalization.

Critique of this model

The model implies a mechanistic approach to knowledge categorisation, which is over simplistic, and the process of knowledge transfer is far more complicated in organisations.

b.Hedlund and Nonaka – knowledge management model

	Individual	Group	Organisation	Interorganisational Domain
Articulated Knowledge	knowing Calculus	QC documented Analysis of its Performance	Organisation Chart	Supplier's patents
Tacit Knowledge	Cross -cultural Negotiation Skills	Team coordination in complex world	Corporate Culture	Customer's attitudes to products and expectations

This model assumes four different carriers of knowledge in the process of knowledge creation. This is an improvement over the previous model in that it identifies the carriers of knowledge, but assumes that the carriers can be segregated and identified.

c. Boisot model

Codified

Proprietary Knowledge	Public knowledge
Personal Knowledge	common sense

Uncodified

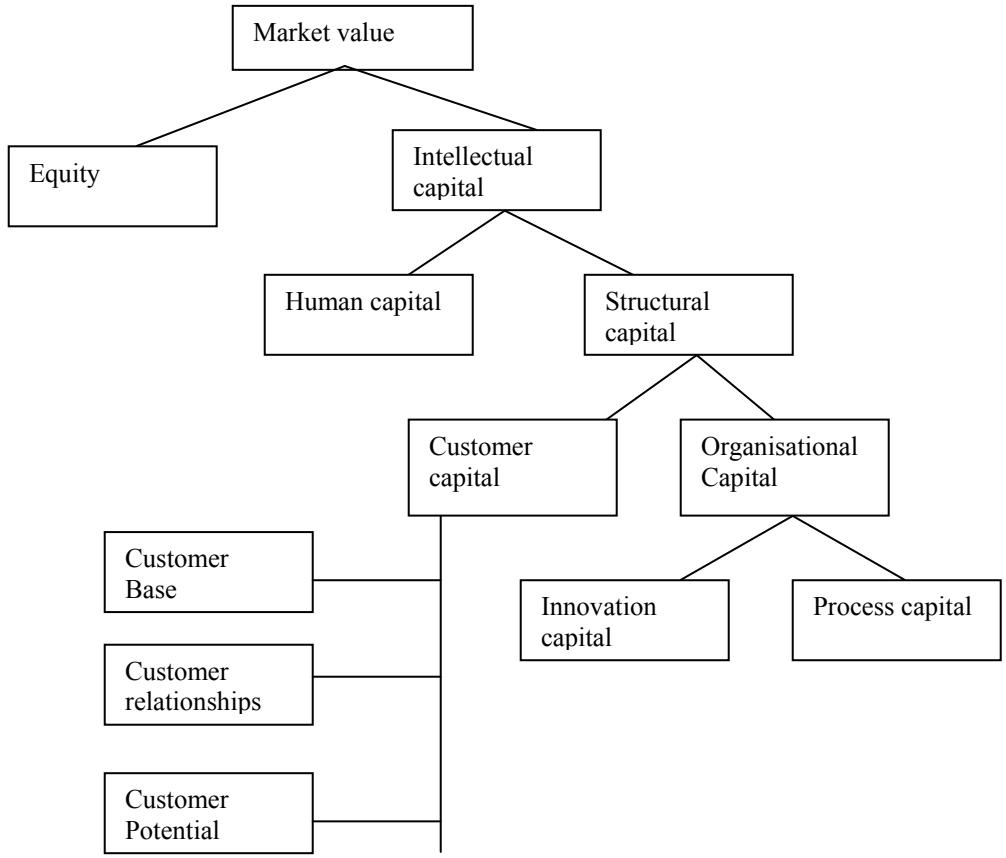
Undiffused Diffused

Codified - knowledge that can be readily prepared for transmission
Uncodified - knowledge that cannot be easily prepared for transmission
Diffused - knowledge that is easily shared
Undiffused - knowledge that cannot be easily shared

Critiques of this model point to the limitation in that codified and uncodified are two distinct and discrete categories of knowledge, which is generally not as distinct as portrayed. Diffused knowledge is rather general and is not clear if it includes incorporating knowledge within the organisation, as well as spreading it.

d. Intellectual capital models

These models represent knowledge management as intellectual capital. (e-g Intellectual model (IC) of Skandia IC)

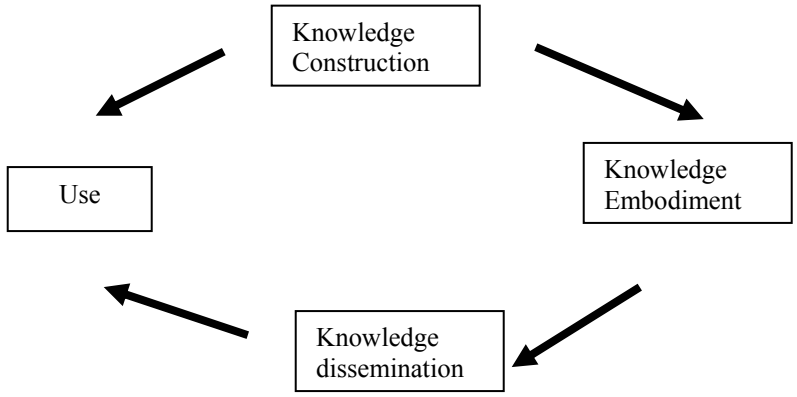


These models ignore the political and social aspects of KM. Moreover, intellectual capital models are generally mechanistic in nature, treating knowledge as an asset similar to other assets.

e. Socially constructed models of KM

This model views knowledge as intrinsically linked within the social and learning processes within the organisation. These models portray a more holistic approach to the process of knowledge creation.

Knowledge creation model - Demerest



This model emphasis the construction of knowledge within the organisation. This construction includes the social and scientific inputs. This knowledge in then embodied within the organisation through explicit programs and social interchange. This is followed by a process of dissemination of espoused knowledge throughout the organisation. Ultimately, this knowledge is seen as being of economic use in regard to the organisational outputs.

This model follows the generic process of knowledge construction of collection, dissemination and use.

Critiques of this model refer to the portrayal of discrete path of flow of knowledge, which is generally not the case, practically speaking.

Types of knowledge

Knowledge can be classified into various types. Authors have classified into various categories and are presented below

Tacit knowledge	Knowledge that cannot be articulated
Implicit knowledge	Knowledge that can be articulated but has not been articulated.
Explicit knowledge	Knowledge that is articulated and more often than not, captured in the form of text, tables, diagrams etc.
Procedural knowledge	Knowledge that manifests itself in the doing of something
Declarative knowledge	Knowledge that consists of descriptions of facts and things or of methods and procedures
Strategic knowledge	Knowing when to do something and why to do it

Principles of knowledge management

Knowledge management is expensive

Knowledge is an asset, but requires investments in other assets for effective management. The investments could be for the following activities

- Knowledge capture
- Categorisation of captured knowledge
- Developing information technology infrastructures and applications for the distribution of knowledge
- Educating employees on the creation, sharing and use of knowledge.

(Buckman labarotaries spend 7% of it's revenues on KM and Mckinsey and Co. spends 10% of it's revenues on developing and managing intellectual capital)

It is worth spending this, since it is more expensive to re-invent the wheel and create the available knowledge all over again. Non-availability of adequate and appropriate knowledge at the required time may also lead to loss of opportunities.

One way of finding out the cost of knowledge management is to estimate the cost of lack of knowledge management.

Effective management of knowledge requires hybrid solutions of people and technology

Effective use of people and computers are required to manage knowledge. Computers could be used to capture, transform and distribute highly structured knowledge that changed rapidly and people are used to understand the created knowledge, interpret it, synthesise various unstructured forms and data and analyse it. So an effective systems requires a hybrid knowledge management environment in which both the humans and computers in complementary ways.

Knowledge management is highly political

Knowledge is power and hence is associated with money, success, lobbying, back-room deals which manifest power. People who manage knowledge would lobby for its use and broker deals between those who have the knowledge and those who use it.

Knowledge management requires knowledge managers

Knowledge cannot be effectively managed unless it is delegated and controlled by a group of people who are responsible for it. The tasks of this group would be to collect and categorise knowledge, establish a knowledge oriented technology infrastructure and monitoring the use of knowledge.
Organisations like Mckinsey etc have knowledge groups headed by 'Chief knowledge officers'. Politics plays a major part in this when managers think that by virtue of managing knowledge, they are more knowledgeable than the others. The most important qualification for such a role is being 'egoless' as argued by one manager at HP.

Knowledge management benefits more from maps than models, more from markets then from hierarchies

Effective knowledge management is more to do with providing maps for existing knowledge rather than creating hierarchies of knowledge. They should be able to connect the client needs with the required information from the knowledge database.

Sharing and using knowledge are often unnatural acts

The normal tendency is reluctance to sharing of knowledge with the natural tendency being to hoard knowledge and look suspiciously upon that from others. One should be highly motivated to allow knowledge to be shared by the others and to be open to share other's knowledge.

Organisations like Lotus Development devotes 25% of the total performance evaluation of its customer support workers to knowledge sharing.

Knowledge management means improving knowledge work processes

In any organisation, knowledge is created through generic knowledge management processes, but knowledge is also generated, used and shared intensively in a few specific knowledge work processes like market research, product design and development. Improvements need to be made in these processes to have a more effective knowledge management in the organisation.

Knowledge access is only the beginning

The process of knowledge management does not mean having access to knowledge. In addition to access knowledge management requires attention and engagement. In order for knowledge consumers to pay attention to knowledge, they must be active recipients through summarizing and reporting to others through role playing based on the usage of knowledge and receiving the knowledge through close interaction with the providers of knowledge, more so, in the case of tacit knowledge.

Knowledge management process never ends

The task of knowledge management is a continuous process and can't be said to be fully managed.
One reason that knowledge management never ends is that the categories of required knowledge are always changing. New technologies, management approaches, regulatory issues and customer concerns are always emerging.

Knowledge management requires a knowledge contract

Most organisations cannot fix ownership or usage rights to employee knowledge. Management of knowledge requires a contract between employees and the organisation to ensure that the knowledge acquired by the employee during his tenure is captured and properly documented.

This assumes importance in the present day environment with employees moving more quickly to new jobs and new organisations.

Thomas Devanport

Knowledge management process

(Ryder – is in the business of providing truck fleets and transportation services)

The steps involved in the process of knowledge management are

- Knowledge creation

Nonaka and Takeuchi have mapped the knowledge creation process from the tacit and explicit knowledge available in an organisation.

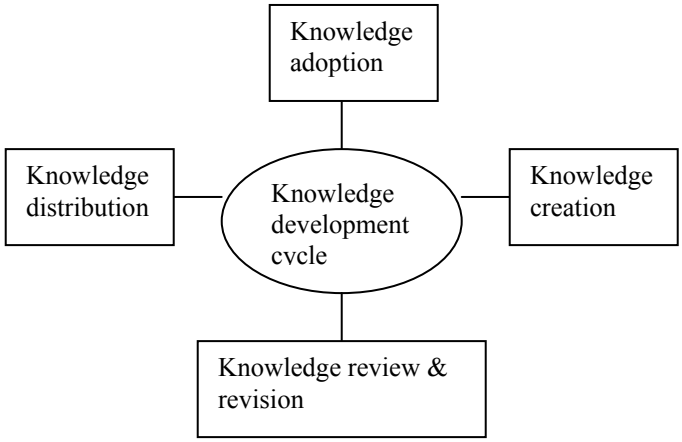
- Knowledge capture
  Most of the knowledge in organisations exists as tacit knowledge gained and built-up through years of experience. This knowledge has to be captured and stored in databases
- Knowledge application
  The knowledge created and captured through would then need to be applied to achieve competitive advantage.
- Knowledge measurement

Galagan proposes the following sample list of knowledge management processes

- Generating new knowledge
- Accessing knowledge from external sources
- Representing knowledge in documents, databases, software etc.
- Embedding knowledge in processes, products and services
- Transferring existing knowledge around an organization
- Using accessible knowledge in decision making
- Facilitating knowledge growth through culture and incentives
- Measuring the value of knowledge assets and the impact of knowledge management

<u>Knowledge Development Cycle</u>

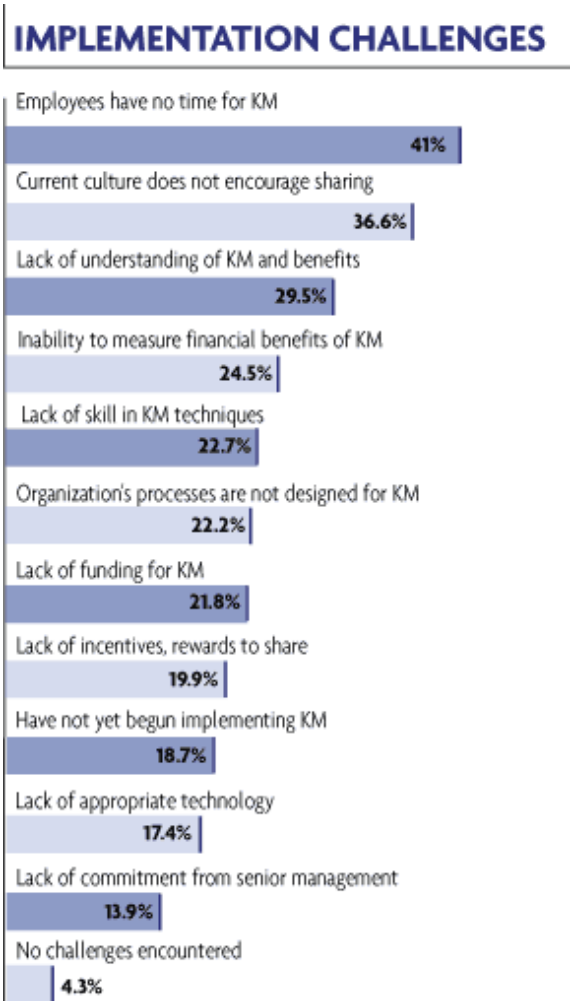
The knowledge development cycle is defines the knowledge management process in an organization, as a cyclic process from knowledge creation to knowledge review and revision.



The knowledge creation process involves the creation of new knowledge in the organization. This also includes activities like research and development, consulting, education etc.

The knowledge adoption process involves the adoption of created knowledge and adapting the knowledge.

The knowledge distribution and knowledge review and revision process involves the conversion of converting the individual knowledge to organizational knowledge.



Obstacles to KM Implementation

Lack of business purpose

Most organisations look at implementation of knowledge management program as an end in itself. Organisations need to look beyond implementation and to define ways of dealing with the pressing problems of the organisation using knowledge management.

Poor planning and inadequate resources

Many companies focus their attention on the KM pilot project and forget about the roll out. Organisations need to make the plan the rollout and the pilot plant simultaneously to avoid loss of focus on the mail roll out.

Lack of accountability

Knowledge management initiatives peter out if accountability is not fixed on persons to implement the initiatives and see the end of it. Typically, knowledge management programs could be implemented by a core team dedicated for the purpose.

Lack of customization

Knowledge management is not a one-size-fit-all program. It works best when individual programs are tailored to the need of the individual users. It should also fit into the organisation culture.

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R Suresh

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Islamic Worldview on Knowledge Management: Implication for Muslim Education System

Shafeeq Hussain Vazhathodi Al-Hudawi,
Mohammed Borhandden Musah and Abdul Rahim Hamdan

Faculty of Education, Universiti Teknologi Malaysia, Johor Bahru, Malaysia

Abstract: In modern times, 'knowledge' is understood as cognitive, subjective and as an ever evolving concept. In contrast, knowledge in Islam is conceived within a 'certain' worldview, i.e., Islamic Worldview (IW) set by the authentic sources of Islam; the Holy Qur'an and the authentic collection of Prophetic traditions. Within this worldview, the concept encompasses spiritual, intellectual, moral and ethical, psycho-social, civilizational and developmental dimensions of human life. This paper aims to present a framework grounded in the IW for 'knowledge' creation and management, with special reference to the Muslim Education system.

Key words: Islamic Worldview · Structure of Islamic Worldview · Knowledge management · KM in Muslim Education system

INTRODUCTION

The concept of knowledge has been debated at many critical points in the history of education [1]. In the contemporary context of abundance and increased velocity of information and the modern technological advancements and post-modernist trends, the concept of knowledge is hotly discussed since it is understood ever evolving cognitive, subjective, 'non-transcendental, non-directional and non-rational' [2-5]. This poses a dilemma for Muslims for they understand 'knowledge' within the paradigm of certitude and truth and they draw a 'distinction between the 'universal and the absolute and the local and relative' [6]. It is in this context that concerns regarding how to manage voluminous 'knowledge' created and accumulated by humans through their intelligence and imagination have become extremely important to them. This is significant when discussing the system of Muslim education. Hence, the first part of this paper defines knowledge management (KM), its characteristic and strategies. Second, it presents Islamic worldview in terms of its dimensions. This paves to the key purpose of the papers which is to briefly discuss the theoretical and conceptual basis for developing a framework for KM based on Islamic worldview. This is the main part of the study. Third, the paper suggests to the means of translating the framework to the Muslim Education system. The approach of the paper is basically conceptual and descriptive.

Knowledge Management: There are many definitions of knowledge management (KM). Yet there are many approaches to KM depending upon the contexts where 'knowledge' is being managed, as in learning and teaching, banking, military, political and other sectors. At the most basic level, when defined from a process perspective, KM is a set of processes that helps to improve the capturing, sharing, storing and retrieving of knowledge for its functional purposes [7]. The end result of KM 'functional purpose' is imperative due to the fact that it "… can lead to the achievement, stability and maturity in society …" [8] Beside this, KM has been variedly studied from technical and social perspectives as well. From the technical view KM is about managing and developing tools such as Internets and other IT facilities through which organizational members can capture, share, store and retrieve data and information [9]. For social perspective, KM is about facilitating organizational and behavioural change and developing human resources required to achieve knowledge management [10].

Both the process and social perspectives focus on the functional aspect of creating and applying knowledge and on the needs to share distinctive knowledge [11]. Thus, KM can only be viewed from a diversity

Corresponding Author: Shafeeq Hussain Vazhathodi al-Hudawi, Faculty of Education, Universiti Teknologi Malaysia (UTM), Skudai, 81310 Johor Bahru, Malaysia.

perspective rather than a universality perspective, because it is people, not systems, who manage knowledge and for different functional purposes [12]. This is very true of the traditional KM strategies where the application of knowledge "begins with users and also ends with users" [13]. Without understanding people and their culture and contexts, knowledge cannot be managed satisfactorily [10]. How people manage knowledge and what strategies they utilize are influenced by human limitations and situations. General and personal limitations of people, as well as the collective culture and heritage of the society or organizations that they work with affect the means and ways they manage 'knowledge'. Then what is knowledge? What underlies the concept of knowledge?

Knowledge: Knowledge refers to mean a fluid mix of 'insights, understandings, experiences, contextual information and the practical know-how' that provides a framework for evaluating new information [14]. It is accumulated over experience, through which one can understand the underlying patterns and principles, so that it can be put in context and combined and applied appropriately resulting in wisdom [3]. This understanding is tacit and intangible and thus knowledge is tacit and intangible. It is the end result of data-information-knowledge continuum, where people process them with the help of tools and technologies (see Figure 1).

Neil Fleming (nd) gives an apt description of what data, information, knowledge and wisdom are in Figure 2. Data are 'just a meaningless points in space and time' or disjoined facts. People process 'data' by 'finding a way to attribute meaning to them by associating it with other things [15]. Thus, when data is organized and related to each other they are turned into 'information' [15].

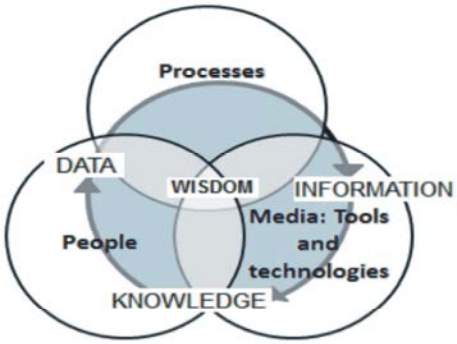

Fig. 1: KM continuam [7]

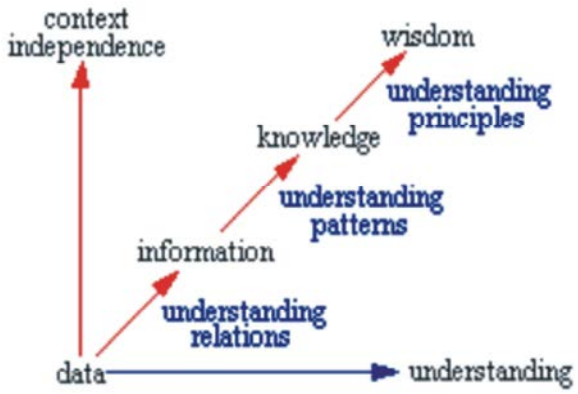

Fig 2: KM Elements in Perspective [20]

Knowledge is the interpreted information. People interpret information to create knowledge. People utilize the patterns that already reside in them when creating knowledge of various bits of information. Thus, as summarized by Sajjadi,

"Knowledge is dependent on and based on information and it is the transcendent stage of information. Although information and knowledge are related, information per se contains no knowledge; however, knowledge can contain information." [16].

According to Fleming (1996), 'wisdom is even more so than knowledge and wisdom arises when one understands the foundational principles responsible for the patterns representing knowledge…" [14, 5]. He prefers to refer to these foundational principles as 'eternal truths' [14], whereas in the organizational setups it is also called as 'organizational intellect [17]. Such a wisdom or intellect is key assets and resources to the organization and a successful management of them helps organizations to deliver value-added services and products. Throughout all these exercises of making relations, finding out patterns and principle, human beings engage in a key human process called 'ratiocination' [18]. The logical coherence achieved through ratiocination make the knowledge possible to be "applied to the real life situations and problems for the evaluation of one's perception about his/her conclusion about the world" and the purpose of living [19].

KM thus brings together three core organizational resources- people, processes and media in tools and technologies- to enable organizations to use and share data-information, knowledge and wisdom [7]. Any of these three organizational resources can be ignored, 'but only at great cost to the organization and to those within it' 7[6].

In a business context, achieving the organizational mission is central to why such an organization is keen to manage its organizational knowledge. In the process, people in the organization might have already developed a big chunk of knowledge. They create this knowledge by interacting with each other and with the sources of knowledge and through experiences. And the byproduct of this human interaction is 'the human knowledge, which is the source of wealth for these organizations' [7]. Thus, 'familiarity with both the concept and context' where knowledge 'normally belongs' is much required when defining the concept of management and creation of knowledge' [21]. This emphasizes the social dimension of knowledge creation and utilization where primarily the focus is not on the individual process, but more on the participative and collaborative process [22].

Thus, there is a sequence and continuity as people progress along the continuum and as their understanding develops. What technologies and tools do is the media part or just facilitation of the processes. Technology provides people with easy access to data, so that they figure out the relations and patterns and principles that underlie in the sequence where data are converted to information and that to knowledge and ultimately into wisdom.

So, in summary:

- Data are disjoint and discrete facts
- Information relates to description, definition, or perspective (what, who, when, where).
- Knowledge comprises strategy, practice, method, or approach (how).
- Wisdom embodies principle, insight, moral, or archetype (why).

When dealing with the Muslim Education (ME) which is the focus of the discussion of the present article, the data, information, knowledge and wisdom need to be seen from the 'faith-based' perspective and within the particularity of Islam. 'Familiarity with both the concept and context' of knowledge within this particularity is *sine quo none* to those managing institutions that cater for educating Muslims [21, 24]. Outside this context, the unequivocal religious facts and figures are just data to its first informants. They turn to be information, when these links are understood. Information is so much elastic and confusing and thus can be unworthy of attention unless they are interpreted based on the underlying patterns that form the links and relations. Thus, information turn into knowledge; and when that is done based on the principles underlying the patterns they become wisdom.

Although data as such, be it religious or not, are true and real, but do not make sense, are meaningless, dry and uninspiring unless data sets are related to each other and unless the 'links' among them are explored. However, there is a 'natural, but distinct relation' between those pieces of data and information related to 'faith' and this relation is determined by the factor called 'religion'. This makes the religious facts and information distinct from scientific data. Nevertheless, this fact in itself does not negate the requirement on religious facts and information that one should know them or 'cognitively process' them in the most reliable manner. Rather, in the faith-based context, the relations, patterns, principles are also decided by the religion; and they also require cognitive comprehension. This is because, a Muslim man or woman needs 'willpower' supported by his/her 'rational' power, in order to be able to submit, his/her feeling, thoughts and behaviour, words and deeds and action and aspirations willingly and whole-heartedly to the Almighty Allah [24]. It is knowledge that creates this willpower and rational support. In the words of Osman Bakar (1991),

the unity of *'ilm* and *îmān* is so well established in Islamic *Weltanschauung* that the customary notion of dichotomy of belief and knowledge, prevalent in the West, is not tenable within the Qur'anic framework. The nature of the Islamic faith is such that the distinction between knowing and believing is rather blurred…. [25].

This is particularly relevant to education institutions and very particular to those providing for the ME. Before venturing into that, the following section elaborates on KM in education, thereby leading the discussion to the concept of education in Islam and its relation to ME.

Knowledge Management in Education: In the post-modern times, phrases like 'knowledge-based society, knowledge-based economy and knowledge-worker' are so commonly used, thereby implying the top priority given to education in every country. Education is about the growth and development every individual potential in the most balanced manner, thereby contributing to the development of economy, power and prosperity of any country and well-being of its people. Knowledge and its transmission, reconceptualization and reproduction for functional purposes are the core of this education

process. Knowledge is the key asset to the educational institutions. But how would educators remain abreast of many external and internal demands for accountability and improvement in education, such as effective student assessment, value-added issues and a wide variety of changing standards in curricula and pedagogical methods while they are on the perils of information overload. This is the *raison d'être* that the educational institutions need to be adaptive to the 'information culture' as well as effective and innovative Knowledge Management Strategies (KMS).

In education, thus KM can be described as a set of practices that helps to improve the use and sharing of data, information, knowledge and wisdom in value-based, reasoned decision-making, especially with regards to enhancing student learning and development. Thus, in the education process, 'knowledge' is managed deliberately and in a purposeful manner, where significant contexts in terms of the unique and particular indigenous culture and ethical beliefs of the learners are not put aside [3, 10]. Thus, KM as such cannot be argued to be a new concept, for that is what educators do when they plan, design, implement and evaluate curriculum.

As Hebert Kliebard (1975) critiques, 'to determine what subjects should be taught we must already know what those subjects ought to be' [26]. That is, when educators decide upon what knowledge (subject-matters) are to be taught and how best they can be learnt by the student, they are actually making reasoned-judgments.

In short, in the education process, 'knowledge' is valuable information or values and insights emerging of human minds; knowledge is about beliefs, commitment and action; knowledge is truth, beliefs, perspectives, judgment, know-how and methodologies [27]. Without understanding the people, therefore, knowledge cannot be managed satisfactorily, because 'knowledge affects thought, behaviour and civilizing effectiveness or (in the case of lack of knowledge,) ineffectiveness' [28]. Add to this, the personal and social dimensions of knowledge-creation mentioned above which promptly suit the faith-based knowledge creation as happens in the ME context. These are mostly in contrast with the concepts of knowledge 'predominantly embedded in western philosophy and values', which 'tend to ignore the growing multicultural nature of educational institutions' [29]. This is especially true about how 'knowledge' is conceptualized in the mainstream KM literature, which has developed from the Western point of view. Rather, as indicated by the definitions of knowledge mentioned above, even within the intellectual and ideological traditions of Western society itself, there are different assumptions regarding the nature of man and society [30]. To put it short, the culturally embedded theories and practices influence the practice of 'knowledge' management [10]. In this regard, it is essential to identify the epistemic beliefs of Muslims with regards to the concept of knowledge, its sources, nature, purpose and the methods of acquiring and managing knowledge. The Qur'anic Sciences (QS) and Muslim Education (ME) is the core of this process.

The Qur'anic Sciences and Muslim Education: The Holy Qur'an as the foundational text and the Qur'anic education as the fundamental element of educational system at every level of Muslim education remain as such due to the fact that Allah, as the Origin of everything in the universe including the human beings, has better knowledge of every minute thing about His creations. His knowledge about them is unique 'in certitude,' and thus QS are ranked the most high. This is monolithic about what Muslims beleive.

Human beings need this knowledge due to the fact that, they need to nourish the transcendental and spiritual, which are essential component resident in their body, i.e., the soul. Another reason is the grandness of the responsibility of man as a servant (*abd*) and vicegerent of Almighty Allah *(khalifah)* on the earth, which is also due the presence of the spiritual soul. The revelation, thus, provides a system of beliefs, which is a direct and immediate disclosure of what God wants man to realize on the earth.

Furthermore, the Qur'anic Sciences (QS) fundamentally make the knowledge of the reality outside the sensual and physical world more understandable or intelligible to humans, so that they make meaning out of it. Subjects such as the existence of God, what is the being, what is freedom and what is the truth, what is soul, what are the destiny and the role of humans, what are the major virtues and so on, are all well-defined subject matters included under the spectrum of the QS [31]. They are simultaneously formative and 'normative'; formative in the sense they 'form' the course of the human history, giving them meaning, purpose, directions and inspiration to further investigate the physical, natural and intellectual spheres of knowledge, essentially directing them towards decisive aims and goals; normative in the sense that they set the norms on higher truths that are transcendental and spiritual. They establish certain spiritual, moral and ethical codes for humans and their interpersonal dealings and transactions.

Practically, this denotes the prior-most place of the QS in determining the parameters and criteria of the foundational principles in various disciplines under intermediary human sciences, physical, natural sciences. The spectrum of Revealed Sciences (RS) is spiritual, metaphysical and transcendental. However, since it is humans who make meaning out on the transcendental realms for practical and applied purposes, there is the second group of sciences called Internediary Human Sciences (IHS).

The Intermediary human sciences investigates the implications of the Revealed sciences on man, his family and the society. They establish certain spiritual, moral and ethical codes for men and their interpersonal dealings and transactions. However, at the applied and practical levels, the intellectual knowledge is of tentative truth and always to be judged in the light of the RS.

Then, there is thePhysical and Natural Sciences include sciences such as physics, astronomy, biology and abstract sciences such as mathematics and logics, whose subject matter is nature [31]. They investigate the physical reality, not the spiritual or metaphysical reality. The Holy Qur'an repeatedly encourages humans to reflect upon them, in order to acquire its knowledge', not as independent intellectual exercise, but in the name of his Lord, because all the laws of nature are placed into it in such an intelligible manner that they also point to the transcendental realm covered by the RS.

In broad terms, thus, there are three categories of knowledge sources, i.e., (a) Revealed, (b) Intermediary Human and (c) Physical and Natural sciences [32]. Thelatter two sources of knowledge indicate another key principle that, caring for the spiritual values does not mean the suppression of the biological or social needs [33]. Together they comprise 'all possible avenues of reflective, contemplative and imagery methods of acquiring knowledge.' The hierarchy and rank of 'knowledge' under each source is determined by their degree of contribution to the perfection of man's knowledge of God and to 'the perfection of the soul to the point of being God-like, either directly or indirectly' [34]. The Holy Qur'an has well manifested this unitary character of all knowledge, for it calls its verses *āyāt* (sing. *āyah*) as well as the signs of nature as *āyāt* (signs). Both are 'signs' pointing to the same source and originating from the same source [34].

Figure 3 summarizes these points and denotes the 'unitary consistency of the Islamic worldview' and by extension, the unitary and holistic nature of Islamic education.

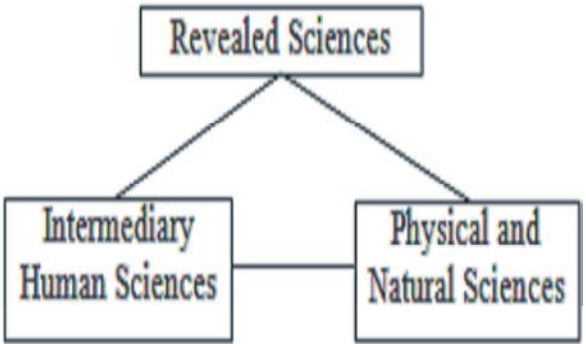

Fig 3: Knowledge in Islamic Worldview [35]

To summarize, these elaborations suggest to the wide and extensive scope as well as complex nature of the QS and ME. The Holy Qur'an thus presents Islam, not merely as belief or faith system, rather as a faith-based way of life, where faith works in the life. Faith sets the foundations for how to lead the life, thereby casting various dimensions of human life within a certainty paradigm. To put the above point succinctly, within this Islamic Worldview (IW), a Muslim should develop the idea of 'knowledge' within the purview of 'faith structure,' and thereby providing universal and objective code of 'virtues' which humans need to personalize and realize in the psyhco-social and civilizational dimensions of practical life. Thus, in total, there are five structures within the Islamic Worldview (IW): the faith, knowledge, virtue structures which are the theoretical and conceptual foundations of IW, whereas the Psycho-Social and Civilization structures are applied and practical foundations. Essential concepts, themes and practices related to 'knowledge' as well as the relation, pattern and fundamental principles under each of these five domains or dimensions, therefor should be regulated by the criteria and parameters of the Holy Qur'an and the Prophetic tradition, where the latter is the interpretation of the former.

The Dimesions of Islamic Worldview and the Islamic Framework for Knowledge Management: A brief description on the five dimensions is subsequently addressed here to point out how 'knowledge' with reference to each of these dimensions is conceptualized and what are the core principles that form the pattern and links among them which in turn should be done through a collaborative endeavour made collectively by a group of Muslim theologians, *Sharî'ah* scholars, various subject/domain specialists, educationists, curricularists and social and human scientists, practitioners having knowledge and experience in Educational system and

Information Technology and others. In other words, KM with regards to the educating Muslims is rather collective than individual effort. A framework developed in collective manner, principally should promote, not a fragmentary or compartmentalized approach to knowledge, but the most balanced, integrative and progressive approach as enshrined by those fundamental principles, concepts and themes contained with these five structures of IW. In this regard, we should be very mindful that Qur'an was the starting point of Almighty Allah's '*ta'dib*' of the Holy Prophet Muhammad (PBUH); it was the only 'text' with which he started educating his companions. The Holy Prophet nurtured an ideal Islamic society within the shadow of the Holy Qur'an and the Divine Wisdom, highlighting the ultimate purpose of human life. Hence, the role of scholars at the *Suffah* School, according to Açikgenç (1996), was at once cognitive (intellectual) and affective (spiritual) [31]. They had to comprehend the Qur'anic message in its original form and then they had to apply it in purifying their souls. At once, the Holy Qur'an was guidance and motivation for reflection on theirown nature and the nature of the universe. The message of Islam was not 'just emotionally and spiritually satisfying' but also 'intellectually fulfilling' [36]. This is why the Holy Qur'an has been and continues to be the core of the 'veritable Islamic Educational System' [37].

The Faith Dimension: Faith (*îmān*) is the core subject dealt in the Holy Qur'an. The Holy Qur'an discusses faith in the human context. Muslims are obliged to have an indelible and unflinching faith in Almighty Allah and other higher truths that they are reverberated in their inner belief, thoughts, attitudes, behaviours, rituals and external actions, deeds. This denotes that faith is essentially intellectual and spiritualin nature…." [18]. Faith should not remain at the level of confession only, but should remain as dynamic and inspiring but as the unifying and integrating factor. This justifies why, in early Islamic history, the Holy Prophet enormously emphasized on consolidation of Islamic faith in the minds of new believers, thereby elaborating the meaning of life [31].

The Knowledge Dimension: Instilling faith in the minds of students in a way the most inspiring and motivating manner is indispensable to the educational endeavour in general and the ME in particular. This necessitates a thorough and in-depth knowledge of its various elements of the faith structure. Thus, knowledge is not only an essential condition of healthy faith, but also in realization of faith in character and behaviour of students. Thus, knowledge is the second fundamental structure of IW. This realization on the other hand, point next structure of IW, i.e., the virtue.

The Virtue Dimension: Simply, virtue functions as criterion and means of deployments and enacting of the faith principles, which is the goals of human life; and consequently, the goal of education. That is, the pursuit of knowledge about Absolute truths and about the human, physical and natural sciences is useless devoid of any creative and constructive purpose and unless they are put into practice. They are points of reference having implications on "man's relationship with God, humanity and the universe" [38]. That is, values are appreciated not as norms, but rather for their 'formativeness'. They import certain meanings to this relationship. The Attributes of Almighty Allah, for example, are not regarded as just some metaphysical theories, but for their creative influence on 'forming' and nurturing the character and attitudes of man.

Various virtues required for protection and preservation of the five essential fundamentals; *dîn* (religion), *nafs* (life), '*aql* (intellect), *nasl* (progeny), *māl* (property) and *ird* (honour), therefore, should be imparted according to their place in the hierarchy and once again they are determined by the Qur'anic criteria and parameters [39]. That is, the Islamic conception of a successful and virtuous life develops so closely to its concept of faith.

To put the above point succinctly, within this Islamic IW, a Muslim should develop the idea of 'knowledge' within the purview of 'faith structure,' to be authenticated in its 'virtue-structure' and realized within the human and civilizational structures.

The Psycho-Social Dimension: This dimension of IW summarizes the Islamic viewpoint on humans; the various spiritual and physical components in them, the nature and ultimate purpose of human existence on the earth. They are subservient to the first three foundations and they examine various psychical, social, political, economic principles related to the utilization of individual and collective potentials for the wellbeing of the individual, family and the humanity at large.

This dimension corresponds to the concept of man as servant and vicegerent of Allah on the earth ('*abd* and *khalîfah)*. The ME therefore should stress the personal or individual scope of education to meet the spiritual, intellectual and psychic needs of man.

The human exemplification of this is historically preserved in the life, activities and saying of the Holy Prophet Muhammad (PBUH), which, can be emulated as the perfect model that the educational institutions can project as their end product [40, 37].

The Civilizational Dimension: Humans live in the physical world and among other members of the society where the principle related to the first three foundations being materialized earlier. In order to facilitate this process, Almighty Allah has succumbed *(taskhîr)* the physical and natural resources for man; for his consumption as well as their effective utilization for the overall human welfare [33]. Thus, an engaging positive vision of the Islamic perspective of progress, development and reform should be developed based on the IW. To be more specific, this dimension stresses the wisdom behind striving for material advancement. It is all about struggling for creating an attachment to morality and awakening the moral consciousness among the people.

These five key dimensions; faith, knowledge, value, man and life correspond to the five essential principles; faith, life, intellect, progeny, property and honor, basically at theoretical, applied and practical applications. But, how to translate these dimensions and essential principles enshrined in them into lived experiences? How could we maximize the benefit of such a paradigm in the civilizational and developmental planes, especially utilizing the Instruction Technology platforms? The Holy Qur'an being the essential core through which the above mentioned five structures get to be conceptualized and thereby applied in the actual life, the ME at different levels of educational ladder should be strategically planned and manned.

As such, inevitably the educational institutions and centres providing for ME should make concerted efforts (1) to further developing the framework and (2) to device their curriculum for all the levels to effectively make the learning experiences of the Holy Qur'an authentic, meaningful, integrative, value-based, challenging and active ones [41]. For example, at pre-school levels, the interest to learn Arabic alphabets needs to be imbued in children. Knowledge already available in the field of Educational Technologies (ET) hence needs to be tapped well, but without failing the spirit enshrined within the framework of IW. In the school level, children need to be introduced to basic facts and their interest should be kept alive so that at the next level they are introduced to the relations that link between them. This is much mandated in the pervasive influx of the Western-centric education system, thought system, way of life and worldview of uncontrolled material progress and development. We should not choose to remain in the periphery, for we are 'the best ever produced for mankind'. The criteria of the best Ummah ever produced for mankind is that they enjoin good and forbid evil and believe in Almighty Allah [42].

That means, it is 'ideas and teachings of the Holy Qur'an and the Holy Prophet should become guides and references while delineating any key term such as reality, knowledge and virtue. To put it more explicitly, all the five dimensions, independently as well as coherently as one architectonic whole provide epistemological foundations and principles which set parameters and criteria to the concept of 'knowledge,' knowledge creation, management, management strategy, sharing and all other related concepts such data mining, information retrieval etc.

Such a framework develop on the Qur'anic criteria should present a blue-print and roadmap for every endeavour in Muslim education. It is in this regard, the article calls the institutions and centres providing for ME at various levels to adopt an enlightened vision, that is to mould a community of religious scientists, who would focus on integration of the moral and the intellectual ideals, which made the early Muslims to be very successful to establish themselves in a very short time [31].

CONCLUSION

Given Islamic point of view as the focal concern, the paper concludesthat 'knowledge' although theocentric in essence is anthropocentric from realistic and practical terms. Hence, it is essential that when various concepts, models and practices in KM adapted to fields such as ME, first, they are understood for all its consequence, positive and otherwise, second conceptualized within purview of the Qur'anic Framework for the purpose.

This is in line with the finding of Waseem (2013) where in contrast to the traditional KM, in Islamic knowledge management (IKM) the application of KM strategies "starts with knowledge resourses for the purpose of user development and then ends up with the source of knowledge… where all knowledge understanding (KU) and output (OK) should be a reflection of knowledge source (KS)" [43]. In this regard, this paper presents an outline for the Qur'anic framework grounded in the Islamic Worldview for KM in the educational settings.

The paper does that only in general terms, for the authors realize that it cannot be done in an individual manner. Therefore, the authors call institutions providing for the Muslim Education to initiate concerted collective effort to gather various related scholars to develop such a framework and means of practically implementing in a collective effort (ijma').

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LECTURE NOTES

ON

KNOWLEDGE MANAGEMENT

Dr. Rehmat shah
Assistant professor

Department of education
Virtual university of Pakistan

The objective of the course is to provide the basics of the emerging area of Knowledge Management to students. This course through light on few important concepts as Knowledge management and Information Technology, Knowledge process, etc.

1. **The Knowledge Economy**: Definition, scope and significance of Knowledge Management, Techniques of Knowledge Management Difficulties in Knowledge Management, Principles of Knowledge Management, Leveraging Knowledge, Data-Information-knowledge-Wisdom relationship, Organizational knowledge, characteristics and components of organizational knowledge –Building knowledge societies- Measures for meeting the challenges of implementing KM programmes.

2. **Essentials of Knowledge Management**: Basic types of Knowledge, Organisational Knowledge Management-Organisational knowledge types- Organisational knowledge capital- Organisational knowledge classification - Knowledge Life cycle- Organisational knowledge sources- process, Knowledge Conversion - Organisational knowledge progression - Organisational knowledge management – Technology Enablers - Ogranisational Human Capital – Organisational, Meta Knowledge

3. **Implementation of Knowledge Management**: Discussion on Roadblocks to success,10-step KM Road Map of Amrit Tiwana, Business Intelligence and Internet platforms, web Portals, Information Architecture: A three-way Balancing Act, KM, the Indian experience, Net Banking in India, The Mystique of a Learning Organisation.

4. **Knowledge Management and Information Technology**: Role Information Technology in Knowledge Management Systems, Knowledge Management tools, Creative effective Knowledge Management Systems through Information Technology, E-commerce and Knowledge Management, Total Quality management and knowledge management, Bench marking and Knowledge Management

5. **Future of Knowledge Management and Industry perspective**: Companies on the road to knowledge management, Knowledge Management in Manufacturing and service industry, challenges and future of Knowledge Management.

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_ Knowledge management, A Thothathri Raman, Excel books

UNIT-1

Knowledge management (KM)

Definition:

Knowledge management (KM) is the process of capturing, developing, sharing, and effectively using organizational knowledge. It refers to a multi-disciplinary approach to achieving organizational objectives by making the best use of knowledge.

- **KM Strategy:** Knowledge management strategy must be dependent on corporate strategy. The objective is to manage, share, and create relevant knowledge assets that will help meet tactical and strategic requirements.
- **Organizational Culture:** The organizational culture influences the way people interact, the context within which knowledge is created, the resistance they will have towards certain changes, and ultimately the way they share (or the way they do not share) knowledge.
- **Organizational Processes:** The right processes, environments, and systems that enable KM to be implemented in the organization.
- **Management & Leadership:** KM requires competent and experienced leadership at all levels. There are a wide variety of KM-related roles that an organization may or may not need to implement, including a CKO, knowledge managers, knowledge brokers and so on.
- **Technology:** The systems, tools, and technologies that fit the organization's requirements - properly designed and implemented.

- **Politics:** The long-term support to implement and sustain initiatives that involve virtually all organizational functions, which may be costly to implement (both from the perspective of time and money), and which often do not have a directly visible return on investment.

Scope of knowledge management

Companies are making their choices regarding the scope of programs and problematic within knowledge management. Decisions are made that lead companies to navigate in some parts of the knowledge management domain while neglecting others (Despres 1999).

There are 3 contexts of knowledge: individual, group and organizational and 5 different activities involved in KM:

1. Scan /Map;
2. Capture/Create;
3. Package/Store;
4. Share/Apply;
5. Transform/Innovate.

Literature in the field presents some known regions of practice within knowledge management including,

- Business Intelligence
- Benchmarking
- Competencies
- Employee development
- Data Warehouse
- Virtual teaming
- Innovation /Creativity,

a) People and their behavior inside the organization:

Several studies showed that the missing ingredient in many KM systems is not the technology, but people. What most companies overlook is not hardware or software, but the so-

called “wetware” (Davenport 1999). Even if typical wetware architecture for successful data-to-knowledge transformation cannot be determined.

b) the knowledge management process:

Knowledge management is the management of corporate knowledge that can improve a range of organizational characteristics by enabling an enterprise to be more “intelligent acting” (Wig 1993). It helps the organization to find, collect, select, organize, disseminate and transfer information and expertise. The importance of knowledge management for a company highly depends on how knowledge intensive is the area - the consulting companies being the best example of knowledge-intensive activity.

c) the management practices:

Knowledge management requires commitment from senior management. They must understand who has knowledge – in order to support systems for its creation and application, where knowledge resides, which knowledge needs to be shared, with whom, how and why. Without their support, no knowledge management system could meet its requirements. It must be clearly understood that successful knowledge management does not depend on new software tools, but on a new perspective to link the pieces of information that promotes understanding and accelerates action.

d) the culture of the organization:

The corporate mindset- the company comes first, and people are fortunate to have a job - prevents people from sharing and disseminating their know-how, trying to hold onto their individual powerbase and viability. On the contrary, in an open organization, incentives are built around integrating individual skills and experiences into organizational knowledge. The company is seen as being made up of individuals – each of whom is important for the company, because of his different capabilities and potentials.

e) technology employed:

There is a large range of IT utilized to support knowledge management systems, including desktop videoconferencing, document management systems, intranet-based webs, relational database management systems together with ODBC and SQL, object oriented database management systems, artificial intelligence tools, information retrieval engines, help-desk

applications, data warehousing and data mining tools, groupware and workflow systems, authoring systems, push technologies and agents, brainstorming applications.

Significance of knowledge management:

Intellectual component of products and services gains in significance, so knowledge management development in organization also starts to become a priority. Possibility of managing the knowledge is becoming more and more important in modern economy. Knowledge creation and expansion in modern organizations become a key factor in achieving and sustaining competitive advantage. In fact, the level of firm's knowledge how effectively firm uses that knowledge and how fast firm gain the knowledge, create sustainable competitive advantage. (Davenport, Prusak, 2000, p. 15) Modern organization, in the era of knowledge, is the one, which learns, memorizes and acts on the basis of the available information and knowledge on the best possible way.

1. Production ability:

Many companies know only one thing to do - to produce products and provide services. Now, they have to do it with proper use of knowledge in appropriate structures and processes. So it means that companies, with effective use of knowledge, have to provide constant control of complex business processes, harmonization of suppliers network and the most effective and cheapest way for product to reach the final customers.

2. Ability to make fast response:

Large number of companies, which successfully keep their places in the top of competitive environment, believe that the key of their success lies in fast response to the changes and requirements of the market. One way to be able to respond properly is connection with customers' needs and creation of business units, where every unit will cover specific segment of the market. These business units provide decentralization of authority, so every unit can faster bring decisions about how to react on changes on the market.

3. Ability of prediction:

If company wants to be truly successful it has to be capable to perceive business environment as whole picture and not only to respond to the trends, but also to predict them.

4. Ability of creation:

Companies constantly have to search for the new ways to maintain their competitive advantage. It depends on their ability to create knowledge and to create it on different ways by producing new products or technologies, using existing knowledge on the new manner or acquiring fresh knowledge about the clients.

5. Ability of learning:

The book "The fifth discipline" by Peter Senge popularizes concept of learning organization. Learning organization is the organization that encourages continuous learning and knowledge generation on all levels and which developed ability for constant learning, adjustments and necessary changes. In that kind of organization, employees manage the knowledge by the constant adoption and exchange of knowledge with each other. In learning organization employees are ready to implement knowledge in making the decisions or doing business.

6. Ability to last:

Knowledge workers will have crucial role in knowledge economy. Companies will have to adjust to the employees' possibilities to require better work conditions and bigger autonomy. Firms will have to develop ways to revitalize and they will achieve that by constant update and regeneration of employees' knowledge.

Techniques of knowledge management

For any teaching and dissemination there is a need to recognize the applicability of different levels of teaching required. In this case, knowledge management at the strategic level requires the organization to analyze and plan its business in terms of the knowledge it currently has and the knowledge it needs for future business processes. At the tactical level the organization is concerned with identifying and formalizing existing knowledge, acquiring new knowledge for future use, archiving it in organizational memories and creating systems that enable effective and efficient application of the knowledge within the organization. At the operational level knowledge is used in everyday practice by professional personnel who need access to the right knowledge, at the right time, in the right location.

1. Knowledge Development Managers:

It needs a strategic perspective on all knowledge assets. They need to understand the current state of the assets and to form a vision of how these knowledge assets could be improved or utilized to move the organization forward.

2. Knowledge Developers:

It needs a comprehensive understanding of individual knowledge assets. They need to understand all the processes, roles, rights, and constraints associated with each knowledge asset, so that they can represent everything that may be relevant when describing or applying that knowledge asset.

3. Professional Personnel:

It need to know about the existence of relevant knowledge assets and must understand how to apply them at the operational level. This paper focuses on the techniques we employ for managing knowledge within the organization.

- the techniques that have been used previously from business management, for example, SWOT (Strengths Weaknesses Opportunities Threats) analysis; balanced scorecards (Kaplan and Norton (1996)); process modeling languages such as the IDEF Process Flow and Object State Description Capture Method (Mayer, Cull inane, de Witte, Knappernberger, Perakath and Wells (1992)); and agent/communication modeling techniques such as RADs (Role Activity Diagrams, Ould (1993)); ·
- Knowledge modeling techniques that have been used previously for the disciplined development of knowledge-based applications such as Common ADS (Benus (1993) and Schreiber, Ackerman's, Anjewierden, De Hogg, Van De Velde, and Wielinga (1998)).

It must be recognized that the ultimate success of any knowledge management programme for a particular organization will also depend critically on the attitude and culture adjustments of its key workers.

Difficulties in knowledge management

In reality, working with people is never like a control loop that entails simply scrutinizing problem areas and then re-adjusting these for change.

As mentioned, this paper should primarily be seen as a southern African case study; the examples mentioned below have a higher likelihood to be relevant in southern Africa, but could also help to avoid surprising revelations elsewhere.

The structure of this chapter is based on the categories technology, content, routines, organization and personnel. As personnel are found to be crucial for knowledge management, this sub-chapter will be more detailed. Some barriers identified will fit into several categories.

1. Collection / Overview of Knowledge Inventory:

The knowledge inventory should list and connect all necessary information about the above mentioned: people, routines and procedures, content and technology. Thus, the knowledge inventory is a meta-information centre. Collecting and summarizing this knowledge inventory already is a critical first step where barriers will be encountered.

2. Expert's Analysis:

The expert knowledge manager can be used to identify the first signs/avenues for enhancements – just from analyzing what is given in knowledge inventory. Considering that the successful implementation of KM can only be achieved when all players are properly involved in the process, the expert's external analysis is only an initial step in defining KM activities.

3. Participatory Analysis:

Having the personnel aboard and giving them the space to reflect on their own situation, their own input and their own needs provides very valuable hints. In most cases, participation will strengthen the process and the chances for a change.Participatory processes also help external advisors to understand how the organization 'functions' from within.

4. Proposal of Interventions:

As a next step, personnel involved should work on creating ways to improve knowledge management in the future. Summarizing ideas that have been developed in a participatory manner, and proposing alternatives to resolve bottlenecks and realize enhancements, is one of the main tasks for a knowledge manager. These alternatives may consist of various approaches, like implementing new routines, collecting new information, using new technology, etc.

5. Conducting Selected Interventions:

After – in best case: participatory – prioritization and decision on activities on how to enhance the management of knowledge, these activities should be implemented – thus creating a change in the inventory.

6. Knowledge Management System:

The formalized process of updating technologies, routines, organizational structures and personal skills would then be called 'Knowledge Management System'.

Principles of Knowledge Management

More than ever, companies are realizing that their real advantage lies in what they know. But how do you manage knowledge?

- Knowledge management is expensive
- Effective management of knowledge requires hybrid solutions involving both people and technology.
- Knowledge management is highly political.
- Knowledge management requires knowledge managers.
- Knowledge management benefits more from maps than models, more from markets than hierarchies.
- Sharing and using knowledge are often unnatural acts.
- Knowledge management means improving knowledge work processes.
- Access to knowledge is only the beginning.
- Knowledge management never ends.
- Knowledge management requires a knowledge contract.

If knowledge is really becoming a more valued resource in organizations, we can expect to see more attention to the legalities of knowledge management. Perhaps the greatest problem with increased knowledge management is the increased population of lawyers it will engender. Intellectual property law is already the fastest-growing legal field, and it will only grow faster.

The 5 basic principles of knowledge management is:

1) KM must align with the business.
2) KM must include
3) KM must address
4) KM must address Roles, Processes, Technologies and Governance
5) KM must be embedded into the business

Using the 5 principles

Use these 5 principles to design your Knowledge Management Framework. You will still need to decide

- What the critical business knowledge is, that you need to align to
- How to connect people and set up conversations
- How to collect knowledge and manage content
- How to create a demand for knowledge
- How to create a supply of knowledge
- Which roles to put in place
- Which processes to adopt
- Which technology to use
- What governance to apply, and
- How and where to embed the roles, processes, technology and governance.

However the principles will ensure that the framework you create works well, is stable, has no gaps, covers all relevant types of knowledge, and will not "tip back" to the previous pre-KM state.

Leveraging knowledge

At face value, the latest trend in knowledge management can yield a vastly improved customer service experience, allowing you to build a relationship with your customers and enable ongoing learning on both sides of the call.

- Technology
- Leveraging a Community

- Workflow Process
- Bottom Line Benefits

Knowledge processing activities includes:

• **Knowledge Gathering:** Knowledge can be gathered externally, e.g. from research institutes or by hiring experts, and it can be created and developed internally, for example in research and development or by gaining experience from the operation of a process. Since knowledge can become obsolete very quickly, it always needs to be improved and updated.

• Knowledge Presentation: To be helpful for end users, knowledge needs to be documented, structured and related to other knowledge and information. It is also essential to document the knowledge meta-structure, i.e. what kind of knowledge is available, how it is structured, and who can be contacted for advice on a certain subject.

• **Knowledge Transport:** Before it can be applied, knowledge needs to be moved to the people who need it. Documented knowledge can be transmitted by e-mail, file transfer, or the distribution of paper documents. Another option is the provision of knowledge in a way that the users of this knowledge can actively access it, e.g. in a library or in an Intranet. In this situation, the knowledge movement is accomplished when the end user searches and accesses the required knowledge. For accessing tacit knowledge which is not documented, the respective knowledge owners need to be found and contacted.

• **Knowledge Employment:** This is the purpose of knowledge processing - to use the knowledge for carrying out, supporting and improving value-adding business and support activities.

• Knowledge Archive: Knowledge which is outdated or has become irrelevant needs to be identified, removed from the active corporate memory, and archived.

These knowledge processing activities are usually not discrete, but most of them are - or should be - integral parts of the existing corporate process framework.

KM's goal is to improve and support knowledge processing in the company. It is therefore concerned with developing, supporting, controlling and improving of strategies, processes, organization, and technologies for knowledge processing.

The design created on level one defines the processes, structures and tasks for the following levels:

• **Knowledge Process Management:** The tasks of managing the implemented knowledge processes can be found on this level. These tasks include the operation of the specific knowledge processes defined on level one, as well as controlling and monitoring of knowledge processing. The variables to be monitored are defined during the design of the knowledge processes (level one). For example, it could be useful to record the number of unsuccessful information searches and to analyse the reasons for not finding the desired pieces of information. When such problems are identified, an improvement cycle is triggered, in which the knowledge process design on level one is changed.

• **Knowledge Process Control:** this level comprises those activities that are not related to the actual knowledge contents, but rather to meta-information about the knowledge, such as topics, keywords, or areas of expertise. This meta-information is required for distributing, exchanging, searching, and accessing knowledge.

• **Knowledge Process Application:** The activities on this level are concerned with the actual knowledge contents. They include the creation of new knowledge, the documentation of knowledge, its application etc.

Data Information-Knowledge-Wisdom relationship

According to Russell Ackoff, a systems theorist and professor of organizational change, the content of the human mind can be classified into five categories:

1. **Data**: symbols
2. **Information**: data that are processed to be useful; provides answers to "who", "what", "where", and "when" questions

3. **Knowledge**: application of data and information; answers "how" questions

4. **Understanding**: appreciation of "why"

5. **Wisdom**: evaluated understanding.

Ackoff indicates that the first four categories relate to the past; they deal with what has been or what is known. Only the fifth category, wisdom, deals with the future because it incorporates vision and design. With wisdom, people can create the future rather than just grasp the present and past. But achieving wisdom isn't easy; people must move successively through the other categories.

A further elaboration of Ackoff's definitions follows:

Data... data is raw. It simply exists and has no significance beyond its existence (in and of itself). It can exist in any form, usable or not. It does not have meaning of itself. In computer parlance, a spreadsheet generally starts out by holding data.

Information... information is data that has been given meaning by way of relational connection. This "meaning" can be useful, but does not have to be. In computer parlance, a relational database makes information from the data stored within it.

Knowledge... knowledge is the appropriate collection of information, such that it's intent is to be useful. Knowledge is a deterministic process. When someone "memorizes" information (as less-aspiring test-bound students often do), then they have amassed knowledge. This knowledge has useful meaning to them, but it does not provide for, in and of itself, an integration such as would infer further knowledge.

Understanding... understanding is an interpolative and probabilistic process. It is cognitive and analytical. It is the process by which I can take knowledge and synthesize new knowledge from the previously held knowledge. The difference between understanding and knowledge is the difference between "learning" and "memorizing". People who have understanding can undertake useful actions because they can synthesize new knowledge, or in some cases, at least new information, from what is previously known (and understood).

Wisdom... wisdom is an extrapolative and non-deterministic, non-probabilistic process. It calls upon all the previous levels of consciousness, and specifically upon special types of human programming (moral, ethical codes, etc.). It beckons to give us understanding about which there has previously been no understanding, and in doing so, goes far beyond understanding itself.

Organizational Knowledge

Definition:

Individual knowledge paired with that of other individuals in an organization. Organizational knowledge is the type of company asset to which no value can be named. When individuals pool their knowledge within an organization, that knowledge can give the organization advantages over others in the same field.

Organizational Knowledge Resources:

Business knowledge can exist on several different levels:

Individual: Personal, often tacit knowledge/know-how of some sort. It can also be explicit, but it must be individual in nature, e.g. a private notebook.

Groups/community: Knowledge held in groups but not shared with the rest of the organization. Companies usually consist of communities (most often informally created) which are linked together by common practice. These communities of practice (Lave & Wenger 1991) may share common values, language, procedures, know-how, etc. They are a source of learning and a repository for tacit, explicit, and embedded knowledge.

Structural: Embedded knowledge found in processes, culture, etc. This may be understood by many or very few members of the organization. E.g. the knowledge embedded in the routines used by the army may not be known by the soldiers who follow these routines. At times, structural knowledge may be the remnant of past, otherwise long forgotten lessons, where the knowledge of this lesson exists exclusively in the process itself.

Organizational knowledge lifecycle

Organizational Knowledge Characteristics

Organizational characteristics are features originating from the management model adopted by the organization, through its structure or strategy, and from the company culture embodies in the nature of its membership and relationships. It follows that these aforementioned organizational characteristics could also be broadly referred as organizational influences. The acquisition of knowledge in the organization will greatly depend on its structure, knowledge storage on its membership attribute, knowledge diffusion on its relationship pattern, and knowledge implementation on its strategy.

1. Culture:

The concept of organizational culture was adapted from anthropology for organization management research. Almost every scholar has his/her special attitude of mind for culture, and different scholars have different definitions of organization culture. Douglas (1985) pointed out that organization culture was the emergent result of the continuing negotiations about values, meanings and proprieties between the members of that organization.

2. Top Management Support:

Top management support is considered as one of the important potential influences on organizational knowledge. Numerous studies have found top management support essential to creating a supportive climate and providing sufficient resources emphasized the importance of the visible top management's support to organizational knowledge sharing climate. Moreover, the perception of top management encouragement of knowledge sharing intentions is necessary for creating and maintaining a positive knowledge sharing culture in an organization.

3. Reward & Incentive:

It encourages encourage knowledge management activities amongst employees play an important role as an enabler. Incentives are things that have the ability to incite determination or action by employees in an organization. Rewards, on the other hand, can be broadly categorized as being either extrinsic or intrinsic. Extrinsic rewards are positively valued work outcomes that

are given to the employee in the work setting whilst intrinsic rewards are positively valued work outcomes that are received by the employee directly as a result of task performance

4. Organization Structure:

Size is an important variable that affects various organizational aspects as well as overall organizational performance. Whereas the impact of size on group dynamics has been well explored in the social sciences literature, the discussion of organizational size has received less attention in management. For example, prior research has examined the impact of organizational size on information technology innovation adoption but the results appeared to be mixed and inconsistent because of the influence of other unaccounted variables.

Components of organizational knowledge

Knowledge Management is more about processes then products. But products and technology enable these processes and provides required tools for an effective KM program. We talked about Knowledge Management lifecycle in previous posts. Knowledge Management provides order to unstructured enterprise data and information into knowledge that is actionable and provides business value. Those who are responsible for knowledge management directly or indirectly should know the building blocks and their interaction with the processes.

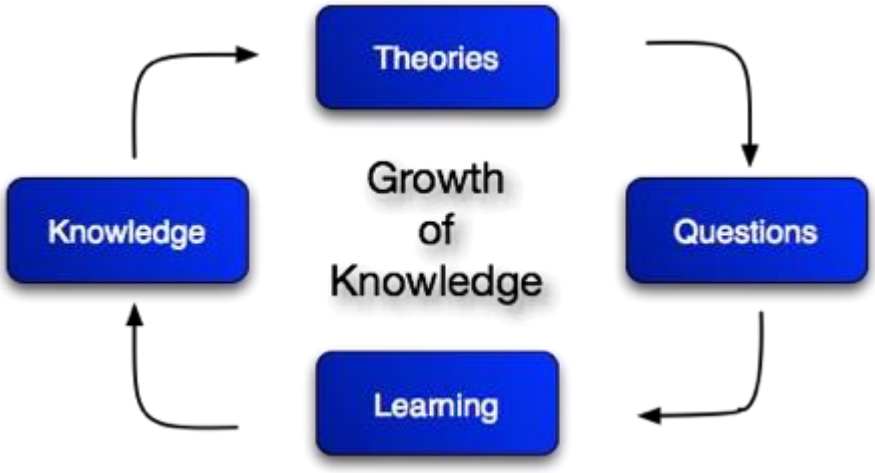
What are the building blocks of Knowledge Management from technology standpoint?

Knowledge Management consists of following components:

- Collaboration
- Content Management
- Search
- Taxonomy management
- Business Process Management
- Business Intelligence
- Portal

All the components are required for knowledge management practice within the organization. There are vendors that provide all the required components in their product suite to enable organizations to implement effective Knowledge Management program.

Key components:



Building Knowledge Society

The emergence of the knowledge society, building on the pervasive influence of modern information and communication technologies, is bringing about a fundamental reshaping of the global economy. Its significance goes well beyond the hyping of the Internet. What is underway is a transformation of our economy and society.

Knowledge has always been a factor of production, and a driver of economic and social development. Earlier economies depended, for example, on knowledge about how to farm, how to build and how to manufacture. However, the capacity to manipulate, store and transmit large quantities of information cheaply has increased at a staggering rate over recent years.

The Youth Building Knowledge Societies e-conference was structured around three themes:

Access:

Participants highlighted a number of barriers blocking widespread participation in the global information society. They also illustrated a number of examples of how they are overcoming

these obstacles through new and creative ways of adapting locally available technologies to meet community information and communication needs. Some of the access issues discussed included those surrounding:

• Receiving information;

• Creating and disseminating information, and;

• Participating in the decision making processes that shape the context for ICTs.

Education:

Participants gave a number of examples of how they are trying to use ICTs to help make education more equitable, more affordable and more humanitarian. Participants examined the overlapping issues of ICTs in formal and informal education.

Livelihoods:

Participants stressed that sustainable livelihoods encompass more than simply employment. They noted that the concept includes other characteristics such as: meaningful work, meeting basic needs, health, security, and living within an equitable and just society. Participants highlighted a number of cases where ICTs are being used as tools for creating sustainable livelihoods. Some of the ICT related sustainable livelihood issues raised by participants included:

• employment and entrepreneurship,

• developing skills and sharing knowledge through internships and;

• sharing experiences through global networking projects. In addition to these themes, the issue of how ICTs could enable greater youth participation in governance was raised.

Examples:

- In South Africa, the government requires telecommunication operators (as part of their license obligations) to provide services in rural areas through the South Africa Universal Service Agency.
- In Sub-Saharan Africa, the IDRCís Acacia initiative is providing multi-purpose community telecenters to test ICT development solutions such as telemedicine, distance education and ecommerce.
- In the Philippines, Deutsche Telekom-supported local telecommunication provider Islacom is distributing affordable cellular phones in community units/barangays. Remote villagers buy prepaid cellular telephone cards at subsidized prices.
- In Bangladesh, the Grameen Bank is financing cell-phones for village women who in turn provide pay telephone services to their community. In doing so they create livelihoods for women while providing communications to rural villages without land-based phone services.
- In the Philippines, University student cooperatives have expanded their services to include fax and phone services, Internet cafes and computer rentals.
- In Colombia, women run Neighborhood Information Units are setting up local information systems and offering Internet services, especially to young people that do not have access to education.
- In South Africa, A Compaq-sponsored notebook computer helped a 16-year old YBKS participant in South Africa to participate and socialize more effectively with classmates after she made the decision to attend a mainstream school.
- In Canada and Jamaica, the Community Access Program is creating community owned and operated public Internet access sites. These are usually run by young volunteers or employees - providing them with employment opportunities or experience to gain such employment elsewhere.
- In Zimbabwe, the Education with Enterprise Trust is helping to develop learning enterprises ñ businesses (including cybercafés) where young people are able to gain hands-on experience.

Measures for meeting the challenges of implementing KM Programmes

A successful knowledge management program will consider more than just technology. An organization should also consider:

- **People**. They represent how you increase the ability of individuals within the organization to influence others with their knowledge.
- **Processes**. They involve how you establish best practices and governance for the efficient and accurate identification, management, and dissemination of knowledge.
- **Technology**. It addresses how you choose, configure, and utilize tools and automation to enable knowledge management.
- **Structure**. It directs how you transform organizational structures to facilitate and encourage cross-discipline awareness and expertise.
- **Culture**. It embodies how you establish and cultivate a knowledge-sharing, knowledge-driven culture.

8 Steps to Implementation

Implementing a knowledge management program is no easy feat. You will encounter many challenges along the way including many of the following:

- Inability to recognize or articulate knowledge; turning tacit knowledge into explicit knowledge.
- Geographical distance and/or language barriers in an international company.
- Limitations of information and communication technologies.
- Loosely defined areas of expertise.
- Internal conflicts (e.g. professional territoriality).
- Lack of incentives or performance management goals.
- Poor training or mentoring programs.
- Cultural barriers (e.g. “this is how we've always done it” mentality).

The following eight-step approach will enable you to identify these challenges so you can plan for them, thus minimizing the risks and maximizing the rewards. This approach was developed based on logical, tried-and-true activities for implementing any new organizational program.

Step 1: Establish Knowledge Management Program Objectives

Before selecting a tool, defining a process, and developing workflows, you should envision and articulate the end state. In order to establish the appropriate program objectives, identify and document the business problems that need resolution and the business drivers that will provide momentum and justification for the endeavor.

Step 2: Prepare for Change

Knowledge management is more than just an application of technology. It involves cultural changes in the way employees perceive and share knowledge they develop or possess. One common cultural hurdle to increasing the sharing of knowledge is that companies primarily reward individual performance. This practice promotes a "knowledge is power" behavior that contradicts the desired knowledge-sharing, knowledge-driven culture end state you are after.

Step 3: Define High-Level Process

To facilitate the effective management of your organization's knowledge assets, you should begin by laying out a high-level knowledge management process. The process can be progressively developed with detailed procedures and work instructions throughout steps four, five, and six. However, it should be finalized and approved prior to step seven (implementation).

Step 4: Determine and Prioritize Technology Needs

Depending on the program objectives established in step one and the process controls and criteria defined in step three, you can begin to determine and prioritize your knowledge management technology needs. With such a variety of knowledge management solutions, it is imperative to understand the cost and benefit of each type of technology and the primary technology providers in the marketplace. Don't be too quick to purchase a new technology without first determining if your existing technologies can meet your needs

Step 5: Assess Step 5: Asses Current State

Now that you've established your program objectives to solve your business problem, prepared for change to address cultural issues, defined a high-level process to enable the effective management of your knowledge assets, and determined and prioritized your technology needs that will enhance and automate knowledge management related activities, you are in a position to assess the current state of knowledge management within your organization.

The recommendations will become the foundation for the roadmap in step six.

Step 6: Build a Knowledge Management Implementation Roadmap

With the current-state assessment in hand, it is time to build the implementation roadmap for your knowledge management program. But before going too far, you should re-confirm senior leadership's support and commitment, as well as the funding to implement and maintain the knowledge management program. Without these prerequisites, your efforts will be futile. Having solid evidence of your organization’s shortcomings, via the assessment, should drive the urgency rate up.

Step 7: Implementation

Implementing a knowledge management program and maturing the overall effectiveness of your organization will require significant personnel resources and funding. Be prepared for the long haul, but at the same time, ensure that incremental advances are made and publicized. As long as there are recognized value and benefits, especially in light of ongoing successes, there should be little resistance to continued knowledge management investments.

Step 8: Measure and Improve the Knowledge Management Program

How will you know your knowledge management investments are working? You will need a way of measuring your actual effectiveness and comparing that to anticipated results. If possible, establish some baseline measurements in order to capture the before shot of the organization’s performance prior to implementing the knowledge management program. Then, after

implementation, trend and compare the new results to the old results to see how performance has improved.

The Power of Knowledge Management

Implementing a complete knowledge management takes time and money, however, the results can be impressive and risks can be minimized by taking a phased approach that gives beneficial returns at each step. Organizations that have made this kind of investment in knowledge management realize tangible results quickly. They add to their top and bottom lines through faster cycle times, enhanced efficiency, better decision making and greater use of tested solutions across the enterprise.

UNIT-2

Essentials of Knowledge Management

Knowledge Management (KM) has emerged as a tool for a continuous and sustainable development. KM is not a single discipline; rather an integration of numerous endeavors and fields of study. It is about using right knowledge at right time.

Aspects of Knowledge Management:

- Culture
- Technology

1. **Culture:**

   It is a way to facilitate collaborative processes, learning dynamics and problem solving.

   - Nature of knowledge
   - Types of knowledge
   - Implementation

2. **Technology:**

   It focuses on databases or other storage devices, mechanisms for sharing knowledge products such as documents, and terms such as knowledge transfer.

   - Database
   - Input
   - Output

Process

Basic types of Knowledge

Understanding the different forms that knowledge can exist in, and thereby being able to distinguish between various types of knowledge, is an essential step for knowledge management (KM). For example, it should be fairly evident that the knowledge captured in a document would need to be managed (i.e. stored, retrieved, shared, changed, etc.) in a totally different way than that gathered over the years by an expert craftsman.

Within business and KM, two types of knowledge are usually defined, namely explicit and tacit knowledge. The former refers to codified knowledge, such as that found in documents, while the latter refers to non codified and often personal/experience-based knowledge.

1. Explicit Knowledge:

This type of knowledge is formalized and codified, and is sometimes referred to as know-what (Brown & Duguid 1998). It is therefore fairly easy to identify, store, and retrieve (Wellman 2009). This is the type of knowledge most easily handled by KMS, which are very effective at facilitating the storage, retrieval, and modification of documents and texts.

From a managerial perspective, the greatest challenge with explicit knowledge is similar to information. It involves ensuring that people have access to what they need; that important knowledge is stored; and that the knowledge is reviewed, updated, or discarded.

2. Tacit Knowledge:

This type of knowledge was originally defined by Polanyi in 1966. It is sometimes referred to as know-how (Brown & Duguid 1998) and refers to intuitive, hard to define knowledge that is largely experience based. Because of this, tacit knowledge is often context dependent and personal in nature. It is hard to communicate and deeply rooted in action, commitment, and involvement (Nonaka 1994).

Tacit knowledge is also regarded as being the most valuable source of knowledge, and the most likely to lead to breakthroughs in the organization (Wellman 2009). Gamble & Blackwell (2001) link the lack of focus on tacit knowledge directly to the reduced capability for innovation and sustained competitiveness.

3. Embedded Knowledge:

Embedded knowledge refers to the knowledge that is locked in processes, products, culture, routines, artifacts, or structures (Horvath 2000, Gamble & Blackwell 2001). Knowledge is embedded either formally, such as through a management initiative to formalize a certain beneficial routine, or informally as the organization uses and applies the other two knowledge types.

The challenges in managing embedded knowledge vary considerably and will often differ from embodied tacit knowledge. Culture and routines can be both difficult to understand and hard to change. Formalized routines on the other hand may be easier to implement and management can actively try to embed the fruits of lessons learned directly into procedures, routines, and products.

Organizational Knowledge Management

Knowledge:

Knowledge is often defined as a "justified personal belief." There is much taxonomy that specifies various kinds of knowledge. The most fundamental distinction is between "tacit" and "explicit"knowledge.

Knowledge Management Systems:

Knowledge management systems (KMS) are applications of the organization's computer-based communications and information systems (CIS) to support the various KM processes. They are typically not technologically distinct from the CIS, but involve databases, such as "lessons learned" repositories, and directories and networks, such as those designed to put

organizational participants in contact with recognized experts in a variety of topic areas.

Knowledge Management in Organizations:

KM processes directly improve organizational processes, such as innovation, collaborative decision-making, and individual and collective learning. These improved organizational processes produce intermediate outcomes such as better decisions, organizational behaviors, products, services and relationships. These, in turn, lead to improved organizational performance.

The Knowledge Management Processes Cycle:

It is a process cycle model of KM. Such cycle models provide a useful way to organize one's thinking about KM processes. There have been numerous KM processes cycle models that describe the relationships of the key processes of KM, ranging from Davenport and Prusak's (2000) 3-stage model ("Generate, Codify/Coordinate, Transfer") to Ward and Aurum's (2004) 7-stage ("Create, Acquire, Identify, Adapt, Organize, Distribute, Apply"). The process cycle model of Fig. 2 is particularly valuable in that it uses the generally accepted terminology of KM and makes use of alternative paths in order to make important distinctions. The various activities

listed as bullet-points under some of the major phases are meant to be illustrative and not necessarily definitional.

KM Strategies:

Most organizations focus primarily on one or the other of two broadly defined KM strategies – "codification" or "personalization" (Hansen et al., 1999) .

Codification is primarily implemented in the form of electronic document systems that codify and store knowledge and permit its easy dissemination and re-use. This strategy is based on "re-use economics" – invest once in creating or acquiring a knowledge asset and re-use it many times.

Personalization, on the other hand, focuses on developing networks to facilitate people-to people knowledge transfer and sharing. It is based on "expert economics" – channeling individual expertise to others with less expertise who may employ it to further the organization's goals.

Earl (2001) has described various KM strategies, or "schools of thought" at a more detailed level. He developed this empirically through observation in numerous companies.

They are listed below in groups that emphasize their reliance on either the codification or a personalization approach. Codification Sub-Strategies – Earl's codification-oriented sub-strategies are:

1. Systems (creating and refi ning knowledge repositories and on motivating people to provide content)

2. Process (developing and using repeatable processes that are supported with knowledge from previously conducted processes)

3. Commercial (the management of intellectual property such as patents, trademarks, etc.)

4. Strategic (the development of "knowledge capabilities" that can form the foundation of competitive strategy) Personalization Sub-Strategies – Earl's personalization-oriented sub-strategies are:

5. Cartographic (creating knowledge “maps” or directories and networks to connect people)

6. Organizational (providing groupware and intranets to facilitate communities of practice)

7. Social (spatial) (socialization as a means of knowledge creation and exchange; emphasizes the providing of physical “places” to facilitate discussions) While some organizations focus on only one of these strategies or sub-strategies, many use a combination of strategies that suits their needs.

Organizational Knowledge Types

An Overview and Interpretation, Blackler builds on Polanyi’s distinction between tacit and explicit knowledge (in Polyani, 1967) and identifies five types of knowledge to be found in contemporary organisations. His ideas provide useful insights into the process of knowledge management. These conceptual distinctions were first suggested to explain the psychological and behavioural aspects of knowledge. They were later adapted to describe the different 'images' of knowledge within the organisation.

1. Embrained knowledge

This is the abstract, conceptual and theoretical knowledge people possess – accountancy knowledge and an understanding of health and safety legislation – which is generally acquired through some type of formal education. This is akin to Polanyi’s explicit knowledge.

2. Embodied knowledge

This the knowledge people possess about their own roles and activities, and those of other people, in specific work situations. It is that knowledge about what you should be doing (which isn’t always the same as what it says in your job description.) This knowledge is acquired slowly and gradually through a process of socialisation and is, I would argue, an aspect of Polanyi’s tacit knowledge.

3. Uncultured knowledge

This is the working knowledge people possess of 'the ways things work around here' – or the principal shared beliefs, values and rituals of an organisation's culture. This cultural knowledge is overwhelmingly tacit.

4. Embedded Knowledge

This is knowledge that is wrapped up somebody's ability to undertake a specific task or activity. It is the skills, know-how and capabilities that enable that worker to do a task 'without thinking' and as 'second nature.' It is an aspect of Polanyi's tacit knowledge.

5. Encoded knowledge

This is documented, codified and formalized knowledge conveyed by texts and in writing. It refers to the minutes, websites, codes of practice, strategy and policy documents and textbooks to be found in all organisations. As such, it is an aspect of Polanyi's explicit knowledge.

The knowledge Hierarchy

The terms information and knowledge are often used interchangeably. In reality there is a hierarchy as shown below.

- Wisdom
- Knowledge
- Information
- Data

Organizational Knowledge Capital

Definition:

Organizational Capital has been defined as the "knowledge used to combine human skills and physical capital into systems for producing and delivering want-satisfying products." Organizational capital consists of the processes, systems, and other assets that companies have aside from their financial report.

1. Knowledge Assets and Intellectual Capital:

Knowledge assets may be distinguished from the traditional factors of production: land, labor and capital - in that they are governed by what has been described as the 'law of increasing returns'. In contrast to the traditional factors of production that were governed by diminishing returns, every additional unit of knowledge used effectively results in a marginal increase in performance.

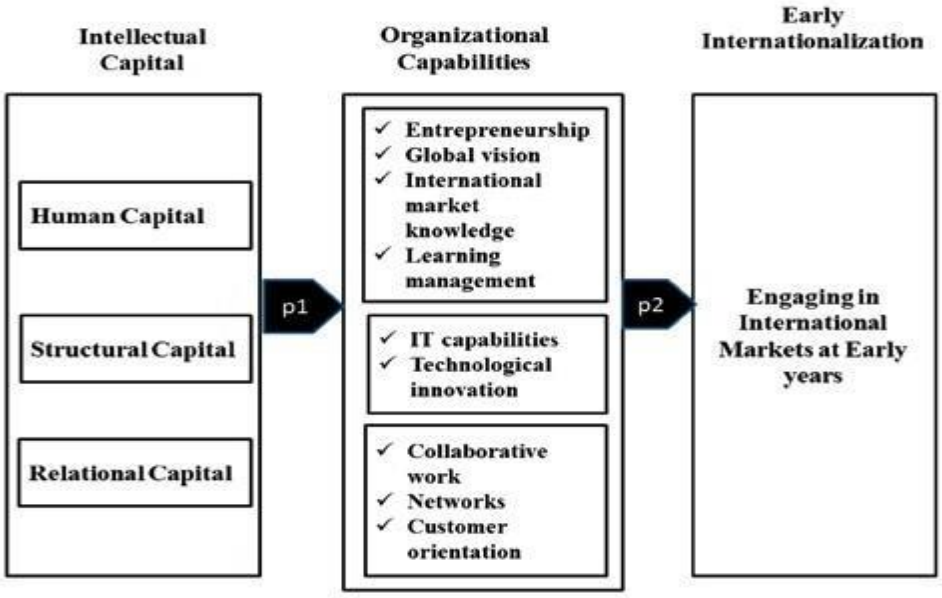
2. Assessment of Knowledge Capital and Intellectual Assets:

Recent business history has shown that huge investments in human capital and information technology are the key tools of value creation that often do not show up on company balance sheets as positive values themselves.

3. Measuring Knowledge Assets and Intellectual Capital:

Managers of enterprises are trying to find reliable ways for measuring knowledge assets to understand how they relate to future performance. The expectation from finding reliable measures of knowledge assets is that such measures can help managers to better manage the intangible resources that increasingly determine the success of the enterprises.

Process:



Organizational Knowledge Classification

Classification Systems:

Libraries attempt to organize and shelve books about the same subject matter together. This may sound simple and rather straightforward; however, if you stop and think for a moment you will realize that most books are about more than one idea or subject.

The two major classification systems used in American libraries to organize books on library shelves are the Dewey Decimal Classification System and the Library of Congress Classification System.

Dewey decimal classification System:

The Dewey Decimal Classification System was designed by Melvil Dewey in 1876. Dewey was a librarian who worked in Boston and New York. He was very interested in creating efficient ways to organize knowledge and make it accessible to the public. Prior to Dewey's time there were few public libraries, and patrons were not allowed to go into the book stacks to look for their own books. Books had to be paged for the patron by a library staff person who knew

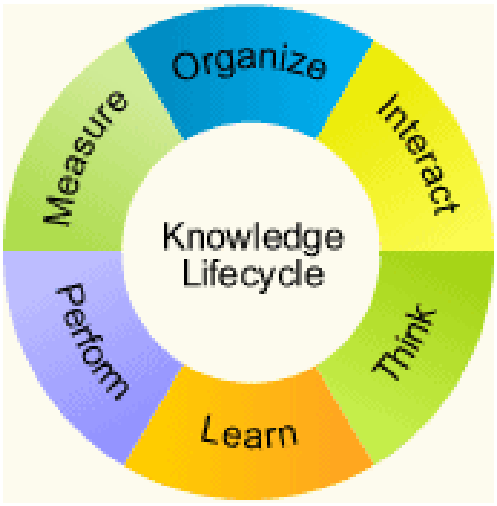
where things were located. Most academic libraries at the time were little more than warehouses. Melvil Dewey worked to change this situation.

Library of Congress Classification System:

The Library of Congress Classification System was developed by the Library of Congress in Washington, DC in the early 1900's to organize the collections of the Library. The Library of Congress chose to develop its own classification system rather than use the Dewey Decimal Classification System because of the large size of its collection--the Dewey system was not considered flexible enough to meet the needs of the LC collection. Over the years most U.S. research and academic libraries, as well as some public libraries, have adopted the Library of Congress Classification System.

Knowledge Life Cycle

There is no doubt that knowledge workers have dominated the North America workforce since the early 1980s. In fact, knowledge workers have been estimated to outnumber all other workers in North America by a factor of more than 4-to-1 . Executives have acknowledged this by recognizing that the most important strategic asset in their organizations is the knowledge possessed by their employees. However, many admit that it is not clear how to manage this asset. It see raising the productivity of knowledge workers as the single greatest challenge that managers face, which will ultimately determine the competitive performance of organizations.



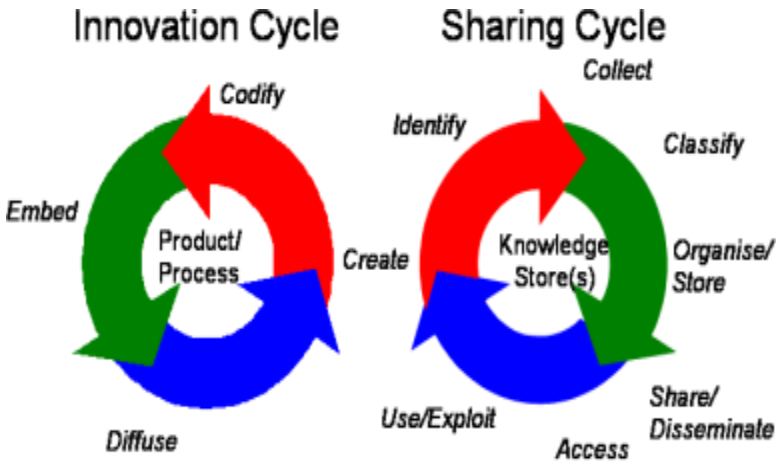
The KLC: A Separate Framework:

- ❖ I'll show that while the KLC is comprised of OLCs, it is a separate construct and that, in fact, KLC processes originate in OLCs and then feed back into them.
- ❖ The alternation between KLCs and OLCs is both basic to knowledge processing and grounded in human psychology, both at the individual and group levels of interaction.
- ❖ This alternation is the foundation of knowledge management as a distinct process.

In the analysis of over 100 KM programmes for the book Knowledge Networking, two main approaches were identified:

- **Better sharing of existing knowledge - knowing what you know.** Examples include sharing best practice, avoiding "reinventing the wheel", and the use of intranets as portals into core knowledge that is widely shared.
- **Faster or smarter innovation - creating and commercializing new knowledge.** This involves converting ideas into valuable products, services or processes, either internally or for external sale.

We can represent the evolution of knowledge in these two approaches as two life cycles



The Innovation Cycle:

This shows the evolution the generation of ideas (unstructured knowledge) into more structured and reproducible knowledge, embedded within processes or products. Some of the key processes are:

- **Create:** An idea for a new product, process or strategy is created. These are discussed and formalised to initiate a new cycle of innovation.
- **Codify:** The ideas are codified, such as in a product design or a process description. The original idea is now more structured and transferable.
- **Embed:** At this stage (for a product) the knowledge is encapsulated in a prototype, or for a process made part of organizational procedures.
- **Diffuse:** Products reach the market; processes are widely practiced throughout the organization. Application of the embedded knowledge generates ideas for improvements, and so the cycle repeats.

The Knowledge Sharing Cycle:

These are the processes associated with gathering and disseminating existing knowledge. For most KM programmes, this is the primary focus.

- **Create/collect.** New knowledge is created or existing knowledge is gathered. A knowledge audit is a good technique for discovering what exists.
- **Organize/store.** The knowledge is classified and stored, perhaps using a company specific taxonomy. This makes subsequent retrieval easier.
- **Share/disseminate.** Information may be 'pushed' to people as part of routine dissemination or it may be simply 'parked' in information repositories for individuals to access it when needed. For tacit knowledge, this part of the cycle involves knowledge transfer activities such as meetings.
- **Access.** Individuals browse or search their organization's information and document repositories, typically via an intranet. Users 'pull' the information when they need it.

- **Use/exploit.** They use this knowledge to carry out specific tasks. As they use it the knowledge is evaluated, refined and improved. As a result new knowledge is created and the cycle repeats.

Organizational Knowledge Sources

From the perspective of an MNC subsidiary, there are two knowledge sources. Knowledge may come from sources that are internal to the MNC and is transferred from other MNC units (i.e., other subsidiaries or the Center) or is developed in the subsidiary itself (e.g., through R&D, processes of routinization, etc.). Alternatively, knowledge sources may come from external partners (customers, suppliers, etc.) or other agents (e.g., high quality research institutions, etc.).

- Knowledge inputs into the process of building knowledge also differ across subsidiaries because subsidiaries confront different knowledge sources.
- Some subsidiaries may rely relatively more on internal knowledge sources, while others may rely more on external ones.
- In turn, this will impact the knowledge that is built and also influence the costs and benefits of transferring such knowledge.
- Knowledge that is based on internal knowledge sources may be transferable at low cost inside the MNC, particularly knowledge which is developed within the core of the MNC knowledge structure.

Research highlights the role of external knowledge sources in the recognition of strategic opportunities but is less forthcoming with respect to the role of such sources during the process of exploiting or realizing opportunities. We build on the knowledge-based view to propose that realizing opportunities often involves significant interactions with external knowledge sources.

Process:

Conceptually, one may distinguish between two external sources of knowledge that may be available to subsidiary firms. The first category may be called “network-based knowledge”, the gaining of knowledge from long-lasting interaction with specific external parties, such as customers or suppliers, and the use of that knowledge in the firm’s activities.

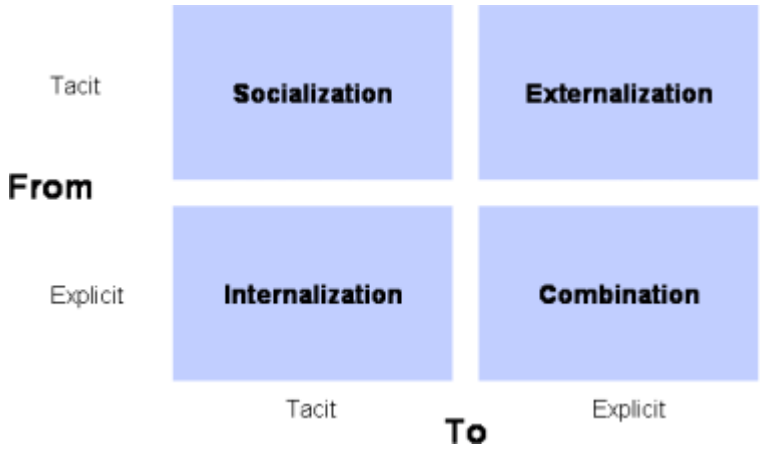
Knowledge Conversion

Definition:

The incorporation of knowledge into the process of solving analytical tasks is a fast emerging area in visualization is Knowledge Conversion.

Knowledge Conversion Processes:

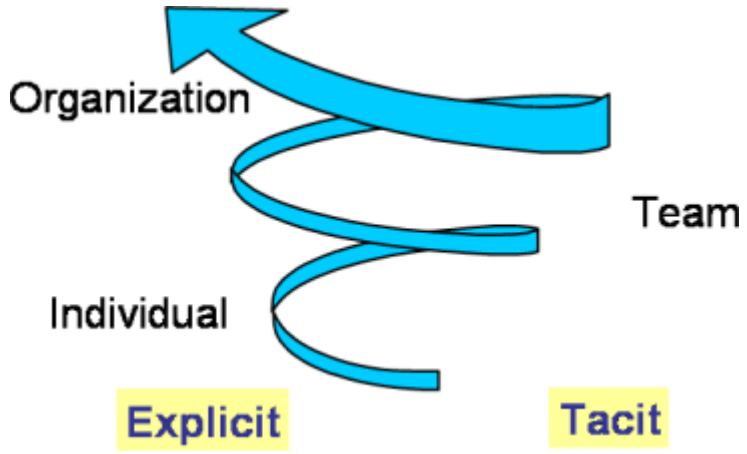
Nonaka and Takeuchi defined four types of conversion processes which they describe as "fundamental to creating value". The four are the combinations of conversion of explicit and tacit knowledge (see diagram).



1. Tacit-to-tacit (socialization) - individuals acquire knowledge from others through dialogue and observation
2. Tacit-to-explicit (externalization) - the articulation of knowledge into tangible form through elicitation and documentation
3. Explicit-to-explicit (combination) - combining different forms of explicit knowledge, such as that in documents or databases
4. Explicit-to-tacit (internalization) - such as learning by doing, where individuals internalize knowledge into their own mental models from documents.

The Knowledge Spiral:

In their book, Nonaka and Takeuchi say that "the key to knowledge creation lies in the mobilization and conversion of tacit knowledge". They go on to describe how organizational knowledge is created through processes in the knowledge spiral (see diagram).



Organizational knowledge starts at the individual level with thoughts or understanding (internalization). It then moves upwards through socialization, where individuals dialogue with their team colleagues. The ideas are then articulated (externalization) and become more widespread through diffusion of explicit knowledge (combination). As knowledge moves up the spiral knowledge is more widely spread and the spiral gets wider.

Organizational Knowledge Progression

Definition:

The term **learning or knowledge progression** refers to the purposeful sequencing of teaching and learning expectations across multiple developmental stages, ages, or grade levels.

Types:

What does every single business ever created have in common? The answer is they all started out as an idea; one person's fantasy as to how their vision can make a difference to the world.

From the minute an organization is born, a company culture is installed within it. For those start ups that cannot afford to hire employees at the inception point, the culture is enshrined within the values and beliefs of the founding members and so culture will play a smaller role limited to these individuals at this stage.

Taking on Employees:

Company culture will start taking a much more prominent role within an organization as it starts to grow and employees are hired to help build the business "fantasy." The founding values and beliefs will start rubbing off on the employees as they work closely on a day-to-day level within the organization and they start learning the knowledge and the company way of doing things.

Competition:

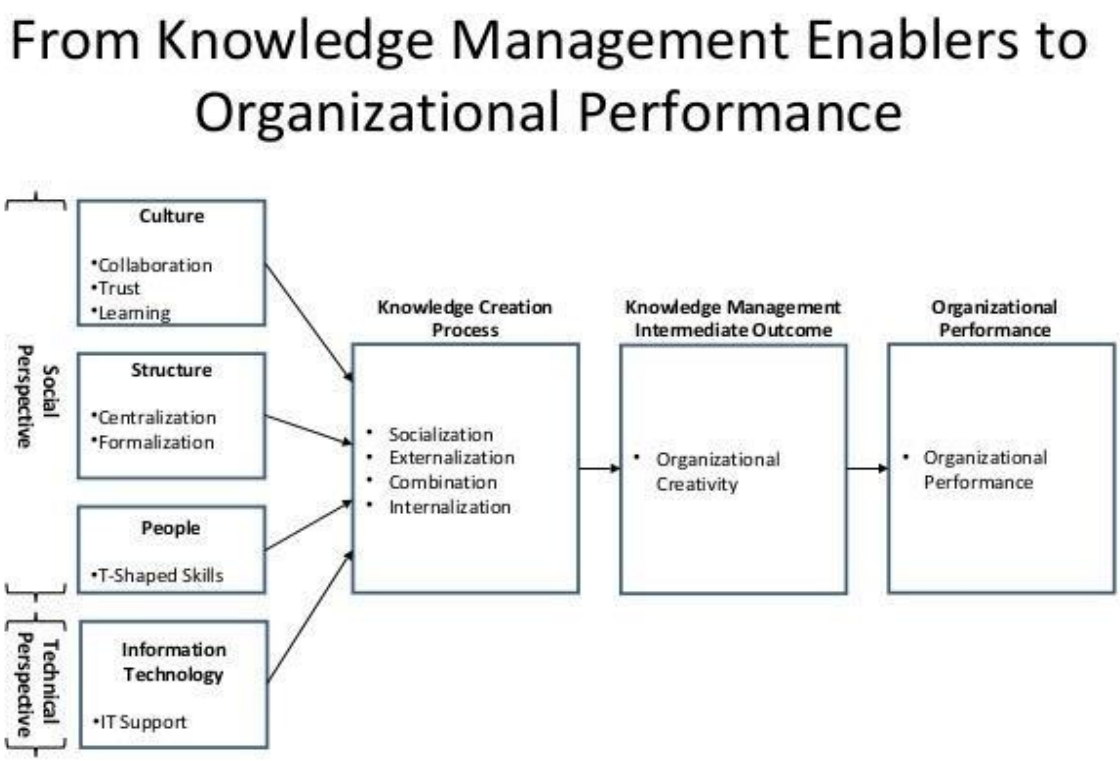
As an organization continues to grow, eventually it will appear on the radar of its competitors. When this happens, a battle of culture will emerge as each company tries to pitch to its customers why their product or service is superior; and culture plays an important role within the heart and foundations of this pitch.

What should company culture be?

The truth is that there is no right answer as to what company culture should be because every culture is different for every company which stems down to what the underlying motivation was for the creation of the organization on day one; whether it was to change the world, to do things better than the competition, or to exploit a potential gap in the market.

Employee action plan:

Business owners should therefore come up with an employee action plan to maximise their growth within an organization. Assuming that you have found the right candidate to help grow your business and they are fully trained, the next stage is to encourage employee entrepreneurship. By setting up a company, you will display entrepreneurial characteristics in abundance, e.g. being an independent free spirit, creativity, passion, leadership, vision, a driving personality, initiative as well as a 'can do' attitude and you should encourage your employees to display these skills as well.



Source: Lee and Choi, Knowledge Management Enablers, Processes and Organizational Performance

Organizational knowledge Management

Knowledge management comes from the understanding of the critical value of the other factors, less typical than document or data, and the awareness o the need for finding modes to sustain it and get from it strategically benefits. The difference between organizational knowledge and information and data is, aside from effective, intuitive.

Basics of Knowledge Management and Organizational Learning:

To understand KM and OL, one must understand knowledge, KM processes and goals and knowledge management systems (KMS).

1. Knowledge:

Knowledge is often defined as a "justified personal belief." There is much taxonomy that specifies various kinds of knowledge. The most fundamental distinction is between "tacit" and "explicit" knowledge.

2. Knowledge Management and Organizational Learning:

Explicit knowledge exists in the form of words, sentences, documents, organized data, and computer programs and in other explicit forms. If one accepts the useful "difficult-to-articulate" concept of tacit knowledge, a fundamental problem of KM is to explicate tacit knowledge and then to make it available for use by others. One can also distinguish among "know what," "know how" and "know why" levels of knowledge.

3. Knowledge Management Processes and Goals:

Knowledge management is the planning, organizing, motivating, and controlling of people, processes and systems in the organization to ensure that its knowledge-related assets are improved and effectively employed.

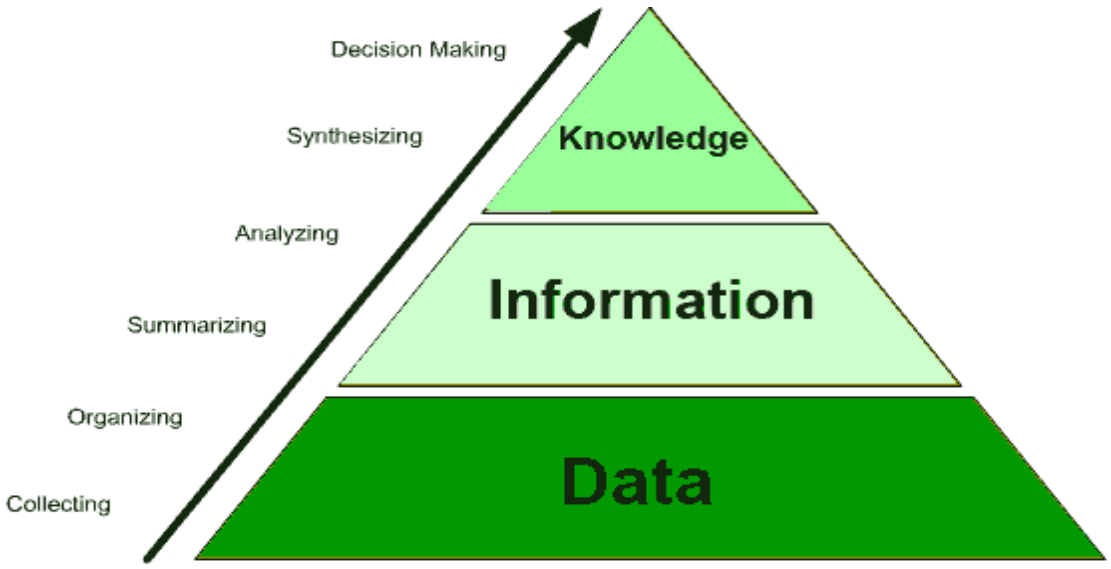
4. Knowledge Management Systems:

Knowledge management systems (KMS) are applications of the organization's computer-based communications and information systems (CIS) to support the various KM processes. They are typically not technologically distinct from the CIS, but involve databases, such as "lessons learned" repositories, and directories and networks, such as those designed to put organizational participants in contact with recognized experts in a variety of topic areas.

5. Organizational Learning:

Another way to conceptualize the relationship between the two areas is to view OL as the goal of KM. By motivating the creation, dissemination and application of knowledge, KM initiatives pay off by helping the organization embed knowledge into organizational processes so that it can continuously improve its practices and behaviors and pursue the achievement of its goals.

Knowledge Management process:



Technology Enablers

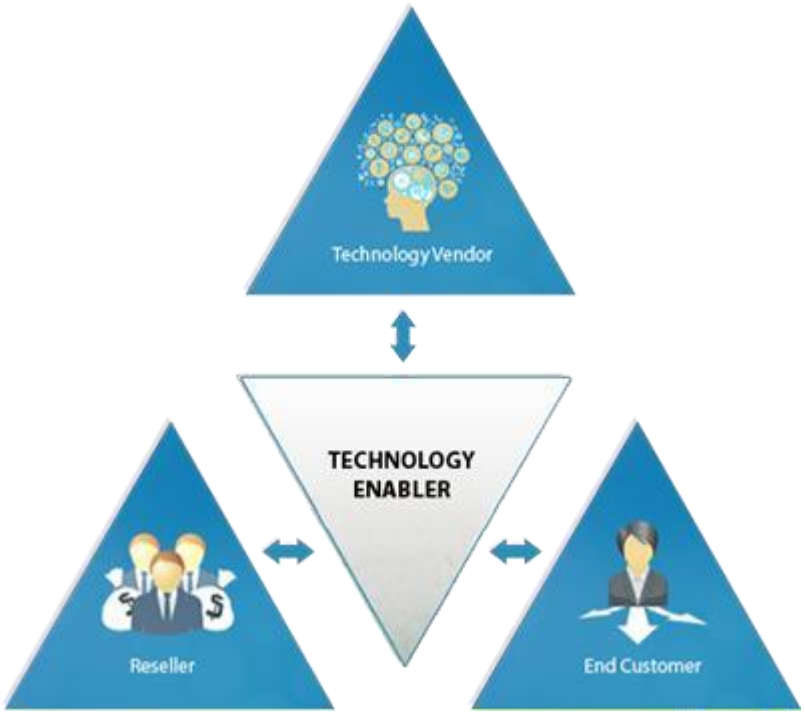
Definition:

An enabling technology is an invention or innovation that can be applied to drive radical change in the capabilities of a user or culture. Enabling technologies are characterized by rapid development of subsequent derivative technologies, often in diverse fields.

Equipment and/or methodology that, alone or in combination with associated technologies, provides the means to increase performance and capabilities of the user, product or process.

There are certain technological developments that allow meeting the users' needs significantly better. Here I will list three major innovations – the All-IP, the ongoing standardization of communications and the opportunities of sensors. The future of the networks will be significantly influenced by the fixed-mobile convergence.

Process



Technology is continuously evolving. It is like Abraham Maslow's theory of Need Hierarchy. We are continuously motivated by our unsatisfied needs. EAI comprises of the following layers

1.ModelingandWorkflow
2.ProcessAutomationandMonitoring
3.Broker
4.ConnectivityAdapters
5.Transport

Earlier the EAI services continuum covered only Communications Middleware that catered for the transport layer. Business was satisfied with the capabilities of systems being able to talk to each other and data being transferred from one system to another.

This was followed by adapters. Adapters classified as technology adapters and connectivity adapters started evolving.

Now having the ability to communicate, the need for data transformation and routing popped up. Later came in the age of brokers.

With Smart Technology Enablers solving your IT issues, you can:

- **Start using your time wisely** – with the basics of your company all under control, you can focus on more profitable ventures for your company.
- **Save capital for important projects** – with our flat rate IT and managed services, you'll save cash every month that would have been otherwise used for your technology breakdowns.
- **Enjoy exemplary uptime** – don't worry about your network being down at awkward times anymore. With Smart Technology Enablers' 24/7 monitoring, you can trust your network will be running when you need it.

Our custom service packages deliver what you need and want without overstepping the boundaries of your budget. From cloud services to data backup, we're here team up with you and your company for expert support.

Organizational Human Capital

Human Capital:

Human capital is the stock of knowledge, habits, social and personality attributes, including creativity, embodied in the ability to perform labor so as to produce economic value.

It is an aggregate economic view of the human being acting within economies, which is an attempt to capture the social, biological, cultural and psychological complexity as they interact in explicit and/or economic transactions.

Competence & Capital:

The introduction is explained and justified by the unique characteristics of competence (often used only knowledge). Unlike physical labor (and the other factors of production), competence is:

- Expandable and self-generating with use: as doctors get more experience, their competence base will increase, as will their endowment of human capital. The economics of scarcity is replaced by the economics of self-generation.
- Transportable and shareable: competence, especially knowledge, can be moved and shared. This transfer does not prevent its use by the original holder. However, the transfer of knowledge may reduce its scarcity-value to its original possessor.

Competence, ability, skills or knowledge? Often the term "knowledge" is used. "Competence" is broader and includes cognitive ability ("intelligence") and further abilities like motoric and artistic abilities. "Skill" stands for narrow, domain-specific ability. The broader terms "competence" and "ability" are interchangeable.

Importance:

1. The concept of Human capital has relatively more importance in labour-surplus countries.

2. These countries are naturally endowed with more of labour due to high birth rate under the given climatic conditions.

3. The surplus labor in these countries is the human resource available in more abundance than the tangible capital resource.

4. This human resource can be transformed into Human capital with effective inputs of education, health and moral values.

5. The transformation of raw human resource into highly productive human resource with these inputs is the process of human capital formation.

6. The problem of scarcity of tangible capital in the labour surplus countries can be resolved by accelerating the rate of human capital formation with both private and public investment in education and health sectors of their National economies.

7. The tangible financial capital is an effective instrument of promoting economic growth of the nation.

Why Human Capital Is Important for Organizations:

Why Human Capital Is Important for Organizations is an innovative book that derives from the casual meeting of people, scholars, and practitioners who live and work in many different parts of the world. The 'fil rouge' among them is their interpretation of how human resource management actually works in the present organizational context. Concretely, this book encompasses eleven chapters dealing with some of the most important issues in the field of human resource management through the exploration of four key themes: drawing the scenario, the pivots of human capital, measuring human capital, and good practices from abroad.

Empirical Findings:

The framework we use for identifying the key drivers of organizational performance (both within and across organizations) rests on a decade of research. A critical finding that has emerged from this research is that with few exceptions, traditional HR metrics (e.g., employee turnover rates, average time to fill open positions, total hours of training provided) are not predictive.

Our major empirical findings in this area are summarized briefly below.

There is a core set of “human capital drivers” that predict organizational performance across a broad array of organizations. HCM can be broken into five major categories, each of which can be measured separately, and each of which helps to drive organizational performance: Leadership Practices

- Employee Engagement
- Knowledge Accessibility
- Workforce Optimization
- Learning Capacity

Meta Knowledge

Definition:

Meta-knowledge is a fundamental conceptual instrument in such research and scientific domains as, engineering, knowledge, and others dealing with study and operations on knowledge, seen as a unified object/entities, abstracted from local conceptualizations and terminologies.

Although many studies involve meta-knowledge, the term is not always explicitly used. These studies can be found in various domains such as mathematical logic [1], scientific methodology [2], problem resolution and its teaching [3], educational technology [4,5], software and cognitive engineering [6, 7], artificial intelligence [8].

Jacques Pitrat has produced an important synthesis in which he distinguishes several meta-knowledge categories and proposes the following definition : « meta-knowledge is knowledge about knowledge, rather than knowledge from a specific domain such as mathematics, medicine or geology». According to this definition, meta-knowledge is at the heart of the learning process, which consists in transforming information into knowledge:

- By attributing values to knowledge from other domains : truth, usefulness, importance, knowledge priority, competence of an individual towards a knowledge object, etc.
- By describing « intellectual acts », processes that facilitate knowledge processing in other domains: memorisation, understanding, application, analysis, synthesis, evaluation, etc.
- By representing strategies to acquire, process and use knowledge from other domains : memorisation techniques, heuristic principles for problem solving, project management strategies, etc.

Representation system:

A basic MOT model [10], is composed of six types of knowledge objects and six types of links. Knowledge is represented by geometric figures that identify its type, such as abstract knowledge (concepts, procedures, principles), as well as three types of corresponding facts (examples, traces, statements).

- **Concepts** describe a domain's classes of objects (the « what » dimension), by their attributes and possible values.
- **Procedures** describe sets of operations that may apply to several objects (the « how » dimension).
- **Principles** are general statements intended to describe objects properties, of concepts to establish cause-and-effect links between them (the « why » dimension), or properties of procedures to determine their conditions (the « when ») and the resulting actions.

Different kinds of meta-knowledge:

The analysis of the answers regarding the knowledge exchange within the companies indicates the relevance of six aspects of meta-knowledge referring to content (a), characteristics of the participants (b), future-process of usage (c), cooperation (d), self-efficacy (e), and the way of structuring of the content (f).

A) meta-knowledge referring to the content:

Content-related meta-knowledge addresses the quality and timeliness of the content in the system. Knowledge about the quality and timeliness of the contributed content was useful for participating in the exchange of knowledge.

B) meta-knowledge about the characteristics of the participants:

Furthermore, knowledge about other users and their activities has influence on the characteristics of knowledge exchange. In our cases, knowledge about other participants is mentioned as a precondition for participating in the exchange of knowledge.

C) meta-knowledge about the future-process of using the entered data:

The interviewees mentioned that they would like to know what would happen with the uploaded content (future process-related meta-knowledge). The coordinators in company 3 for example would like to know who will read this content and whether it might be interesting for other employees as well. Feedback mechanisms should transmit this meta-knowledge.

D) meta-knowledge about the cooperation:

The knowledge about the cooperation between the actors (cooperation-related meta-knowledge) covers the guidelines and conventions of effective teamwork and the possibilities of communication processes for computer supported knowledge exchange.

E) meta-knowledge about self-efficacy:

The competence to estimate the relevance of one's own knowledge for the work of others (self-efficacy-related meta-knowledge) is a decisive factor. Self-efficacy consists of expectations and awareness about a person's own competences and capabilities.

F) meta-knowledge about the structuring of content:

Meta-knowledge about how the representation of knowledge should be structured is predominantly related to the knowledge about the internal structure of the content. The necessity of this meta-knowledge could be observed in some companies: if it is not available, unclear content areas arise and hamper the use of the knowledge management system.

UNIT-3

Discussion on Roadblocks to success

11 Major Roadblocks to Success and How to Avoid Them

1. Lack of a well-defined purpose in life

There is no hope of success when you don't have a central purpose, or definite goal at which to aim. Ninety-eight percent of people are followers who have no definite idea of their ultimate goal. **What to do:** As an absolute first step in your personal or professional success, know your passion. What is your higher purpose?

2. Lack of ambition to aim above mediocrity

If you don't like where you are, you must find a way to change that. **What to do:** Becoming a fulfilled Home Executive or accomplished Business Leader will occur only when you consistently strive for excellence.

3. Negative environment

As the saying goes, "you are who you know," so it is of the utmost importance to have only those people in your life who support you and what you believe/desire yourself to be**. What to do:** Control the amount of doom and gloom you allow into your life, creating an environment that is filled with people and things that are supportive of your higher purpose.

4. Poor health

It is impossible to enjoy outstanding success when you lack physical and emotional health. Obtaining this goal is an ongoing process. **What to do**: Consume a healthy, well-balanced diet of nutritious food and, also, exercise regularly. This regimen will lead to both physical and emotional well-being.

5. Unfavorable environmental influences during childhood

"As the twig is bent, so shall the tree grow?" This isn't a curse, its a challenge. Anyone can overcome their childhood difficulties. **What to do**: Surround yourself with people who emulate who you want to be, study the behaviors you like about them and change the behaviors you don't like about yourself.

6. Lack of persistence

Most of us are good "starters" but poor "finishers" of what we begin. Moreover, people are prone to give up at the first signs of defeat. There is no substitute for PERSISTENCE**. What to do:** Watch out for this one! Snuff it out the minute you feel it creep in. You'll notice it when you procrastinate or feel stagnant in your daily living.

7. Negative personality

There is no hope of success for the person who is offensive because of their negative personality**. What to do:** You have power in your presence, so use your winning/positive personality instead of manifesting a negative character.

8. Lack of ability to make a decision

Those who succeed reach decisions promptly (no procrastinating!), because they know there are no failures – only tests. **What to do:** Know that everything is happening according to your divine order. Keep this in mind and you will never suffer from indecision.

9. Inability to take risks

The person, who takes no chances, generally has to take whatever is left when others are finished choosing. Over-caution is as bad as under-caution. Both are extremes to be guarded against. **What to do:** Take chances. Remember, there are no failures! Live your life in the divine flow and remember that everything is happening according to plans.

10. Lack of concentration of effort

The "jack-of-all-trades" seldom is good at any of them. **What to do:** Concentrate all of your efforts on your higher purpose in life, then, with laser focus, continue on that path that brings you passion.

11. Lack of enthusiasm

Having no enthusiasm generally means you don't enjoy your current lot in life. Whatever you are doing, as long as you are moving in the direction of your higher purpose, will make you enthusiastic. **What to do:** Test yourself. Are you not enthusiastic? This is a sign you're on the wrong path and need to re-evaluate your higher purpose.

10-Step KM Road Map of Amrit Tiwana

This 10-step Knowledge Management road map will guide you through strategizing, designing, developing, and implementing a KM initiative that delivers business impact. Learn how to build an effective road map for developing an idiosyncratic knowledge strategy that is unique to your company.

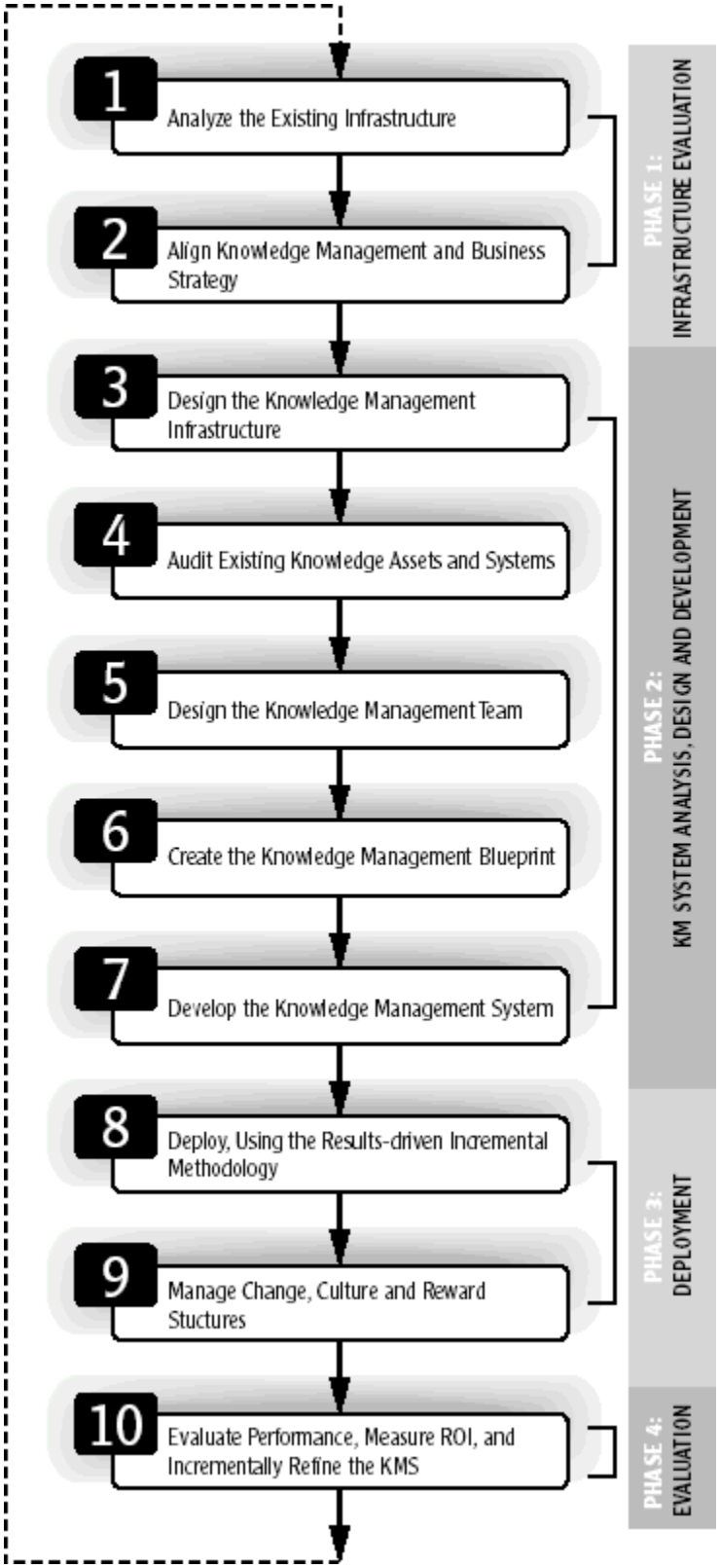
- Understand the 10-step KM road map and how it applies to your company.

- Understand the four phases constituting these 10 steps: infrastructural evaluation; KM system analysis, design and development; deployment; and evaluation.
- Understand where each step takes you.
- Articulate a clear link between KM and business strategy.
- Learn how to prioritize KM support for processes to maximize business impact.
- Understand the key steps involved in knowledge auditing, knowledge mapping, strategic grounding, deployment methodology, teaming, changing management, and return-on-investment (ROI) metrics formulation.
- Use real-options analysis to guide your KM investments.

To grasp the bigger picture, look at the four phases that the 10 steps of the road map comprise:

1. Infrastructural evaluation
2. KM system analysis, design, and development
3. System deployment
4. ROI and performance evaluation

Process:


1
Analyze the Existing Infrastructure
2
Align Knowledge Management and Business Strategy
3
Design the Knowledge Management Infrastructure
4
Audit Existing Knowledge Assets and Systems
5
Design the Knowledge Management Team
6
Create the Knowledge Management Blueprint
7
Develop the Knowledge Management System
8
Deploy, Using the Results-driven Incremental Methodology
9
Manage Change, Culture and Reward Stuctures
10
Evaluate Performance, Measure ROI, and Incrementally Refine the KMS
PHASE 1: INFRASTRUCTURE EVALUATION
PHASE 2: KM SYSTEM ANALYSIS, DESIGN AND DEVELOPMENT
PHASE 3: DEPLOYMENT
PHASE 4: EVALUATION

Business Intelligence and Internet platforms

Definition:

Business intelligence (BI) is often described as "the set of techniques and tools for the transformation of raw data into meaningful and useful information for business purposes.

To distinguish between the concepts of business intelligence and data warehouses, Forrester Research defines business intelligence in one of two ways:

1. Using a broad definition: "Business Intelligence is a set of methodologies, processes, architectures, and technologies that transform raw data into meaningful and useful information used to enable more effective strategic, tactical, and operational insights and decision-making." Under this definition, business intelligence also includes technologies such as data integration, data quality, data warehousing, master-data management, text- and content-analytics, and many others that the market sometimes lumps into the "Information Management" segment. Therefore, Forrester refers to data preparation and data usage as two separate but closely linked segments of the business-intelligence architectural stack.
2. Forrester defines the narrower business-intelligence market as, "...referring to just the top layers of the BI architectural stack such as reporting, analytics and dashboards.

1. Business Intelligence Software:

Business intelligence software is designed with the primary goal of extracting important data from an organization's raw data to reveal insights to help a business make faster and more accurate decisions. The software typically integrates data from across the enterprise and provides end-users with self-service reporting and analysis.

2. Big Data and Business Intelligence:

Big Data is used most extensively today with business intelligence and analytics applications and a number of BI vendors have moved to launch new tools that support Hadoop. For example, SAP offers connectors to Hadoop for SAP BI and Business Objects.

- Integration connectors that make it easier to move data from Hadoop into their tools.
- Data visualization tools that make it easier to analyze data from Hadoop.

3. Business Intelligence Vendors:

The large BI vendors, including SAP, Oracle, IBM, Microsoft, Information Builders, Micro Strategy and SAS, have been around for years, but there is also a number of BI startups that see their products get absorbed as a feature in a larger player's software.

Comparison of Business Intelligence:

- **Comparison with Competitive Intelligence:**

  Though the term business intelligence is sometimes a synonym for competitive intelligence (because they both support decision), BI uses technologies, processes, and applications to analyze mostly internal, structured data and business processes while competitive intelligence gathers, analyzes and disseminates information with a topical focus on company competitors.

- **Comparison with Business Analytics:**

  Business intelligence and business analytics are sometimes used interchangeably, but there are alternate definitions. One definition contrasts the two, stating that the term business intelligence refers to collecting business data to find information primarily through asking questions, reporting, and online analytical processes. Business analytics, on the other hand, uses statistical and quantitative tools for explanatory and predictive modeling.

- **Business sponsorship**:

  The commitment and sponsorship of senior management is according to Kimball et al., the most important criteria for assessment. This is because having strong management backing helps overcome shortcomings elsewhere in the project. However, as Kimball et al. state: “even the most elegantly designed DW/BI system cannot overcome a lack of business [management] sponsorship”.

- **Business needs**:

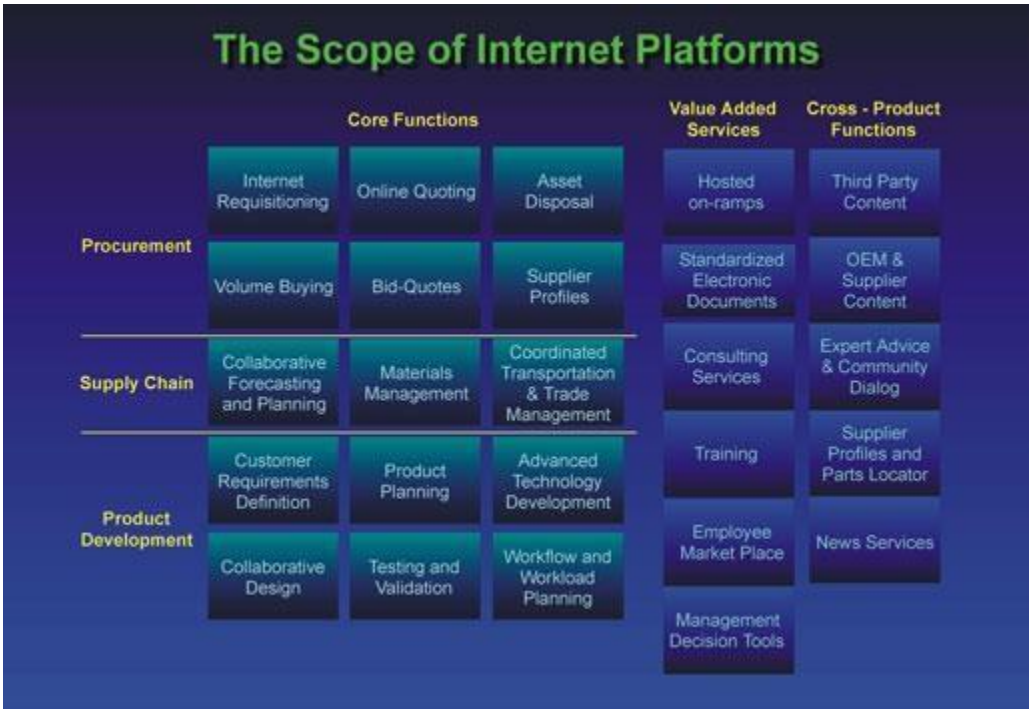
  Because of the close relationship with senior management, another critical thing that must be assessed before the project begins is whether or not there is a business need and whether there is a clear business benefit by doing the implementation. The needs and benefits of the implementation are sometimes driven by competition and the need to gain an advantage in the market.

Internet Platform

The platform defines a standard around which a system can be developed. Once the platform has been defined, software developers can produce appropriate software and managers can purchase appropriate hardware and applications.

The underlying hardware or software for a system. For example, the platform might be an Intel 80486 processor running DOSVersion 6.0. The platform could also be UNIX machines on an Ethernet network.

Scope:



Three Kinds of Platforms

1. Level 1 is what I call an "Access API".

This is the kind of Internet platform that is most common today. This is typically a platform provided in the form of a web services API -- which will typically be accessed using an access protocol such as REST or SOAP.

2. Level 2 is what I call a "Plug-In API".

This is the kind of platform approach that historically has been used in end-user applications to let developers build new functions that can be injected, or "plug in", to the core system and its user interface.

3. Level 3 is what I call a "Runtime Environment".

In a Level 3 platform, the huge difference is that the third-party application code actually runs inside the platform -- developer code is uploaded and runs online, inside the core system. For this reason, in casual conversation I refer to Level 3 platforms as "online platforms"**.**

Web portals

A **web portal** is most often one specially designed web page that brings information together from diverse sources in a uniform way. Usually, each information source gets its dedicated area on the page for displaying information (a portlet); often, the user can configure which ones to display.

Classification:

Web portals are sometimes classified as horizontal or vertical. A horizontal portal is used as a platform to several companies in the same economic sector or to the same type of manufacturers or distributors. A vertical portal is a specialized entry point to a specific market or industry niche, subject area, or interest. Some vertical portals are known as "vertical information portals" (VIPs). VIPs provide news, editorial content, digital publications, and e-commerce capabilities. In contrast to traditional vertical portals, VIPs also provide dynamic multimedia applications including social networking, video posting, and blogging.

Types of Web portals:

1. Personal portals

A personal portal is a web page at a web site on the World Wide Web or a local HTML home page including JavaScript and perhaps running in a modified web browser. A personal portal typically provides personalized capabilities to its visitors or its local user, providing a pathway to other content.

2. Government web portals

At the end of the dot-com boom in the 1990s, many governments had already committed to creating portal sites for their citizens. These included primary portals to the governments as well as portals developed for specific audiences.

3. Cultural portals

Cultural portal aggregate digitized cultural collections of galleries, libraries, archives and museums. This type of portal provides a point of access to invisible web cultural content that may not be indexed by standard search engines.

4. Corporate web portals

Corporate intranets became common during the 1990s. As intranets grew in size and complexity, webmasters were faced with increasing content and user management challenges. A consolidated view of company information was judged insufficient; users wanted personalization and customization.

5. Stock portals

Also known as stock-share portals, stock market portals or stock exchange portals are Web-based applications that facilitates the process of informing the share-holders with substantial online data such as the latest price, ask/bids, the latest News, reports and announcements.

6. Search portals

Search portals aggregate results from several search engines into one page. You can find search portals specialized in a product, for example property search portals.

7. Tender portals

A tender portal is a gateway for government suppliers to bid on providing goods and services. Tender portals allow users to search, modify, submit, review and archive data in order to provide a complete online tendering process.

Information Architecture

Def:

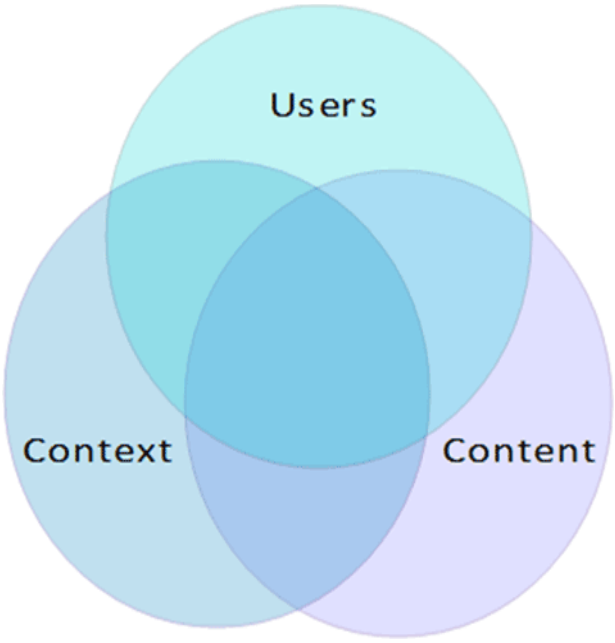
Information architecture (IA) is the structural design of shared information environments; the art and science oforganizingandlabeling websites,intranets, onlinecommunities and software t o support usability and find ability; and an emerging community of practice focused on bringing principles of design and architecture to the digital landscape.

Information Architecture Basics:

Information architecture (IA) focuses on organizing, structuring, and labeling content in an effective and sustainable way. The goal is to help users find information and complete tasks.

To be successful, you need a diverse understanding of industry standards for creating, storing, accessing and presenting information. Lou Rosenfeld and Peter Morville in their book, Information Architecture for the World Wide Web.

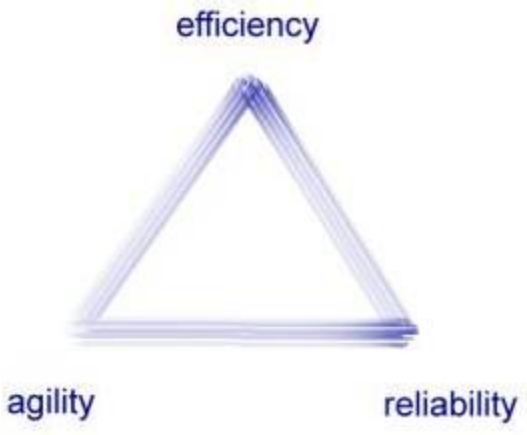
- **Organization Schemes and Structures**: How you categorize and structure information
- **Labeling Systems**: How you represent information
- **Navigation Systems**: How users browse or move through information
- **Search Systems**: How users look for information



In order to create these systems of information, you need to understand the interdependent nature of users, content, and context. Rosenfeld and Morville referred to this as the "information ecology" and visualized it as a venn diagram. Each circle refers to:

- **Context**: business goals, funding, politics, culture, technology, resources, constraints
- **Content**: content objectives, document and data types, volume, existing structure, governance and ownership
- **Users**: audience, tasks, needs, information-seeking behavior, experience

A Three-way Balancing Act



1. Efficiency:

In order to improve something, we need to measure it. We need to get a handle on where our costs are going today. This costing information needs to be on a per service basis.

2. Agility:

We need to be able to move things from development in to production faster. We need to be able to provision new services faster. We need to be able to change the configuration and capacity of existing services faster.

Developing the Process:

Also, bear in mind that the competencies development of managers will not be efficient if the orgnisation doesn't reward or support the new competencies. Imagine sending a manager into a training programme that develops their entrepreneurial behaviors when the manager knows that the organisation (middle managers, resource allocation mecanisms, etc.) don't support the new behaviors! This is what is called learning readiness. In this case, the organisation is not ready.

Successful development requires a simultaneous approach that focuses on individual competency development, organizational development (what barriers exist, etc.) and the

management of the balance between the two (is the organization efficient and effective and what feedback mechanisms help the organization manage the interface).

1. Recruit with care:

When it comes to recruiting a new CIO or CISO, businesses need to take a lot of care. Your CISO candidate may have a peerless CV, but if your CIO isn't fully on board with your choice, and enthusiastic about working with them, there may well be a smarter hire out there.

2. Check your lines of reporting:

Almost half of all North American CISOs report to the IT function, but one in four report directly to the CEO. While there's disagreement on which set-up is smarter, there's no doubt that reporting hierarchy can have a profound effect on the CIO/CISO dynamic. If yours isn't working, consider shaking things up.

3. Keep CISOs aligned with business goals:

The top priority for a CISO may be keeping your data and reputation safe, but that doesn't mean they can't still be plugged in to the wider objectives of your business.

Mystique of learning Organization

Learning Organization:

Organizational learning as the process of "detection and correction of errors." In his view organizations learn through individuals acting as agents for them: "The individuals' learning activities, in turn, are facilitated or inhibited by an ecological system of factors that may be called an organizational learning system".

Leadership Mystique:

Leadership is an individual's ability to inspire, influence, and enable others to contribute toward greater organizational effectiveness. True leaders create a vision, set direction, inspire, motivate, provide containment, and equip their people with objectives, tools, and incentives. Leaders, however, are not only the people at the top of an organization.

However, the ability to lead is not an innate skill. Leaders have to be developed. In many organizations, the tendency is to promote or hire people who have achieved superior results due to their technical skills. The assumption is that these people will be great leaders and managers. But many technically very competent people are not up to making the transition and acquiring the skills/competencies needed to be an effective leader.

Role of Information Systems in the Learning Organization:

- Although, Huber (1991) explicitly specifies the role of IS in the Learning Organization as primarily serving Organizational Memory.
- One instance of use of IS in Knowledge Acquisition is that of Market Research and Competitive Intelligence Systems.
- At the level of planning, scenario planning tools can be used for generating the possible futures.
- Similarly, use of Groupware tools, Intranets, E-mail, and Bulletin Boards can facilitate the processes of Information Distribution and Information Interpretation.
- The archives of these communications can provide the elements of the Organizational Memory.
- Organizational Memory needs to be continuously updated and refreshed.
- The IT basis lies at the basis of organizational rigidity when it becomes "hi-tech hide bound" (Kakola 1995) and is unable to continuously adapt its "theory of the business" .

UNIT-4

Knowledge Management and Information Technology

Definition:

Information technology (IT) is the application of computers and telecommunications to store, retrieve, transmit and manipulate data, often in the context of a business or other enterprise.

Role of Information Technology

Effective performance and growth in knowledge-intensive organizations requires integrating and sharing highly distributed knowledge. Although tacit knowledge develops naturally as a by-product of action, it is more easily exchanged, distributed, or combined among communities of practice by being made explicit. However, appropriately explicating tacit knowledge so it can be efficiently and meaningfully shared and reapplied, especially outside the originating community, is one of the least understood aspects of knowledge management.

The management of explicit knowledge utilizes four primary resources:

- Repositories of explicit knowledge;

- Refineries for accumulating, refining, managing, and distributing that knowledge;
- Organization roles to execute and manage the refining process; and
- Information technologies to support those repositories and processes.

1. The Knowledge Repository:

The design of a knowledge repository reflects the two basic components of knowledge as an object: structure and content. Knowledge structures provide the context for interpreting accumulated content. If the repository is conceived as a "knowledge platform", then many different views of the content may be derived from a particular repository structure.

2. The Knowledge Refinery:

- **Acquisition:** Information and knowledge is either created within the organization or can be acquired from many different internal and external sources.
- **Refining:** Captured knowledge, before being added to the repository, is subjected to value-adding processes (refining) such as cleansing, labeling, indexing, sorting, abstracting, standardizing, integrating, and re-categorizing.
- **Storage and Retrieval:** This stage bridges upstream repository creation to downstream knowledge distribution.
- **Distribution:** This stage represents the mechanisms used to make repository content accessible.
- **Presentation:** The value of knowledge is pervasively influenced by the context of its use. Capabilities should be provided for flexibly arranging, selecting, and integrating the knowledge content.

3. Knowledge Management Roles:

A common weakness in knowledge management programs is the overemphasis on information technology at the expense of well-defined knowledge management roles and responsibilities. Traditional organizational roles typically do not address either knowledge management or the cross-functional, cross-organizational process by which knowledge is created, shared and applied.

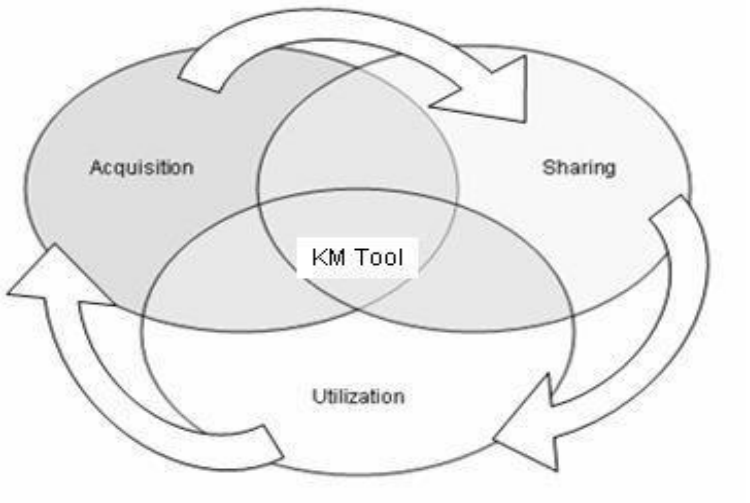
Roles:

The information technology infrastructure should provide a seamless "pipeline" for the flow of explicit knowledge through the 5 stages of the refining process to enable.

- capturing knowledge,
- defining, storing, categorizing, indexing and linking digital objects corresponding to knowledge units,
- searching for ("pulling") and subscribing to ("pushing") relevant content,
- Presenting content with sufficient flexibility to render it meaningful and applicable across multiple contexts of use.

Knowledge Management Tools

Knowledge management efforts typically focus on organizational objectives such as improved performance, competitive advantage, innovation, the sharing of lessons learned, integration and continuous improvement of the organisation.KM efforts overlap with organizational and may be distinguished from that by a greater focus on the management of knowledge as a strategic asset and a focus on encouraging the sharing of knowledge. It is an enabler of organizational learning.



1. Acquisition:

Strategy of buying and selling of various companies to quickly grow a company**.** The process of acquiring products for national defiance.

2. Sharing:

Sharing is the joint use of a resource or space. In its narrow sense, it refers to joint or alternating use of inherently finite goods, such as a common pasture or a shared residence.

3. Utilization:

Utilization is the primary method by which asset performance is measured and business success determined. In basic terms it is a measure of the actual revenue earned by assets against the potential revenue they could have earned.

Tools

KM Strategy

Knowledge management strategy must be dependent on corporate strategy. The objective is to manage, share, and create relevant knowledge assets that will help meet tactical and strategic requirements.

Organizational Culture:

The organizational culture influences the way people interact, the context within which knowledge is created, the resistance they will have towards certain changes, and ultimately the way they share knowledge.

Organizational Processes:

The right processes, environments, and systems that enable KM to be implemented in the organization.

Management & Leadership:

KM requires competent and experienced leadership at all levels. There are a wide variety of KM-related roles that an organization may or may not need to implement

Technology:

The systems, tools, and technologies that fit the organization's requirements - properly designed and implemented.

Politics:

The long-term support to implement and sustain initiatives that involve virtually all organizational functions, which may be costly to implement and which often do not have a directly visible return on investment.

Creative Effective Knowledge Management System

Business enterprises typically are valued at the net tangible assets recorded on their books. When the market value of a firm succeeds its book value, conventional stock market theory regards the premium as the market's assessment of intangible assets or intellectual capital of the firm.

KMS (knowledge management strategies) conceptual model in industries:

There are two types of knowledge involved in industries settings: academic knowledge and organizational knowledge. Academic knowledge is the primary purpose of universities and colleges. Organizational knowledge refers to knowledge of the overall business of an institution: its strength and weaknesses, the markets it serves, and the factors critical to organizational success.

1. Academic Knowledge Framework:

Huang (1998) suggested four major processes to form a culture of knowledge sharing and collaboration. They are: (1) making knowledge visible, (2) increasing knowledge intensity, (3) building knowledge infrastructure, and (4) developing a knowledge culture.

2. Organizational Knowledge Framework:

The most generally recognized four organizational knowledge management strategies are culture, leadership, technology, and measurement (The American Productivity and Quality Center and Arthur Andersen Consulting, 1997).

Despite the issues is better known at the end of this stage of the process knowledge management course, we review the main factors of knowledge management projects fail. The main reasons are as follows:

1. Hasty planning and command and to desire to extract the knowledge of experts.
2. Sheer care on expository aspect of design and sacrificing accuracy for speed.
3. Lack of primary study and evaluating knowledge requirements.
4. Outsourcing justifies irreversible renal extraction process to consultants outside the organization and Disclaimer.
5. Lack of proficiency and familiarity of advisors.
6. Lack of employer and advisor's care to necessity of make culture and planning in order to making physical and spiritual incentives for experts.
7. Mere reliance on a very inefficient and display software to display in bringing the so-called sciences extracted.
8. Designating a too little time in order to extracting skillful and experienced experts.

Model

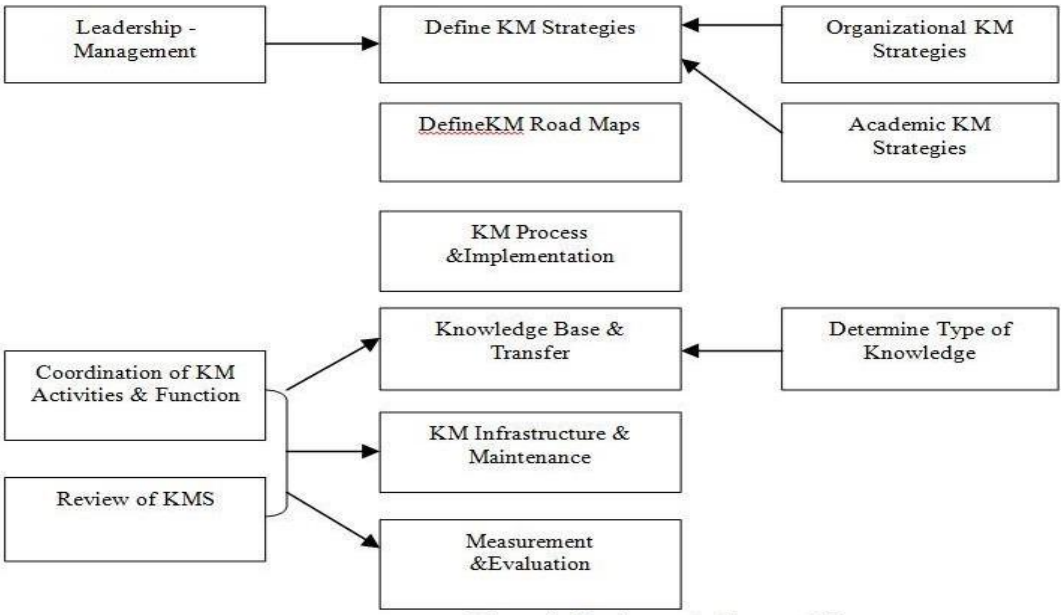


Figure1: implementation model

Core Team is formed as center for KMS for each community, including Router for initial evaluation of knowledge proposal, Reviewer for verification, Structures for categorizing, Editor for formalizing, Category Owner for maintenance and Communicator for knowledge transfer and sharing.

1. Knowledge of consulting field
2. Experience
3. Professional knowledge of consultant
4. Know-how and Experience
5. Time for research and investigation
6. Knowledge
7. Quality of consulting Service
8. Control of service Quality

E-commerce and Knowledge Management

E-commerce:

The buying and selling of products and services by businesses and consumers through an electronic medium, without using any paper documents. E-commerce is widely considered the buying and selling of products over the internet, but any transaction that is completed solely through electronic measures can be considered e-commerce.

Electronic commerce, commonly written as **e-commerce**, is the trading in products or services using computer networks, such as the Internet.

E-commerce businesses may employ some or all of the following:

- Online shopping web sites for retail sales direct to consumers
- Providing or participating in online marketplaces, which process third-party business-to-consumer or consumer-to-consumer sales
- Business-to-business buying and selling
- Gathering and using demographic data through web contacts and social media
- Business-to-business electronic data interchange
- Marketing to prospective and established customers by e-mail or fax (for example, with newsletters)
- Engaging in pretail for launching new products and services

1. Business Applications:

Some common applications related to electronic commerce are:

- Document automation in supply chain and logistics

- Domestic and international payment systems
- Enterprise content management
- Group buying
- Automated online assistant
- Newsgroups
- Online shopping and order tracking
- Online banking
- Online office suites
- Shopping cart software
- Teleconferencing
- Electronic tickets
- Social networking

2. Governmental Regulation:

In the United States, some electronic commerce activities are regulated by the Federal Trade Commission (FTC). These activities include the use of commercial e-mails, online advertising and consumer privacy. The CAN-SPAM Act of 2003establishes national standards for direct marketing over e-mail.

3. Global Trends:

In 2010, the United Kingdom had the biggest e-commerce market in the world when measured by the amount spent per capita.As of 2013; the Czech Republic was the European country where ecommerce delivers the biggest contribution to the enterprises´ total revenue. Almost a quarter (24%) of the country's total turnover is generated via the online channel.

Social impact of e-commerce:

Along with the e-commerce and its unique charm that has appeared gradually, virtual enterprise, virtual bank, network marketing, online shopping, payment and advertising, such this new vocabulary which is unheard-of and now has become as familiar to people.

1. The e-commerce has changed the relative importance of time, but as the pillars of indicator of the country's economic state that the importance of time should not be ignored.

2. The e-commerce offers the consumer or enterprise various information they need, making information into total transparency, will force enterprise no longer is able to use the mode of space or advertisement to raise their competitive edge.

The competitiveness of enterprises will be much more obvious than before, consequently, social welfare would be improved by the development of the e-commerce.

4. The new economy led by the e-commerce change humanistic spirit as well, but above all, is the employee loyalty.

E-commerce in knowledge management:

Knowledge management refers to acquisition, creation, dissemination, and utilization of knowledge. Knowledge is becoming an important resource for today's organizations, and enterprises are keen to deploy this resource to improve their products, services, and processes as well as ensure delivery on demand.

This is due to the fact that KM requires satisfactory systems and controls in place to properly manage and deploy the customer and organizational information. There are two aspects to KM:

- To acquire, store, locate and update the information - for the organization itself for the purpose of process and product improvement
- To share and disseminate contextual information and expert insight - for the benefit of the organization's customers and partners.

E-commerce companies are depending on knowledge management systems for growth, customer acquisition and retention and to manage variable costs.

Better customer targeting:

Controlling customer acquisition and retention costs is one of the top concerns for e-commerce companies. Bike Berry, a large online store for bicycles and accessory kits—most notably engines for motorized two-wheelers—saw that returning customers spent about 30 percent more

than new customers, but was unsure how to correctly align its e-mail advertising efforts to effectively market to those customers while also continuing to attract new customers.

Total Quality Management

Definition:

Total quality management (TQM) consists of organization-wide efforts to install and make permanent a climate in which an organization continuously improves its ability to deliver high-quality products and services to customers.

The key concepts in the TQM effort undertaken by the Navy in the 1980s include:

- "Quality is defined by customers' requirements."
- "Top management has direct responsibility for quality improvement."
- "Increased quality comes from systematic analysis and improvement of work processes."
- "Quality improvement is a continuous effort and conducted throughout the organization."
- Standing cross-functional teams responsible for the improvement of processes over the long term

Activities of TQM

There are a number of evolutionary strands, with different sectors creating their own versions from the common ancestor. TQM is the foundation for activities, which include:

- Commitment by senior management and all employees
- Meeting customer requirements
- Reducing development cycle times
- Just in time/demand flow manufacturing
- Improvement teams
- Reducing product and service costs
- Systems to facilitate improvement
- Line management ownership
- Employee involvement and empowerment
- Recognition and celebration
- Challenging quantified goals and benchmarking

- Focus on processes / improvement plans
- Specific incorporation in strategic planning

Principles of TQM

The key principles of TQM are as following:

Management Commitment

- Plan (drive, direct)
- Do (deploy, support, participate)
- Check (review)
- Act (recognize, communicate, revise)

Employee Empowerment

- Training
- Suggestion scheme
- Measurement and recognition
- Excellence teams

Continuous Improvement

- Systematic measurement and focus on CONQ
- Excellence teams
- Cross-functional process management
- Attain, maintain, improve standards

Customer Focus

- Supplier partnership
- Service relationship with internal customers
- Never compromise quality
- Customer driven standards

The Concept of Continuous Improvement by TQM

A central principle of TQM is that mistakes may be made by people, but most of them are caused, or at least permitted, by faulty systems and processes. This means that the root cause of such mistakes can be identified and eliminated, and repetition can be prevented by changing the process.

There are three major mechanisms of prevention:

1. Preventing mistakes (defects) from occurring (mistake-proofing or poka-yoke).
2. Where mistakes can't be absolutely prevented, detecting them early to prevent them being passed down the value-added chain (inspection at source or by the next operation).
3. Where mistakes recur, stopping production until the process can be corrected, to prevent the production of more defects. (Stop in time).

Benchmarking

Definition:

Benchmarking is the process of comparing one's business processes and performance metrics to industry bests or best practices from other companies. Dimensions typically measured are quality, time and cost. In the process of best practice benchmarking, management identifies the best firms in their industry, or in another industry where similar processes exist, and compares the results and processes of those studied to one's own results and processes.

Benefits & use:

In 2008, a comprehensive survey on benchmarking was commissioned by The Global Benchmarking Network, a network of benchmarking centers representing 22 countries. Over 450 organizations responded from over 40 countries. The results showed that:

1. Mission and Vision Statements and Customer (Client) Surveys are the most used of 20 improvement tools, followed by SWOT analysis (72%), and Informal Benchmarking (68%). Performance Benchmarking was used by 49% and Best Practice Benchmarking by 39%.
2. The tools that are likely to increase in popularity the most over the next three years are Performance Benchmarking, Informal Benchmarking, SWOT, and Best Practice Benchmarking. Over 60% of organizations that are not currently using these tools indicated they are likely to use them in the next three years.

The term benchmarking was first used by cobblers to measure people's feet for shoes. They would place someone's foot on a "bench" and mark it out to make the pattern for the shoes.

Procedure:

There is no single benchmarking process that has been universally adopted. The wide appeal and acceptance of benchmarking has led to the emergence of benchmarking methodologies.

The 12 stage methodology consists of:

1. Select subject
2. Define the process
3. Identify potential partners
4. Identify data sources
5. Collect data and select partners
6. Determine the gap
7. Establish process differences
8. Target future performance
9. Communicate
10. Adjust goal
11. Implement
12. Review and recalibrate

Types of Benchmarking:

Within these broader categories, there are three specific types of benchmarking:

1) Process benchmarking,

2) Performance benchmarking and

3) Strategic benchmarking.

These can be further detailed as follows:

1. Process benchmarking:

The initiating firm focuses its observation and investigation of business processes with a goal of identifying and observing the best practices from one or more benchmark firms. Activity

analysis will be required where the objective is to benchmark cost and efficiency; increasingly applied to back-office processes where outsourcing may be a consideration.

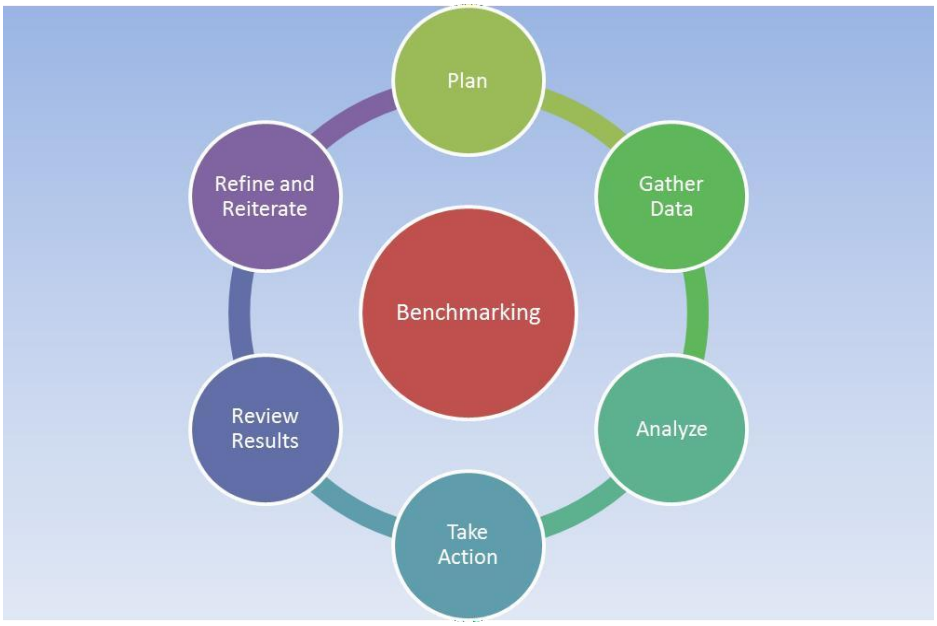
2. Performance benchmarking:

Allows the initiator firm to assess their competitive position by comparing products and services with those of target firms.

3. Strategic benchmarking:

It involves observing how others compete. This type is usually not industry specific, meaning it is best to look at other industries.

Process



UNIT-5

Future of Knowledge Management and Industry perspective

Industry:

The manufacturing or technically productive enterprises in a particular field, country, region, or economy viewed collectively, or one of these individually.

Industry perspective:

Industry supporters of the program cite many advantages, ranging from device design experience to understanding regulatory considerations to learning to work in multidisciplinary settings.

1. We believe this program provides a very good understanding of the full life cycle needs for medical device design, manufacturing, regulatory, funding, and marketing.

2. Bridging the gap between basic research and commercialization is an important need, and the MBID program appears well-suited to address this need.

Companies on the road to knowledge management:

Firms do not only compete to sell their product, but also to acquire the best resources/inputs. One of these resources is the acquisition of skilled labor.
Labor is a resource that has the capacity to make a difference in any organization.

In my view, the

1. **Importance of capturing knowledge** has to be decided on before firms embark on the

2. **Process of capturing knowledge** as it is a costly process.

According to Aarit Tiwana (2002) there are **10 Steps in a Knowledge Management Road Map**

1. **Analyze Existing Infrastructure:** This implies that in knowledge management process you need to know what you presently have in your company. Then identify the gap by evaluating your present resource for KM and then build up on it to close the gap.
2. **Align Knowledge Management and Business Strategy**: knowledge is not managed for the

sake of managing it. Companies have to take into account and align their KM strategy with their business strategy

3. **Knowledge Management Architecture and Design:** One must select the infrastructural components that constitute the KM system architecture.

4. **Knowledge Audit and Analysis:** It is a good thing to know the existing knowledge that an organisation owns.

5. **Design the Knowledge Management team:** Organize a team with relevant expertise to design the knowledge management system.

6. **Create the KM Blue Print:** The knowledge Management Team builds a KM blue print that provides a plan for building and incrementally improving KM system

7. **Develop the Knowledge Management System:** This is about putting together a working system of the KM

8. **Pilot Testing of the Developed KM System:** The test helps to make sure that if the KM systems meet the need of users

9. **Leadership and Reward Structure:** After putting the system in place, you need your employees to use it. Your employees are not like troops they rather like volunteers. You must encourage your employees to use the system and come up with new ideas.

10. **Real-option Analysis for Knowledge Management:** This is about computing the return on investment using the best metrics. This helps to see the impact of the KM system and lets you refine KM design through subsequent iterations".

Challenges and Future of Knowledge Management

In its basic form, knowledge management is about converting available raw data into understandable information. The information is then placed in a reusable repository for the benefit of any future need based on similar kinds of experiences. Knowledge management contributes towards streamlining the ideas problems, projects and deployment driving towards productivity.

But, it’s more than just knowing everything your organization knows, it’s creating a synthesis between the people and the information to the point that the whole is more than the sum of the parts.

Today's Knowledge Management Challenges

1. **Security.** Providing the right level of security for knowledge management is key. Sensitive information should be shielded from most users, while allowing easy access to those with the proper credentials.
2. **Getting people motivated.** Overcoming organizational culture challenges and developing a culture that embraces learning, sharing, changing, improving can't be done with technology. There is no use in launching a tool if there is no drive to share the knowledge.
3. **Keeping up with technology.** Determining how knowledge should be dispensed and transferring it quickly and effectively is a huge challenge. Constantly changing structures mean learning how to be smart, quick, agile and responsive – all things a KM tool must be able to accomplish.
4. **Measuring knowledge.** Knowledge is not something that can be easily quantified, and is far more complex because it is derived out of human relationships and experience. The focus should be on shared purpose rather than results or efforts.
5. **Overcoming shared leadership.** KM tools allow others to emerge as voices of power within an organization. Workers are given a "voice", which can sometimes cause internal conflict.
6. **Keeping data accurate.** Valuable data generated by a group within an organization may need to be validated before being harvested and distributed. Keeping information current by eliminating wrong or old ideas is a constant battle.
7. **Interpreting data effectively.** Information derived by one group may need to be mapped or standardized in order to be meaningful to someone else in the organization.
8. **Making sure information is relevant.** Data must support and truly answer questions being asked by the user, and requires the appropriate meta-data to be able to find and reference. Data relevancy means avoiding overloading users with unnecessary data.
9. **Determining where in the organization KM should reside.** Does KM fall under HR, IT, communications? This decision will determine what drives your knowledge sharing initiative and who will be responsible for maintaining the community.

10. **Rewarding active users.** Recognizing the users who actively participate and contribute to a knowledge database will not only encourage them to continue contributing, but will also encourage other users to join.

Overcoming Knowledge Management Challenges

Knowledge, learning and sharing come from people and their relationships with one another, not necessarily from the tools, databases and technological aids used. However, with the proper technology in place you can facilitate better communication and overcome these challenges to have an up-to-date, secure and organized knowledge base.

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The emerging academic discipline of knowledge management

Martin Grossman
Bridgewater State College, mgrossman@bridgew.edu

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Martin Grossman
Department of Management
Bridgewater State College
Bridgewater, MA 02325, USA
mgrossman@bridgew.edu

ABSTRACT

Although knowledge management (KM) has gained worldwide recognition as an important strategic imperative, its integration into academia has lagged. A review of the literature, as well as an examination of information systems (IS) curriculum models, was performed to determine how KM related courses are being integrated. The analysis revealed that KM is still not considered appropriate as an integral component of the undergraduate IS curriculum; rather it is more prevalent in optional courses or those covering advanced topics, and integrated into the curriculum at the graduate level. The sluggish adoption of KM into mainstream academia is countered by an increasing demand for KM professionals in the marketplace. Examination of several web resources reveals the emergence of new professional categories and job titles related to KM and a growing certification industry. The article also presents a preliminary analysis of KM related doctoral dissertations, written over the last two decades. Findings reveal a steady growth in the number of such dissertations, as well as a widening array of research topics. Data on degree type, nation of origin, and academic discipline are presented along with ideas for future research in this area.

Keywords: Knowledge management, KM, MIS curriculum models, academic discipline, dissertation research

1. INTRODUCTION

Entering into its second decade, the field of knowledge management (KM) has started to coalesce into a unique discipline. While there may be a few that denigrate the field as being nothing more than a rehash of information management (Wilson, 2002), KM has outlived the point at which most management fads start to decline (Ponzi and Keoenig, 2002). Indeed, there does not seem to be any waning of interest in knowledge management.

Knowledge management encompasses much more than information systems (IS) management. According to Dr. Yogesh Malhotra, a well-known pioneer in the field and founder of the BRINT Institute, knowledge management

> "… *refers to the critical issues of organizational adaptation, survival and competence against discontinuous environmental change. Essentially it embodies organizational processes that seek synergistic combination of data and information processing capacity of information technologies, and the creative and innovative capacity of human beings."* (www.brint.com).

A survey of CEOs of U.S. companies found that knowledge management was judged to be one of the most important trends in today's business environment, surpassed only by globalization (MacGillivray, 2003).

Knowledge management initiatives have been implemented at some of the world's largest and well known corporations, such as Accenture, Cable & Wireless, DaimlerChrysler, Ernst & Young, Ford, Hewlett Packard, and Unilever (Rao, 2005). Knowledge management is not only being adopted at the corporate level; it is being embraced by international development institutions and national governments (Jarboe, 2001; Malhotra, 2003). As rapid advances in information and communication technology (ICT) drive the world further towards a global, 'knowledge economy', companies and countries alike must adapt to an ever-changing and increasingly competitive landscape. The leveraging and management of knowledge assets is seen by many to be the most critical factor in obtaining and sustaining competitive advantage (Grant, 1996; Stewart, 1997).

In spite of the general acceptance of the concept, there is still a lack of consensus with regard to the definitions and underlying precepts of KM. Jones (2006) stresses the fact that KM is not merely about information systems and information technology, that it relies heavily on social and cultural components, and that it overlaps with a number of other disciplines (organizational development, innovation, competitive intelligence). Dalkir (2005) refers to at least 100 published definitions of knowledge management, stressing the multidisciplinary nature of the field of study and the need to consider different perspectives (business, cognitive science, or technology) when defining the discipline. Much

work still needs to be done to formalize the theoretical frameworks, models, and procedures that are necessary to serve managers and which are critical to solidify KM's position as a unique and valuable discipline. In order for this to happen, KM needs to become more infused into the academic curriculum. Chen, Chiu and Fan (2003), professing that KM will be the focus of business administration in the 21st century, call for colleges and universities to develop adequate channels for the training of KM professionals. At a recent international conference on intellectual capital, leading KM gurus (including Karl Sveiby, Leif Edvinsson, and Hubert Saint-Onge) made the plea for academia to "pick up the KM torch", that is, to promote more doctoral research in the area and to provide more formalized education and training. This was suggested as an alternative to leaving KM strictly to practitioners, who use it to solve problems by the 'seat of their pants' (Dalkir, 2005. p. 16).

2. THE KM PROFESSION

If knowledge management is not merely repackaged information management or information technology, the KM professional will require a broader set of skills. Todd and Southon (2001) suggest the following skill-sets for the knowledge management professional: (1) people skills – networking, sharing, team work, (2) cognitive skills – analysis, synthesis, oral and written communication, (3) management skills – change management, human resources management, project management, (4) organization and business skills – policy formulation, vision, marketing, (5) information processing skills – recording, storage and retrieval, content management, (5) information technology skills – data base design, web publishing, use of groupware software. Calling for a blend of technical and business skills in management is certainly nothing new. Indeed, the concept of the 'hybrid manager' (O'Conner and Smallman, 1995), popular several years ago, encapsulates the same notion.

It is tempting to question whether the concept of the 'KM professional' actually exists in the minds of hiring managers and whether there is a significant market for individuals with such skills. The amount of activity on the most popular on-line job boards certainly would suggest that both are the case. For example, a search on Monster.com, with the keywords 'knowledge management', resulted in over 1000 hits, each representing an active position. A cursory examination of several of the job listings provides insight into the type of individual currently in demand and highlights the fact that KM is a multifaceted discipline requiring a balanced mix of technology, business and people skills.

1. **Knowledge Management Manager** - Serves as an internal consultant to the organization leading the active sharing of knowledge and managing the collection, sanitization, and organization of that knowledge (case studies, pitch materials, industry overviews, etc.) to support the development and efficiency of the organization. The Manager will work to develop and maintain standards in the knowledge base, and will be responsible for upkeep of the knowledge management center.
2. **Knowledge Management Specialist** - Design, develop, market and manage the knowledge resources that help the firms litigators deliver effective and efficient work product for our clients. Work closely with our litigation attorneys, legal support staff, software programmers and financial analysts to manage a variety of KM projects.
3. **Knowledge Management Specialist** - Supports the organizational Knowledge Management Lead to formulate and define system scope and objectives for knowledge management projects. Assists clients in defining knowledge content, organization, and key words. Prepares detailed specifications for knowledge management programs to include process definition for knowledge capture and management. Has technical knowledge and responsibility for knowledge management applications and analyses. Oversees the design of knowledge management user interface features, site animation, and special knowledge management features including enhancing the look and feel of the organization's online knowledge management screens. Works with organization web designers, data managers and programmers to support and implement the organization's knowledge management program. Requires an understanding of knowledge management principles, procedures and processes. Responsible for supporting the work of the organization's knowledge management team.
4. **Knowledge Specialist** - Responsible for managing the build of the Common Repository. Recommend and design methods and processes for maintaining and updating the knowledge capital resources. Investigate and monitor other project knowledge bases and any sharing as appropriate. Ensure the quality and integrity of documents published. Provide management reporting on knowledgebase content (updates, participation etc.). Develop and enhance the processes for collecting and organizing content.
5. **National Knowledge Management Project Manager -** Manage multiple project teams to identify KM needs throughout the US firm and to explore process-based solutions to address those KM needs. Work closely with designated project sponsors and other stakeholders to define approach and scope of desired capabilities. Provide significant input to or create documented business requirements to capture requested capabilities. Partner with business sponsors and industry and/or functional customers to identify and prioritize requirements. Participate in discussions of capabilities, deployment timeframes and trade-off decisions. Manage projects to identify and/or implement enhancements to existing KM processes. Perform project management tasks for multiple projects simultaneously - including managing resources, issues, communications, budgets and pilots for projects.

Some of the better known companies in search of KM talent were Ernst & Young, PricewaterhouseCoopers, Computer Sciences Corporation, IBM and General Dynamics. In addition, a large number of smaller consulting and recruiting firms were advertising open positions.

KnowledgeRecruit, part of a London and New York based executive search focusing specifically on KM related placement (http://www.tfpl.com/permanent_recruitment/clients/knowledgerecruit.cfm), outlines the following KM position profiles: (1) **Chief Knowledge Officer** - lead in the development of corporate culture, processes, infrastructure and information resources to facilitate the creation and utilization of corporate knowledge, expertise and information to create competitive advantage and support creativity. (2) **Knowledge Department Manager -** develop the understanding of knowledge assets and needs in all divisions and manage and promote the effective supply and use of knowledge, (3) **Knowledge Coordinator/Information Specialist -** manage the effective supply and use of internal information and its integration into the corporate knowledge base, (4) **Knowledge Management Analyst -** provide information management support to knowledge teams and to undertake analytical research to support business teams, (5) **Knowledge Coordinator -** manage the provision of value added research to sales departments, (6) **Knowledge Administrator -** manage the acquisition and provision of external business information and to identify and maintain links with corporate sources of business information.

Another sign indicating a market for KM professionals is the proliferation of certification programs offered by non-academic, professional organizations. Some of the vendors in this space are: (1) **International KM Institute** (http://www.kminstitute.org/index.php) offering the Certified Knowledge Manager (CKM) certification, (2) **Knowledge Management Professional Society** (http://kmpro.org) offering the Certified Knowledge Manager (CKM) and the Master Certified Knowledge Management Professional (MKMP) certifications, (3) **Global Knowledge Economics Council** (http://www.eknowledgecenter.com/certificationcourses/CertTracks.htm) offering the Certified Knowledge Manager (CKM), Certified Knowledge Environment Engineer (CKEE), and Certified Knowledge Economics (CKE) certifications, and (4) **Knowledge Management Consortium International** (www.kmci.org) offering the Certificate in Knowledge and Innovation Management (CKIM) and the KMCI Advanced Certificate Program. As in other certification programs, these claim to teach the most essential skills needed in today's job market (within a one to five day seminar), and promise to put the aspiring professional on the 'fast-track' to career advancement.

3. ACADEMIC KM PROGRAMS

Not surprisingly, the literature relating to knowledge management as an academic discipline is scarce. Most of the existing references frame the discussion in the context of the graduate as opposed to undergraduate curriculum. Ruth, Theobald and Frizzel (1999) were perhaps the first researchers to address the diffusion of KM into the academic curriculum. Pointing to the delay that often exists between industry practice and university courses, the authors lament the severe shortage of KM related courses in universities. To help alleviate this problem, and to hasten the assimilation of KM into mainstream curricula, the authors offer guidelines derived from their early forays into KM education at the International Center for Applied Studies in Information Technology (ICASIT) at George Mason University. They argue that KM is particularly appropriate as an interesting graduate level elective because it is primarily about upper management as opposed to technology issues, it presents ample opportunity to examine failures as well as successes, and it can be presented from multiple perspectives. The recommended core ingredients of a graduate level KM course are composed of the following modules: (1) knowledge creation, (2) history of KM theory and concepts, (3) importance of trust, (4) strategic issues in KM, (5) knowledge coding, (6) hardware/software/systems, (7) KM ROI/evaluation, and (8) international issues.

Chaudry and Higgens (2001) analyzed the offerings of 37 knowledge management courses offered by universities in Australia, Canada, Singapore, UK and USA. They found that most offerings were in MIS or MBA programs within business, computing and information schools and that most were at the graduate level. The authors also scrutinized the contents of the KM courses, narrowing the curriculum areas into five main themes: (1) foundations, (2) technology, (3) process (codification), (4) applications, and (5) strategies. Those KM courses offered in business schools had more of an emphasis on such topics as intellectual capital, measurement, and business cases, while those in IS focused more on knowledge repositories and the development and management of content.

To date, the most exhaustive study on KM in the academic curriculum comes from Sutton (2002), who identified 79 KM graduate programs offered by 47 institutions around the world. Programs were categorized according to the following disciplines : (1) business, commerce, management, (2) artificial intelligence, cognitive science, computer science, computer systems, information systems, software engineering, (3) information and media, information management, information science, library and information studies, (4) information technology, systems engineering, (5) knowledge science, (6) continuing education, other. Analysis of the data revealed that the largest number (37%) fell in category 3, which is predominantly made up of graduate schools of Library and Information Science. Other findings in this study were that the U.S had the majority of programs (followed by the UK and Australia/New Zealand), and that there was a shortage of undergraduate degree programs.

Several articles describe examples of integrating KM into the curriculum at a particular college or university. Reichgelt, Zhang and Price (2002) consider Knowledge Management as a major concentration (along with Project Management, Systems Development and Support, Telecommunications and Network Administration, and Web and Multimedia Foundations) in the IT baccalaureate program at Georgia Southern University. The track includes courses in data management, decision support systems, information organization and retrieval, and knowledge discovery and data mining.

Argamon, et al. (2005) describe the extension of the undergraduate Computer Science program at the Illinois Institute of Technology to embrace KM related themes. The development of a new specialization option in Information and Knowledge Management Systems (IKMS) is described. The IKMS specialization is composed of core areas in text

analysis, data mining, information retrieval, and database systems and consists of five upper-level undergraduate courses. The capstone course in the sequence requires students to work on team-based projects to build realistic knowledge management applications, combining the development of new software systems with the use of existing technologies.

Al-Hawamdeh (2005) stresses the interdisciplinary nature of KM and argues for a balanced and practical approach to developing a KM curriculum. The author describes the development of a graduate program in KM at the Nanyang Technological University in Singapore, an effort motivated in large part by a strong demand for KM professionals in that country. Among the courses included in the program were: Learning Organization, Business Intelligence, Electronic Records and Document Management, Electronic Commerce and Knowledge Management, Knowledge Discovery and Data Mining, Human Capital Management, and Knowledge Management Measurement.

Steenkamp and DeGennaro (2004) detail an initiative to develop a doctoral program in Management in Information Technology (DMIT). Knowledge management is included as one of several possible topics that would receive in depth analysis within a course entitled *Advanced Topics in IT*. The class deals with the development of an enterprise wide knowledge management framework and includes exploration of KM methodology and architecture.

George Mason University's ICAST maintains a site called KM in Academia which includes information on course materials, degree programs, research centers, syllabi, teaching case studies, and training providers (http://www.icasit.org/km/academia/index.htm). Of the programs referenced (predominantly in British, Australian, Canadian and American universities), 18 were at the Masters level, 5 were doctoral programs, and 10 were certification programs. No undergraduate programs were listed.

4. KNOWLEDGE MANAGEMENT AS PART OF THE IS CURRICULUM

In the current analysis, several information systems (IS) curriculum models were inspected to determine the extent of KM's presence. Information systems integrates information technology solutions and business processes to meet the needs of businesses and other organizations. Alternative names commonly used to describe degree programs related to IS are: Management Information Systems, Computer Information Systems, Information Management, Business Information Systems, Informatics, Information Resources Management, Information Technology, Information Technology Systems, Information Technology Resources Management, Accounting Information Systems, Information Science and Information and Quantitative Science (Gorgone et al., 2002). Curriculum models are meant to guide the development of courses that address the marketplace and which are academically sound. This section describes IS curriculum models and the extent to which they include the concept of KM as a component.

The Organizational & End-User Information Systems (OEIS) Model Curriculum (Hunt, 2004) is sponsored by the Organizational Systems Research Association (OSRA). The purpose of the model, which focuses exclusively on the undergraduate curriculum, is to specify the competencies needed by today's new breed of information technology specialists. The OEIS model recognizes that many of today's jobs are focused on end-users, as outsourcing continues to move many software development jobs off-shore. Thus, the model addresses programs geared to prepare undergraduates for entry and mid level, non-programming positions such as software trainer, PC support specialist, technology coordinator, Web designer, helpdesk administrator, network analyst, process improvement manager and director of online learning. Although not specified as a core course within the model, KM is given the status of an optional, senior-level course. Entitled *Collaborative Technologies and Knowledge Management*, the course provides an introduction to group decision support systems (GDSS), electronic meeting management, web-based groupware applications, and other collaborative technologies. In addition, the course delves into the theoretical background of knowledge management and organizational learning. The recommended breakdown of content for this course is as follows:

1. Communication, organizational and instructional factors (30%) - covers interpersonal, group and organizational factors that promote technology based collaboration.
2. Business process analysis and meeting facilitation (30%) - planning and facilitation of meetings to analyze existing and needed business processes, set goals and objectives, make decisions, and devise plans for implementing instructional and business decisions
3. Technology implementation (20%) – participation in group activities using collaborative technologies, planning and establishment of electronic, web-based meeting agenda, facilitation of meetings using groupware technology tools
4. Knowledge Management (20%) – KM trends and issues; challenges in building KM systems, the knowledge management life cycle; knowledge creation, transformation, and architecture.

In a study by Hunt et al. (2004), alumni from universities and colleges in the U.S. were asked to assess the level of importance of the different OEIS Model Curriculum objectives on a 5-point Likert scale (5 = critical importance; 1 = no importance). The survey questions relating to KM were scored rankings of 3.4 and 3.5. While not an overwhelming endorsement, the rankings indicate a positive perception of the relevance of the KM related objectives in the OEIS model.

The IRMA/DAMA Model Curriculum (Cohen, 2000) describes an international information resources management curriculum for a four-year undergraduate level program. Its intent is to "prepare students to understand the concepts of information resources management and technologies, methods, and management procedures to collect, analyze and disseminate information throughout organizations in order to remain competitive in the global business world". Knowledge management is explicitly acknowledged as a technical component of information resources in today's organization, and is included under the category of Information Systems Architecture. However, there is no

further mention of KM and it is not included in any of the suggested core courses.

Another model, the Informatics Curriculum Framework for Higher Education (ICF-2000) (Mulder and Weert, 2000), contains no reference whatsoever to knowledge management or anything closely related to it. A more conspicuous omission is evident in the IS-2002 model (Gorgone et al., 2002), a collaborative effort of three predominant professional organizations in the field of IS and computing: Association for Computing Machinery (ACM), Association for Information Systems (AIS), and Association of Information Technology Professionals (AITP). The IS-2002 has become the primary IS curriculum model and is updated every few years to reflect the changing requirements of IS professionals.

The MSIS2006 Curriculum initiative is an update of a guideline established by the AIS and ACM for course inclusion in the IS graduate curriculum (Gorgone et al., 2005). The latest iteration, updated from the previous one in 2000, has incorporated some new content areas which are more in line with the rapidly changing business environment. Major areas in the new guideline include: (1) business processes, (2) globalization, (3) impacts of digitization, (4) human-computer interactions, and (5) emerging technologies and the inclusion of several new business, IS management and technology courses to reflect these broad areas. Although there are no courses specifically labeled Knowledge Management, the topic itself figures prominently in several of the proposed course offerings (Emerging Technologies and Issues, and Enterprise Modeling). See Table 1 for a summary of the models evaluated.

Level	Curriculum model	Inclusion of 'knowledge management'
Undergrad	IRMA/DAMA - 2000	KM acknowledged as a technical component of Information Resources Management under the category of Information Systems Architectures. No further mention of KM as an integral part of the curriculum.
	OEIS-2004	Included in the Collaborative Technologies and Knowledge Management senior level (optional) course.
	IS-2002	No mention of KM
	ICF-2000	No mention of KM
Graduate	MSIS-2006	Included as a core topic in the courses Emerging Technologies and Issues and Enterprise Modeling

Table 1 - KM in IS Curriculum Models

5. ACADEMIC RESEARCH IN KNOWLEDGE MANAGEMENT

Another way to gauge the acceptance of KM into academia is to examine the number and type of dissertations being written that deal with some aspect of KM. Sutton (2002) only found 15 doctoral dissertations that in any way referenced KM between 1980 and 2001. The ICASIT site (http://www.icasit.org/km/academia/list_of_phd_dissertation.pdf) does a bit better, with 137 dissertations between 1991 and 2002. Table 2 reveals a marked increase of dissertations starting in 1998.

Year	Frequency	Percent
2002	31	.23
2001	26	.19
2000	28	.20
1999	21	.15
1998	13	.9
1997	6	.4
1996	3	.2
1995	1	.1
1994	5	.4
1993	0	0
1992	2	.1
1991	1	.1
Total	137	100.0

Table 2 – KM Dissertations
Adapted from ICASIT (www.icasit.org)

Perhaps no one has picked up the KM torch more vigorously than Michael Stankosky, who launched the KM doctoral graduate program at George Washington University (GWU). The program, which offers a D.Sc. degree, has become a major producer of KM dissertations over the last few years. The KM curriculum, developed by Stankosky and his colleagues, is based on a four-pillar framework of KM composed of (1) leadership/management – stresses the need for integrative management principles and techniques; influenced primarily by systems thinking, (2) organization – deals with the operational aspects of KM drawing mainly from systems engineering principles and techniques, (3) learning – deals with organizational behavioral aspects such as collaboration and knowledge sharing, (4) technology – deals with the information technology that supports or enables KM strategies. A number of dissertations, written between 2000 and 2004 at GWU, have recently been compiled and published in book form (Stankosky, 2005).

5.1 Analysis of dissertation database

To supplement the existing data, an analysis of KM related dissertation records taken from the database *Dissertations and Theses* (available via PROQUEST DIRECT) was performed. A query with the term 'knowledge management' in the Citation and Abstract field resulted in 327 dissertations written between 1981 and 2004. Figure 1 shows the distribution of dissertations by year. As in the ICASIT data, we see the number of dissertations start to increase dramatically in 1998.

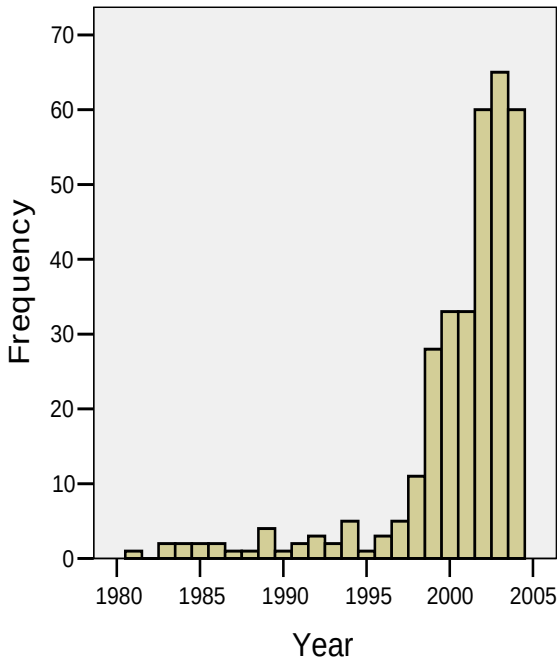

Figure 1 – KM Dissertations/Year

Country	Frequency	Percent
U.S.A.	269	82.3
Canada	15	4.6
Finland	7	2.1
Sweden	7	2.1
Spain	6	1.8
South Africa	5	1.5
China	4	3
Switzerland	3	.9
The Netherlands	3	.9
Norway	3	.9
United Kingdom	2	.6
Belgium	1	.3
Poland	1	.3
Australia	1	.3
Total	327	100.0

Table 3 – KM Dissertations/Country

In agreement with previous studies, this study confirms that KM is being researched by universities across the globe. Table 3 reveals that U.S. universities are by far the most prolific producers of KM related doctoral dissertations.

It is evident from the data on degree type, that KM is a dissertation topic appropriate for many different terminal degrees. The PhD has the highest representation, with 82.3% of the sample (see Table 4). The terminal degree in education, the Ed.D, comes in a distant second, with the D.Sc. (skewed due to Stankosky's prolific group at George Washington University) and the DBA right behind.

Degree	Frequency	Percent
Ph.D	257	78.6
Ed.D.	20	6.1
D.Sc.	13	4.0
D.B.A.	12	3.7
Dr.	7	2.1
D. Phil.	4	1.2
Dr. ing.	3	.9
Dr. Tech.	2	.6
Dr.sc.tech	2	.6
D.I.B.A	1	.3
D.P.S	1	.3
D.P.A.	1	.3
Educat.D	1	.3
Fil.dr.	1	.3
D.M	1	.3
Psy.D	1	.3
Total	327	100.0

Table 4 – KM Dissertations/Degree

The diversity of degree types should be expected. Knowledge management draws from many different disciplines and can be applied to numerous areas of inquiry. Dalkir (2005) specifies the following areas which are directly related to KM: (1) organizational science, (2) cognitive science, (3) linguistics, (4) information technology (knowledge-based systems, document and information management, and database technologies), (5) information and library science, (6) technical writing and journalism, (7) anthropology and sociology, (8) education and training, (9) storytelling and communication studies, (8) collaborative technologies (groupware, intranets, extranets, portals, and other web technologies).

Stankosky (2005) provides the following list of KM study impact areas, again demonstrating the multidisciplinary nature of the field: systems theory, risk management assessment, intelligent agents, management of R&D, Decision Support Systems, modeling and simulation, data mining / data warehousing, Enterprise Resource Planning (ERP), business process engineering, systems analysis, systems engineering, leadership, ethics, communications theory, organizational psychology, visualization, groupware, virtual networks, strategic planning, Management-by-Objectives, Total Quality Management, management theory, MIS, database design / DBMS, data communications and networks.

To gain a better understanding of which areas are being addressed in KM academic research, an analysis of the dissertations' primary subject areas was performed. The *Dissertations and Theses* database has a field called Subject which includes one or more descriptive words, originally entered by the dissertation author. For this analysis, only the first-entered word was used and pegged to one of five categories derived from a common taxonomy of academic disciplines (http://en.wikipedia.org/wiki/Academic_disciplines). The majority of dissertations (80.1%) were in the Professions/Allied Sciences category (see Table 5). Humanities/Arts and Social Sciences were also represented, with 9.8% and 8.9% respectively.

Discipline	Frequency	Percent
Professions / Allied Sciences	262	80.1
Humanities and Arts	32	9.8
Social Sciences	29	8.9
Math and Computer Science	3	.9
Natural Science	1	.3
Total	327	100.0

Table 5 – KM Dissertations/Academic Disciplines

Table 6 shows a breakdown of the subcategories within the Professions/Allied Sciences category. Approximately 67% of the dissertations are within the Business sub-discipline. Education and Engineering ranked 2nd and 3rd with 14.1% and 8.8% respectively.

The finding that KM is being addressed most prominently in business and management related research is certainly reasonable, especially since IS topics are also included in this category within this taxonomy. Drilling down further into the Business category was not attempted at this point, since a deeper level of analysis is reserved for a future study. The semantic value of these discipline categories is rather limited and only provides a very broad view of the topical content of KM dissertations. The actual abstracts, in which the authors summarize the essence of the research, would be a much more valuable resource to evaluate. In a future study, the narratives will be coded using a qualitative software package, and analyzed to uncover a deeper understanding of the themes and theoretical frameworks used.

Sub Discipline	Frequency	Percent
Business	176	67.2
Education	37	14.1
Engineering	23	8.8
Public affairs and community service	10	3.8
Health sciences	5	1.9
Journalism and mass communications	4	1.5
Library and information sciences	4	1.5
Design	2	.8
Family and consumer science	1	.4
Total	262	100.0

Table 6 – KM Dissertations/Professions and Allied Sciences

6. CONCLUSION

In today's turbulent business environment drivers such as globalization, technological innovations, and an ever-changing work force, make the capture and codification of corporate knowledge a number one priority and a strategic imperative. Over the past two decades, the field of knowledge management has emerged to address this need, creating a new career path, along with certifications offered by professional organizations. The present study was undertaken to determine how academia is buying in and incorporating KM into the curriculum. A review of the literature and web resources revealed that KM is primarily being offered at the graduate level, although undergraduate and university-based certification programs are also present to a lesser extent. IS curriculum models were also examined. In general they have not caught up with industry, and poorly reflect the need for inclusion of KM as a core curricular item. While knowledge management has not seen rapid adoption in the classroom, it has become a popular topic for doctoral research. An analysis of dissertations between 1981 and 2004 revealed a surge in KM dissertations being written starting around 1998. Analysis of existing descriptive data revealed that most KM dissertations are from American universities, written to obtain a PhD terminal degree, and related to business topics.

There is a need for further research to understand the adoption of KM as an academic discipline. A more exhaustive and comprehensive analysis needs to be done to better understand the types of courses and certifications being offered around the globe. As previously stated, the same dissertation dataset used in this study will be mined for underlying thematic content. Much can be derived from doing a similar type of analysis on syllabi to determine which topics, cases and resources are being incorporated into KM courses. Those in the KM education business need to share 'best practices' in much the same way as those in any other industry. Understanding how KM is being taught and researched will help educators hone their craft as the discipline matures.

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AUTHOR BIOGRAPHY

Martin Grossman is an Assistant Professor in the Department of Management at Bridgewater State College. Dr. Grossman received a DBA in Information Technology Management and a Masters in International Business from Nova Southeastern University and a BS in Computer Systems from Florida Atlantic University. He has over twenty years of IT experience in the aviation and communication industries. Dr. Grossman's current research interests include knowledge management, e-learning, and technology innovation. He regularly publishes his work in peer-reviewed conference proceedings and journals.

Implementing Knowledge Management in School Environment: Teachers' Perception

Kai Wing Chu*

CCC Heep Woh College
171, Po Kong Village Road, Tze Wan Shan, Kowloon, Hong Kong
E-mail: chukwalex@yahoo.com.hk

Minhong Wang

Faculty of Education
The University of Hong Kong, Hong Kong
E-mail: magwang@hku.hk

Allan H.K. Yuen

Faculty of Education
The University of Hong Kong, Hong Kong
E-mail: hkyuen@hkucc.hku.hk

*Corresponding author

Abstract: Knowledge Management (KM) can be used as an alternative strategy by schools to help teachers equipped with relevant skills to face the challenges to improve performance as its uses in commercial sectors. However, little research has been undertaken on how KM can be applied to school environment. To put KM into action, it is crucial to understand teachers' perception of KM at the outset. The study was carried out in a typical Hong Kong secondary school. Interviews, based on relevant KM models, were conducted to understand teachers' perception of KM. We found that knowledge sharing, people, culture and knowledge storage with IT support were regarded as important from the interviewees' points of view. Most interviewees might accept that KM can help improve their practice but it needs the support of various dimensions such as people, culture, IT and management. The findings may provide insights for KM implementation in the school.

Keywords: Knowledge Management; Teacher Learning; Teacher Perception

Biographical notes: Kai Wing CHU is a principal of a Hong Kong secondary school. He is currently pursuing Doctor of Education in the University of Hong Kong. His research interest is implementing Knowledge Management in schools for teacher professional development.

Minhong Wang is an Assistant Professor in the Faculty of Education, The University of Hong Kong. She received her Ph.D. in Information Systems from City University of Hong Kong in 2005. Her current research interests include e-learning, Web-based training and professional development, knowledge management, complex process management, and information systems. She has published papers in Information & Management, Computers & Education, IEEE Transactions on Education, Educational Technology & Society, Expert

Systems with Applications, Knowledge-based Systems, Journal of Knowledge Management, among others. She is the Editor-in-Chief of Knowledge Management & E-Learning: an International Journal (KM&EL), and serves on the Editorial Board of several international journals.

Allan H.K. YUEN is Associate Professor of the Faculty of Education of the University of Hong Kong. His research interests are evaluative and comparative studies on information technology in education, learning community and knowledge building, technology acceptance and educational change, and mathematics and computer studies education.

1. Introduction

Organizations are starting to understand and appreciate knowledge as the most valued asset in the emerging competitive environment (Bailey & Clarke 2000；Nonaka & Takeuchi 1995). Davenport and Prusak (1997) defined knowledge enterprise from the primary activities involved. They identified activities such as acquisition, creation, packaging or application of knowledge. The objective of Knowledge Management (KM) is to improve the quality of the contributions people make to their organizations by helping people to make sense of the context within which the organization exists, to take responsibility, to cooperate and share what they know and learn, and to effectively challenge, negotiate and learn from others. Organizations have the potential to learn and that new knowledge may be effectively incorporated into specific practices, so that the knowledge is accessible when needed. Schools, like most organizations, should learn and gain knowledge so as to improve decision making and innovation especially in the age of increased external and internal pressures for change and improvement. KM can be used as a strategy by schools to improve competitive performance. Zhao (2010) points out that school KM can facilitate acquisition, sharing and application of teacher knowledge in school so as to better manage and apply schools' tangible and intangible knowledge assets, especially the professional knowledge, experiences and competencies of teachers. Several recent studies have explicitly called for new research to focus on KM in schools (Chu, Wang, Zhou & Yuen, 2009; Ge et al., 2006; Wang & Jia, 2005, Zhao, 2010). In Hong Kong, there have been very few empirical studies that shed light on this topic. In this paper, KM at organizational level will be the focus. This study is the starting point to look for insight into the design and implementation of KM initiatives at organization level and minimize the obstacles in KM practice in a secondary school.

The rest of the paper is organized as follows. Section 2 gives a brief introduction of KM and discusses the need for KM in schools as well as the key factors of KM implementation, which were used to design the interview questions for investigating teacher perception of KM in this study. In Section 3, the motivation of the study is addressed and the research questions are presented. Section 4 provides details of the interviews conducted in the selected school. The results of the study are presented in Section 5. Finally, Section 6 concludes the study and gives insight into and suggestions for further work.

2. Related Work

2.1. Knowledge Management (KM) in Schools

KM is not a new concept. Barron (2000) defines KM as "an integrated, systematic approach to identifying, managing and sharing all of an enterprise's information assets, including databases, documents, policies and procedures, as well as previously unarticulated expertise and experience held by individual workers." According to Zack (1999), a typical KM process includes five stages: acquisition, refining, storage and retrieval, distribution and presentation. Nevertheless, the nature of knowledge is complex; many people try to identify what knowledge is from different perspectives. There are two common ways to distinguish knowledge. Some scholars, like Kogut and Zander (1996), distinguish between know-what and know-how (practical knowledge) while others, like Nonaka (1994), prefer to use the distinction between tacit and explicit knowledge based on Polanyi's (1967) theory. In general, tacit knowledge is hard to articulate and transfer, and has been linked with know-how; explicit knowledge is relatively easy to articulate and codify, and has been linked with know-what. A good KM system must treat all sorts of knowledge, from know-what to know-how, and from tacit to explicit. This is the greatest difficulty for the implementation of a KM project. Meanwhile, the complexity of what knowledge means has led to different approaches to managing knowledge.

In a climate of increased external and internal pressures for improvement, the information needs of school teachers and administrators have never been greater, yet the perils of information overload are real. Schools, like most organizations, should learn and gain knowledge so as to enhance teacher competency. There are many sorts of knowledge, which need to be managed in schools. Cochran-Smith and Lytle (1999) provide a valuable distinction in the types of knowledge that inform practice: knowledge of practice, or information about student performance, and knowledge for practice, or information about best practice. Teachers develop and acquire different kinds of knowledge in school where KM should be applied to facilitate managing teachers' knowledge.

KM can also be used as an alternative strategy by schools to improve competitive performance. Petrides and Nodine (2003) consider broadly that knowledge management in education can be thought of as a framework or an approach that enables people within an organization to develop a set of practices to collect information and knowledge mentioned above and share what they know, leading to action that improves services and outcomes. In seeking to balance an organization's information culture and its technology culture, KM brings together three core organizational resources – people, processes and technologies- to enable the organization to use and share information and knowledge more effectively. For people, organizations should promote policies and practices to help them share and manage knowledge. KM builds upon collegial and professional teamwork by actively engaging people at many organizational levels in sharing with others what they know, and what they are learning. For processes, Petrides and Nodine (2003) reminded us that formal and informal administrative procedures, curriculum development processes, information sharing patterns, information silos, salary incentives, award schemes and many other work practices affect information flow within every organization. KM initiatives help to establish robust processes that enable people to get the information they need when they need it, as well as to share it with others who may benefit from it. KM can help to promote those processes that lead to a more informed decision making. For technologies, Petrides & Nodine (2003) state that it is the most

effective platform for target groups to access and exchange useful information across departments. Therefore, KM can be used to better manage knowledge for schools not only by building up people networks but by also enriching knowledge in school communities by processes and technologies to improve school's competitive performance.

2.2. Key Factors of Knowledge Management

The study is based on the KM framework of Rodrigues and Pai (2005). Developing a suitable KM strategy is the key element of KM implementation. The framework advocates a variety of KM strategies as applied to different settings. In order to develop a suitable KM strategy for schools, we need to identify the key factors or variables of KM. The framework of Rodrigues and Pai (2005) was adopted. Rodrigues and Pai (2005) list eight key factors. The eight dimensions are listed as follows: -

Table 1. Key Factors of KM Implementation (Rodrigues & Pai, 2005)

Key Dimensions	Descriptions
Leadership and Support	management team's support of an organization's KM activities.
Technology and Infrastructure	effectiveness of the organization's IT infrastructure and the appropriation of an organization's technology utilization
Knowledge Creation	knowledge creation in the workplace
Acquisition and Learning	methods to improve organization member's knowledge searching and learning
Dissemination and Transfer	enablers and facilitations of transferring knowledge and information within the organization
Application and Exploitation	employee's attitudes and requirements for applying knowledge and putting it into practice
People Competency	effects of employees' personal skills and competencies regarding handling KM
Sharing Culture	enablers and facilitations of building positive culture for knowledge-sharing

These eight dimensions include most typical KM enablers and activators. This framework was developed and applied in an educational institution to measure KM performance. We adopted this framework as the theoretical basis of our study to investigate the key factors of KM implementation in schools.

3. Reasons for the Study

This study focused on teacher's perception of KM implementation in schools from an organizational perspective. School teachers' understanding and expectations of KM in the school environment were investigated. The motivation of the study includes the following three aspects:

Firstly, collecting data regarding employees' perception of KM is necessary preparation for any KM practice. In the KM framework according to Wiig (1999), the initial step of a KM project should be "Survey and map the knowledge landscape" (pp. 3-6). However, some researchers focus on the measurement of an organization's deposit of knowledge and the characteristics of that knowledge (tacit/explicit) (Boisot, MacMillan, & Han, 2007). They tend to ignore the employees' opinion on the way to implementing KM. This, in many cases, will cause the failure of a KM project (McCampbell, Clare, & Gitters, 1999). Knowing teachers' perceptions and opinions about KM factors is therefore an important precondition for the success of a KM project in schools. In this study, interviews to collect and understand teacher's perception of KM implementation were conducted.

Secondly, this study continued the previous study (Chu et al., 2009) of investigating teacher's perception of KM using a survey instrument developed by Rodrigues and Pai (2005). The result showed that "Leadership", "Interpersonal Trust", and "Management Trust" were regarded as the three most important factors of KM implementation. The aim of this study is to further examine teacher's perception of implementing KM in depth.

Thirdly, although KM technology is now mature enough to be applied in practice across sectors, the integration of KM and education administration is still a newborn phenomenon. Most KM researchers do not have a background in education and they always neglect the gap between KM and KM in schools. We claim that a KM project in a school needs knowledge and suggestions from the teachers, who are experts in education and pedagogy. Through this study, we want to explore teachers' perception of KM in schools in terms of KM implementation.

Therefore, the research questions of the study are:

1. What are teachers' understanding of Knowledge Management and its benefits to school and themselves?
2. What are teachers concerns about KM implementation?
3. What pre-requisites do teachers expect for KM implementation?
4. What benefits do teachers anticipate from KM implementation?

4. Methodology

4.1. Background

This study is treated as the first step of an action research in a selected secondary school. This is a typical secondary school in Hong Kong. Although the school has already installed an Intranet system with efficient and user-friendly functions including e-mail, broadcast, uploading and downloading document, storing teaching and learning materials, monitoring student progress, and an e-learning platform for staff and students, little knowledge management has been initiated in the school. Besides, several servers have been installed for sharing files among teachers, and collaboration among teachers, such as "Lesson Study" for co-planning and co-evaluating the lessons in various subjects in the school have been launched for several years.

4.2. Research Procedure

Because teachers are key players in organization knowledge creation (Nonaka & Takeuchi, 1995), they are the core subjects in this study, and understanding their perception of KM is the focus of this research. All teachers were invited to participate in a voluntary interview by means of returning a letter of consent to the researcher. Most of the teachers (56 out of 62) were willing to participate. 33 teachers were randomly selected from the teachers who were interested. Two groups of external interviewers (each consisting of one main interviewer and one assistant) were recruited and allocated to conduct interviews with standard interview questions and protocols. Each interview lasted for about 20-30 minutes with voice recording under participants' agreement. All interviewees' answers were summarized, recorded and translated from Cantonese into English in the appendix. Back translation of the results has been done to verify their validity. Interviewees' answers have been analyzed to identify the main points or themes occurring in the process. Interviewees were identified using codes like A1 or B12, with letter A or B representing the interview groups and the numbers representing the number of persons in the respective group.

Several measures were adopted to minimize any psychological stress and discomfort in the process. Firstly, the primary researcher did not monitor or supervise the interview process. Secondly, teachers participating in the project could withdraw at any time they liked. Furthermore, if any teachers did not feel comfortable or felt worry about the interview, they would be given the interview questions by intranet email one evening before. Interviewers tried their best to keep teachers' anonymity. The process of the interviews had been approved by the supervisors and HKU research ethic committee before the interviews started.

4.3. Research Framework

Interview questions were designed according to the framework adopted from Rodrigues and Pai's (2005) the eight dimensions KM enablers and activators model. The relationship between the interview questions, research questions and framework are listed below:

Table 2. Relationship between interview questions, research questions and framework of conceptualization

Interview Questions	Research Questions Addressed	Relations to the Framework of this Study
a、 *Understanding of KM:* Have you heard about knowledge management? What's your understanding of KM?	What is teachers' understanding of Knowledge Management	understand teachers' conception of KM. Do teachers know the components of KM implementation, such as "Knowledge Creation", "Acquisition and Learning", "Dissemination and Transfer", "Application and Exploitation" ?
b、 *Concerns about KM* What are your feelings about the implementation of knowledge management in	What are teachers concerns of KM	investigate teachers' self confidence, self efficacy, self perceived competencies, attitude or feeling about the eight KM

your school? What are your concerns?	implementation	dimensions.
c、*Prerequisites for Support of KM :* To put KM into action, we need support from different quarters, such as people, culture, management and IT. What issues do you think are important for putting KM into action in your school, and why are they important?	What pre-requisite teachers expect for KM implementation	understand teachers' perceived importance of KM components in implementation in future, such as "Leadership and Support", "Technology and Infrastructure", "People Competency", and "Sharing Culture" or their perceived readiness of these components above at that time.
d、*Expected Outcomes of KM* What do you expect to achieve from promoting and implementing KM in your school?	What benefits teachers anticipated for KM implementation	study teachers' attitude and feelings about KM, which can in turn affect "People Competency", and "Sharing Culture" and reflect their potential involvement in KM implementation in school.

5. Results

Common patterns for analysis were identified in the interviewees' responses.

5.1. Understanding of KM

Most teachers did know the meaning of Knowledge Management (KM), although their scope of KM was not so broad and they did not know too much about KM components. They mentioned some main points of KM as follows:

Table 3. Analysis of The Interviewee Response of the question: 'Have you heard about knowledge management? What's your understanding of KM?'

Main points mentioned by interviewee	Interviewee
Knowledge sharing	A3, A4, B9, B10, B14, B18
Knowledge storage	A8, B16, B17, B18
Knowledge transfer	B6, B13
Conversion of Tacit Knowledge to Explicit Knowledge	A6, B12
Knowledge Access	A8
Knowledge Categorization	A1
Knowledge Searching	B11
Protect knowledge	A12
Combine knowledge	A11
Update knowledge	B8

Most interviewees regarded the most important function of KM as the sharing and storage of knowledge. They were aware that knowledge could be an asset of an organization. This knowledge had its value and should be stored, shared and even protected to prevent the loss of knowledge from the organization. They also realised that knowledge should be converted from tacit knowledge to explicit knowledge, so that it could be readily shared or transferred within the organization. This can be concluded say that they commended "Dissemination and Transfer" were most prominent in KM. Some interviewees further thought about the reusability of the knowledge; they thought that the knowledge stored in the school should also be categorized, so that the searching of useful information and its retrieval could be easily achieved. Furthermore, knowledge also needed to be combined and updated for better use. Their ideas indicated that they knew the need of "Application and Exploitation" in KM. However, the other KM components, such as "Knowledge Creation" and "Acquisition and Learning" seemed to be neglected.

5.2. Concerns for Implementing KM

Most interviewees were concerned about the implementation of Knowledge Management (KM) in school. They mentioned some main points of KM implementation as follows:

Table 4. Analysis of The Interviewee Response of the question: 'What are your feelings about the implementation of knowledge management in your school? What are your concerns?'

Main points mentioned by interviewee	Interviewee
Knowledge sharing	A2, A4, A7, A8, A9, A11, A15, B1, B2, , B3, B4, B5,B7, B8, B9, B10, B11, B12, B16, B17
Knowledge transfer	A5, A6,
Knowledge capture and acquisition	A12, A13
IT support	A3, A6, A12
Support to Novice teacher	A7, A9
Building up a knowledge base	A7,A10, B9
Culture	A2, B11, B17
Mutual Support	B1
Retention or loss of knowledge	A5

Most interviewees emphasized there should be knowledge sharing when Knowledge Management (KM) would be implemented in school. Interviewees expected that teachers could share their experience in class teacher's work (A6), teaching method or best practice (A7), teaching experience (B5 and B10) and student personal information (B2). They seemed to demonstrate that they had self confidence and self efficacy in sharing experience. Some interviewees thought that sharing could help them perform their job efficiently because teachers could use other teachers' experience (B7). They reflected positive attitudes or feelings towards knowledge sharing. Some interviewees were aware that the materials shared might not be useful to all teachers (A15 and B16). Some interviewees were also aware that teachers might not be willing to share their experience with others (A4) or teachers had no time to share (B10). They also expressed worries or negative feelings or attitudes towards knowledge sharing.

Interviewees noted the need of sharing, transfer and retention of knowledge, otherwise knowledge would be lost when some teachers left the school (A5 and A6).

From the interviewees' perspective, IT support was also important to promote the implementation of KM (A3, A6, A12). IT facilities should be strengthened, especially the forum and knowledge repository (storage space) (A7, A10, B9) to set up a platform for sharing and storing of knowledge. Although the school personnel were commonly using the intranet system, it was mostly used to send and receive emails and assignments. Its usage could be exploited. Moreover, the system should be well designed to be user friendly and conveniently and commonly used in daily practice. Culture was also regarded as important in the implementation of KM (A2, B11, B17). The interviewees mentioned learning culture (A2), consensus (B11) and sharing culture (B17). A culture with a common positive attitude to learning and sharing was thought to be essential to the implementation of KM. These opinions showed their feelings about inadequate conditions of IT support and culture for KM. School should address their needs by improvement in IT support and culture.

Some interviewees thought that KM could help experienced teachers transfer their experience to novice teachers, especially teaching methods, best practice and the knowledge that could not be easily learned from courses, such as skills in managing students' behaviour (A7 and A9). The need for mentoring was expressed.

Finally, one interviewee expressed that knowledge sharing could also bring mutual support to teachers (B1). It showed the positive elements of KM.

The points mentioned above were those offered by interviewees about the implementation of KM in this school.

5.3. Prerequisites for Implementing KM

Most interviewees mentioned the prerequisites for support of implementation of Knowledge Management (KM) in school. They mentioned some main prerequisites for support of KM implementation as follows:

Table 5. Analysis of The Interviewee Response of the question: 'To put KM into action, we need support from different quarters, such as people, culture, management and IT (explain if possible). What are the issues you think more important for putting KM into action in your school, and why are they important?'

Main points mentioned by interviewee	Interviewee
All (people, culture, management and IT)	A2, A3, A13, B11
People	A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B13, B14
Culture	A6, A15, B6, B7, B8, B12, B15, B16, B17, B18
IT support	A4, A5, A15, B10
Management	A14

Some interviewees thought that people, culture, management and IT were all important for Knowledge Management (KM) to be implemented successfully in schools (A2, A3, A13, B11). However, out of the four conditions of KM implementation, most of

the interviewees regarded "people" (A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B13, B14) and "culture" (A6, A15, B6, B7, B8, B12, B15, B16, B17, B18) as the two most important conditions of KM implementation. These two conditions were quite related and mutually dependent. Therefore, if the school personnel would like to implement KM in school, they should firstly change the perceptions or attitudes of people and the culture of the organization. Interviewees reflected that they needed communication and interaction to understand the benefits of KM, and they pointed out that the school personnel needed to convince staff to be involved in KM. They noted that they also needed trust to encourage knowledge sharing and coordination is required to balance the conflict of interests. Interviewees concluded that a culture of willingness to share their own knowledge and trusting each other are very important for implementing KM. Some interviewees reflected that at present the culture to allow knowledge sharing in the researched school at present has not yet been established and they understood that such culture would need considerable time to be inculcated. The opinions above showed the importance and readiness of KM components of "People Competency" and "Sharing Culture", as well as "Leadership and Support".

IT support was also regarded by interviewees as a condition for KM implementation, such as "categorization of knowledge" and "storage and retrieval" (A4, A5, A15, B10). Some interviewees also complained that the existing system failed to serve teachers neither for knowledge sharing nor for daily practice, and it should be upgraded. The opinions can be regarded as the importance of another KM components "Technology and Infrastructure".

Finally, management support was also regarded as necessary for implementation of KM (A14) but not as important as other conditions. The interviewees pointed out that leadership and top management support would empower staff to implement KM actively. This belonged to the KM components of "Leadership and Support".

5.4. Expected Outcomes of KM

Most interviewees expressed the expected outcomes of Knowledge Management (KM) in school. They mentioned some main expected outcomes of KM implementation as follows:

Table 6. Analysis of The Interviewee Response of the question: 'What do you expect to achieve from promoting and implementing KM in your school?'

Main points mentioned by interviewee	Interviewee
Learning of experience from others	A1, A4, A6, A7, A9, A11, A12, B5, B7, B15
Sharing Knowledge	A4, A5, B11, B12, B14, B17, B18
Time saving, efficient work	A4, A5, A10, A13, A15, B17
Getting useful information	A8, A15, B1, B2, B8, B10
Benefits to students	A3, A4, A14, B13
Self enhancement	A2, B4
Sharing Culture	A5, B9
Problems Solving	A7
Enhancing Harmony and Communication	A3
Materials storage for future use	B4,

Most interviewees emphasized knowledge sharing when Knowledge Management (KM) would be implemented in school. Most interviewees noted that KM could help them learn experience from others (A1, A4, A6, A7, A9, A11, A12, B5, B7, B15) and acquire shared knowledge (A4, A5, B11, B12, B14, B17, B18). They felt that KM could allow them to acquire experience and knowledge to improve their practice. They would be more efficient and competent in their practice (A4, A5, A10, A13, A15, B17), and their teaching performance would improve. They felt that it could also help them get information they needed (A8, A15, B1, B2, B8, B10). This could make their practice beneficial to students (A3, A4, A14, B13). Interviewees thought that teachers would also gain self enhancement from the knowledge they acquired (A2, B4). They also felt that a sharing culture would be built up (A5, B9) to facilitate further knowledge sharing. Some interviewees pointed out that KM could help problem solving (A7), enhancing harmony and communication and building up storage of material for future use (B4). They mostly thought that KM could empower their competency to enhance their productivity. They seemed to express their eagerness and positive attitude towards KM. It may be advantageous to develop "People Competency" and "Sharing Culture" in KM implementation in future.

6. Conclusion and Discussion

As an initial investigation of KM implementation in a selected secondary school, this study investigated teachers' perceptions of KM implementation via interviews. Most existing research has investigated KM in schools from the point of view of experts or even outsiders, and few studies have investigated teachers as end user's of KM implementation. Therefore, the results might help us understand KM in the school environment from the participants' viewpoint. This study might also serve as a diagnostic step in further study of KM in schools, i.e., developing a better understanding of key problems to be dealt with in KM implementation in schools. Based on the literature review, we designed the interview questions and conducted interviews in the school in this study. The interview involved 4 questions to study teachers' perceptions of KM implementation: Understanding of KM, Concerns of KM, Needs for Support of KM and Expected Outcomes of KM.

From the interviewees' response to the question of "Understanding of KM", we found that teachers recognized KM was important for organization to manage knowledge as an asset that can be stored, shared, transferred or transformed among members. They could know that "Dissemination and Transfer" and "Application and Exploitation" were the essential KM components, but they might have neglected the essence of other KM components such as "Knowledge Creation" and "Acquisition and Learning". Therefore, some formal and systematic training may be necessary to help teachers realize the overall picture of KM. From the results of the question of "Concerns of KM", we found that teachers did emphasize the benefits of knowledge sharing and also showed their self confidence and self efficacy in knowledge sharing in their daily practice, as well as showing their worries and drawbacks concerning KM implementation. More collaboration could be organized to provide opportunities for sharing among teachers to strengthen their confidence and positive attitudes towards KM as well as strengthening the trust among staff so as to minimize negative feelings. Teachers further pointed out that IT support and culture were also critical but inadequate to promote KM implementation and therefore they needed to be improved. In the part on "Prerequisites for Support of KM", IT and culture support together with people and management support, which were the key KM components: "Technology and Infrastructure", "Sharing

Culture", "People Competency" and "Leadership and Support" were further noted for their importance in facilitating KM implementation. Among them, people and culture were most frequently mentioned among interviewees. Actually, people and culture were regarded in this study as closely related and mutually dependent conditions. Interviewees reflected that communication, interaction and trust among teachers did foster building up a community with a sharing culture in schools for KM implementation. Interviewees also expressed that the school needed to enhance the four KM components as conditions for KM implementation. For the part on "Expected Outcomes of KM", most interviewees expected that KM could help them acquire information, experience and knowledge from others to improve their practice and enhance their competence and efficiency in their work. Moreover, KM was believed to enhance the building up of a sharing culture, which emphasizes organizational problem-solving, collegiality and shared resources in school. They showed their positive attitude to KM and may welcome KM implementation in future.

In conclusion, the eight key components in the framework of the study can help us understand teacher's perceptions of KM in school. From this study, we can note that the four KM components: "Knowledge Creation", "Acquisition and Learning", "Dissemination and Transfer", "Application and Exploitation" are the *Process Components* of the KM components and the other four components: "Leadership and Support", "Technology and Infrastructure", "People Competency" and "Sharing Culture" are the *Condition Components* of the KM components. Schools need to provide training to teachers to allow them learn more about the process components, so that teachers could have better "People Competency" and "Sharing Culture". Moreover, the other *Condition Components*: "Leadership and Support" and "Technology and Infrastructure" should also be strengthened to facilitate KM implementation. Both *Process Components* and *Condition Components* need to be addressed in order to foster teachers' positive attitudes, feelings or perceptions towards KM and minimize those worries or other negative attitudes, feelings or perceptions and in turn facilitate KM implementation.

We have to admit that, because of the limitations of the interview, the results of this research might not be valid in other scenarios. However, the study contributed to new knowledge by examining perceptions of teachers as end users of KM implementation in a school environment. Since most other research has been performed to develop theoretical approaches, or has investigated KM implementation on a larger scale involving a number of schools, little research has been done concerning teacher's perception in a designated school. The research is valuable as it deepens the understanding of KM in schools regarding preparation for its implementation. These findings in turn provide insight into the further study of KM implementation in schools. In this research, some issues are still unresolved, for example: "Do subjects and gender really influence teacher's attitude to team work and technology in KM?" Different methods, such as focus group interviews and surveys, should be further used in this project. Also, further studies should be conducted in other schools with different backgrounds and characteristics in order to validate the results we found in this study, so that a more complete picture of KM implementation in a school environment can be viewed.

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Knowledge Management:

An Overview

Knowledge management is defined by Business Dictionary (2013) as strategies and processes designed to identify, capture, structure, value, leverage and share an organisation‟s intellectual asset to enhance its performance and competitiveness. KM process is a synergic mix of human, communication and IT tools (Basu & Sengupta, 2007). The greatest challenge which most managers face in both developed and developing countries is to raise the productivity of knowledge and services. An institution has to raise productivity of knowledge and services to meet the challenges from competitors in the field. As societies become more and more knowledge-based, "the organisations that can identify, value, create and evolve their knowledge assets are likely to be more successful than those that do not" (Mavodza & Ngulube, 2012). The aim of knowledge management is to support learning organisations that provide all employees with access to corporate memory so that both the individuals and organisations as a whole improve. Re-use of knowledge is done all the time during knowledge sharing, interaction and it benefits an individual who sought the advice of a more experienced colleague. Also re-use of knowledge provides long-term advantages; thus necessary systems are critical for harnessing knowledge (Frappaolo, 2006). Managing Knowledge is accompanied by an ability to retain in the institution, more efficient and effective knowledge workers so as to boost the competitiveness in the market place and improved profitability. A successful Knowledge Management implementation requires that senior management understands the organisation‟s needs with a clear vision for its future, a grasp of the range of technologies available for enabling the KM process that applies the organisation‟s business and experience (Bergerson, 2003). KM practices are founded on four pillars: Knowledge acquisition both internally and externally (suppliers, customers, partners and competitors), knowledge sharing, knowledge reuse and knowledge creation (Frost, 2012: Gamble & Blackwell 2001). KM strategy sets the direction of these practices whereas the achievement of best practices is dictated by good leadership and culture; with good processes and technology being key enablers (Frost, 2012)

Knowledge Management (KM) has increased in popularity and credibility as a management tool, as well as a research discipline, over the past decade. There have been concerns about whether KM is simply a fad, and researchers and academics have debated its faddish like characteristics.

The researchers, and this paper adopts the view that KM certainly is not a fad for different reasons, and agree with Stankosky's view that one of these reasons is that the knowledge-economy is here to stay (Stankosky, 2005). This paper does not present this debate however does present the view that the researchers have taken. Pontzi et al (2002), supports this view in their article "Knowledge management: Another management fad?", and used the article-counting technique and applied it to the concept of Knowledge Management in order to illuminate its current state of development. They also contend that KM has faddish characteristics; however, introduces empirical evidence that proposes that a typical management movement generally reveals itself as a fad in approximately five years, and that KM has survived the 5-year period. His findings suggest that KM is in the process of establishing itself as a new aspect of management (Ponzi, 2002). Knowledge Management is therefore said to be slowly but surely capturing the attention of many organisations in a quest for competitive advantage (Boahene, 2003). KM is a term that has not only gained credibility over the years by virtue of the increased research projects on the subject but also through the increased application of it as a management tool within business organisations. In 2000, Rowley (2000) asked the question, "Is Higher Education ready for Knowledge Management?". This paper investigates the perceptions of Knowledge Management within Higher Education in 2008 as a management tool, and presents the nature of academics and universities, and the related challenges for KM implementation within this context. The research uses the Grounded Theory methodological approach combined with a case study of 7 Higher Education Institutions. The paper begins with a brief introduction to the UK Higher Education context given in relation to its history and the Knowledge Economy, then presents the research framework and some of the initial findings that emerged from the analysis, finally, the paper ends with some concluding remarks.

Knowledge Management in Institutions of Higher Learning

Global Perspective

Institutions of higher learning today need to focus on how to enhance the students‟ quality and skills to cope with the labour market demands. Changing nature of work increases the need for twenty-first century skills preparation (Mahdinezhad, 2011). Knowledge management increases institutional innovation as knowledge is the source of new ideas, hence an institution could boost the efficiency, effectiveness, and quality of graduates who can satisfy the employers‟ needs at

the entry level of employability in future (Ramakrishnan & Yasin, 2012 as cited by MMHE, 2012). This knowledge has to be collected, conserved, and made accessible to everybody in the organisation (Madhar, 2010). KM initiatives are expanding across institutions of higher learning. The competitive benefits of KM efforts have been demonstrated and documented in the industry, government and in the academic world. For instance, towards achieving the objective of its Vision 2020, Malaysian Public Institutions of Higher Education‟s contribution to the Vision is the production of knowledgeable human power or knowledge workers to the country. As other non-profit organisations, Malaysian Public Institutions of Higher Education have taken the challenge of the implementation of KM in their respective organisations on board (Abu-Bakar & Alias, 2005). Many educational institutions want better ways of transforming knowledge into effective decision-making and action. Thus, institutions of higher learning focus on making individual knowledge re-usable for the achievement of their missions. To achieve their institutional missions, that is, education, research and service to society, institutions of higher learning need to manage the processes associated with the creation of knowledge and innovation through shared ideas (AL-Hakim et al, 2012). As Sulisworo (2012) argues, IHLs seek to share information and knowledge among the academic communities within and outside the institutions and normally those institutions that succeed in knowledge management are likely to view knowledge as an asset and to develop organizational norms and values which support knowledge creation and sharing. Therefore, knowledge management can become part of an organisation‟s capital asset and to achieve the institutional mission, that is, education, research and service to society, IHLs need to manage consciously and explicitly the processes associated with the creation of knowledge, its sharing and re-use. A major challenge to any institution of higher learning is how to mobilize its researchers and academicians to understand what knowledge they lack, what is demanded, how an organization can acquire new products using new methods and how it can efficiently market its products (Nonaka & Takeuchi, 1995 as cited by Kok, 2007). A study conducted in institutions of higher learning in the United Kingdom by Rowley (2000) found that IHLs are in the knowledge business since they are involved in the knowledge 52 creation, dissemination and learning process. It is important for institutions to know what they know and what kind of knowledge they lack as institutions inherently store, access, and deliver knowledge in some manner. The question is: What value is added to the products and services they deliver through the effective use of that knowledge capital? Almost every institution refers

to the capturing, sharing and delivery of knowledge from faculty to students. However, KM involves much more; it entails going beyond the inherent knowledge industry of IHLs. It involves the discovery and capture of knowledge, the filtering and arrangement of this knowledge, and the value derived from sharing and using this knowledge throughout the organization. It is this organized complexity of collaborative work to share and use information across all aspects of an institution which marks the effective use of knowledge. Higher education institutions have significant opportunities to apply knowledge management practices to support every part of their mission (Kidwell et al., 2000; Ramakrishnan & Yasin, 2012). They need to create and maintain knowledge repositories, improve access to and use of knowledge among staff; and to create learning and sharing environment to add value to knowledge and to treat it as an organizational asset. Thus, it is clear that KM will dominate the management agenda for decades as this ultimately determines the competitive performance of organizations.

Higher Education and the knowledge economy

Higher Education institutions face many challenges in a rapidly changing global economy (Birgeneau, 2005). As we enter the 21st century, Birgeneau (2005) contends that Higher Education institutions face a world that is more interconnected, one in which knowledge, creativity, and innovation are the essential elements of thriving societies. Bloch (in Duderstadt, 2005:81) supports this by stating that "we are entering a new age, an age of knowledge in which the key strategic resource necessary for prosperity has become knowledge itself – educated people and their ideas". Higher Education institutions today and in the near future, will experience different and intensified external pressure influenced by globalisation, and the past few decades have witnessed the pressure on HEIs to respond to this global integration (Bloom, 2005). Globalisation refers to the process whereby countries become more and more integrated, mainly via movements of goods, capital, labour and ideas (Scott, 2005:22). Scott (2005) highlights two main attributes of what he terms the 21st century globalisation: 1) Acceleration of trends associated with a 'knowledge society'. Some of these trends include the rise of information and communication technologies, which has been accompanied by a cultural revolution. 2) The process of acceleration and innovation has brought about 'uncertainty' about individual identity, about social affinities, about gender roles and about jobs and careers. If it is

easy for goods, capital, labour and ideas to move around, what do HEIs need to do to stay competitive to ensure the quality of their products and to ensure that a good academic experience is achieved by their students? Globalisation and marketization have therefore forced Higher Education Institutions to think about the way in which they teach, conduct research and manage the institution and its various stakeholders. This paper looks at whether HEIs within the UK are able to respond to these changes in a timely manner, or whether they are going about their business in 2008 as they have done before. Are they beginning to appreciate the need to embrace the philosophy of efficiency and effectiveness, and ways in which to incorporate management methods and models from the business world to ensure an ability to respond to change effectively and efficiently? When the adoption of business management models is discussed in relation to HEIs, it is inevitable that the mission and purpose of Higher Education Institutions are raised and the distinction made between non-profit and for-profit missions to discourage its use. Knowledge Management has sparked a plethora of definitions, and a variety of explanations, and encompasses diverse disciplines, which hence gives rise to the different perspectives. An extensive literature review yielded many different models, thoughts, perspectives, frameworks and definitions for KM. This particular research aimed to investigate the application of KM within the HEI context; however this is an under-researched area and a relatively new area for this context. For the purposes of this research, a particular view of KM was taken as a lens through which to view KM in HEIs. Stankosky's Knowledge Management pillars to enterprise learning – leadership, organization, technology and learning, were used as a systemic and holistic framework to investigate the perceptions and practices of KM within seven HEIs. Universities already engage in Davenport and Prusak's (2000) view on knowledge, and KM, who presents knowledge as deriving from information as information derives from data. Davenport further contends that for information to be transformed into Knowledge it requires human intervention hence humans apply their skills, ability, experience, know-how, values and culture via some transformation (comparison, communication, connections, and consequences) to change the information into knowledge. The case study will primarily look at organisational knowledge but acknowledges the psychological debates around what knowledge is. However, for the purposes of this study, it recognises that each individual has abilities, skills, experience, values and a particular work ethos and culture which each uses to transform information into knowledge which can be acted upon and which can become part of the broader organisational knowledge.

"Knowledge Management therefore draws from existing resources that an organisation may already have in place - good information systems management, organisational change management, and human resources management practices" (Davenport and Prusak, 2000:163).

ADVANCES IN INFORMATION TECHNOLOGY AND THE IMPACT ON HIGHER EDUCATION

Technology has developed dramatically over the past few decades, and has become embedded in how people work, play and live. The ability to harness electrical power in miniature form has had a huge impact on our everyday lives (Cole, 2004), and Oliver (2002:p.1) supports the view that technology "is a force that has changed many aspects of the way we live". Modern digital technologies are reshaping our society and our social institutions (Duderstadt, 2005), with Information and communication technologies (ICTs), having a transformational impact on every single aspect of business activity (Department of Trade and Industry, 1998). Automation and mainframe computers, have under-pinned nearly three decades of growth; in the 1980s, personal computers revolutionized the way we work; however, it is suggested that the innovations which emerged during the 1990s - in particular with the advent of the Internet - lead to even more radical business change. The arrival of the World Wide Web, being cheap and easy to use, tore down barriers which used to preserve the use of technology for large organisations which could afford the expensive, custom-built infrastructure and software needed (Department of Trade and Industry, 1998). The speed of adoption of the Internet into general use is unprecedented. Comparative advantage is increasingly being determined by the competitive use of knowledge, information and communication technologies (Bernheim and Chaui, 2003), hence, the importance of understanding more about their application in HE. In 1998, the Department of Trade and Industry (DTI), in their paper „Our Competitive Future: Building the Knowledge Economy", placed extreme importance on the role of technology by suggesting that digital technology is the nerve system, and key enabler of the knowledge driven economy. The DTI has acknowledged that substantial advances have been made to the ability to collect, store, retrieve, analyse and communicate information, reaching into homes as well as into classrooms and workplaces. The ability to share information has expanded exponentially, through mobile communications, satellites and the Internet (Department of Trade and Industry, 1998). As knowledge-driven organisations, universities are greatly affected by the rapid advances in

information and communications technology (Duderstadt, 2005:p.85). Coal drake and Stedman (1999) agree with the view that Information technology has already had a significant impact on higher education, and will continue to reshape the education landscape in coming years. Oliver (2002:p.1), however, suggests that there is a vast difference in the way certain fields, like medicine for example, operate today compared to how they used to in the past; on the other hand, in education there has been "an uncanny lack of influence and far less change than these other fields". Oliver continues to add that in the past, there have been impeding factors for this, including: 1) lack of funding, 2) lack of training, and 3) lack of motivation and need among teachers to adopt ICT as a teaching tool. However, since 2002, this has since changed and there has been a growing need to explore the opportunities and efficiencies that the utilization of ICTs could bring. The suggestion is that there has been a slow adoption of ICTs in educational practice in education; however, the 21st century and its many challenges and opportunities has brought with it strong forces which impose the adoption of ICTs in education, suggesting that large scale changes in the way education is planned and delivered, will be seen as a consequence of the opportunities ICT affords education (Oliver, 2003). Le Grew (1996), cited in Bates (1996), suggests that post-secondary education was undergoing a transformation, a paradigm shift, as characterized.. Moving from the industrial age to the information and knowledge age, creating a „paradigm shift", has necessitated that these organisations require substantial change to accommodate the associated changes (Bates, 1996). Substantial change in terms of sources of employment and new models of teaching and learning to prepare learners for the uncertainties of the 21st century, including work-place learning, as well as greater focus on teamwork than individual work, will need to take place. Oliver (2002) supports this view and suggests that how students learn, what they learn, when and where they learn, and who is teaching them, will change over time. However, Newell et al (2002) contend that advancements in ICTs do not automatically or deterministically lead to the adoption of new organisational forms or new arrangements of organising, and suggest that these changes depend largely on the interactions between technology, organisation and context. They further contend that having access to the technology like intranets and email does not necessarily imply that knowledge sharing will be painlessly shared across an organisation, and suggest that "..New technologies provide constraints and opportunities for human action..... Human action is embedded in a particular institutional context, which both constrains and facilitates action,.....Institutional context

simultaneously empowers and controls behaviour since it legitimizes some forms of behaviour while simultaneously prohibiting others" (Newell et al., 2002:p.94)

Kidwel et al (2000:p.28) pose the question whether the concepts of KM are applicable to universities and colleges. The mission and ethos of most HEIs is primarily research and education, which involves the „sharing of knowledge"; however, if that is the case, then the higher education sector should be replete with examples of institutions that proactively embrace KM to enhance their competitive advantage. However, although some examples exist, they are the exception rather than the rule. In 2000, Kidwell et al suggested that Knowledge Management was a new field, and experiments were just beginning in HE (Kidwell et al., 2000:p.28). Leitner (2004) supports this view and contends that it is surprising then that issues relating to KM in universities have only recently started to attract attention. Serban and Luan (2002b:p.1) takes the argument further by suggesting that few HEIs have processes that are institutionalized for the purpose of "leveraging knowledge to spur innovation, improve instructional and support services, or maximise operational efficiency and effectiveness". And even fewer, suggest Serban and Luan possibly utilise the benefits of KM for competitive advantage. In 2000, Kidwell et al suggested that many institutions of Higher Learning did not have an organised knowledge management system in place or even an understanding of such a system, a view which Corral also supports (1999). Cheng (2009:p.313) contends that "instead of knowledge sharing, knowledge hoarding could be more prevalent in HEIs". There are a few examples of KM implementation dotted around the Higher Education literature, and even fewer in the UK. A case study conducted by Basu and Sengupta (2007) of KM initiatives within a Business school in India, found that the knowledge initiatives were more individualistic and personal goal oriented, than organisational; the KM culture in terms of learning and sharing knowledge among academics was mostly informal and limited to peer groups and restricted to closed pockets of individuals. Another study conducted within an Iranian University (Mehralizadeh, 2009) investigated the practices of KM within it and whether the IR unit and function supported the KM function and implementation in some way. The research findings of this study showed that KM was not developed with regards to the university strategies, policies and programs, and that the IR function and unit did not use KM in ways that could support it or the university. In 1999, Corral (1999) suggested that KM did not seem to have had much impact on the High Education sector thus far; however, she suggests that there was some evidence of involvement. She lists

three universities in the UK that were involved in research projects at the time: One addressed HR roles in the KM initiatives, the second included a Know-How project, and the last university was part of a Knowledge Consortium. Over the years, a small number of scholars have reported on KM type activities within UK higher education. In 2002, Slater and Moreton (2007) reported on a large scale KM implementation within their IT department and present some guidelines for implementation of a KM programme within an IT department; in 2004, White (2004) presents a case study conducted within an academic library within Oxford University, and concluded that academics need KM, which would work better if initiated in a small project, and also concluded that not having a definition for KM could exacerbate the problem. In 2007 Moss et al (2007) suggested that there was greater pressure on HEIs to improve their Intellectual Capital (IC) research outputs, and that a collectivist approach to the research task would increase research output more than the individualistic approach would, and that a pressurized research culture within universities has led to more of an individualistic work culture and ethic than a collegial one, a culture that is needed to enhance and stimulate knowledge sharing and creation; and lastly Wright (2008:p.49) suggests that predominant attention is being paid to explicit knowledge in the curriculum and pedagogy of UK universities which offer courses entitled Knowledge Management, Lin et al (2007) take the argument of using the intellectual capital more effectively, further, by suggesting that, for a university to be most effective in its decision making process, it must make use of the highest possible levels of intellectual analysis, and hence, must look to all possible sources of information and talent which includes academic staff. Their contention is that academic staff are not utilized to their maximum in this regard. Despite the lack of substantial literature evidence of KM implementation in Higher Education, there are those scholars who have the view that there is tremendous value to HEIs that develop initiatives to share knowledge to achieve business objectives, and believe that the potential for KM to provide benefits to every area of Higher Education in support of their mission, is significant (Kidwell et al., 2000). Geng et al (2005:p.1032) support this view by contending that KM can offer "Higher Education the ability to improve its effectiveness in many significant ways". Skyrme (2002:p.1) presents, what he terms, "some commonly found benefits for implementing KM within an organisation", and specifies the knowledge benefits, the intermediate benefits and the organisational benefits, that can be experienced by organisations (see Figure 2. 22 on page 74). Notwithstanding the benefits, a study conducted by Oliver (2003) suggests that there is a

high level of awareness of the importance of KM, yet a low level of implementation. Oliver further purports that, in terms of KM implementation, within the HEI context of constant change, the challenge will be to identify the most appropriate mix of KM practices aligned to goals and strategies. The knowledge needs of a university however, are very different from corporate needs, in that "universities seek to share knowledge for the good of society, whereas corporations seek a profit" (Geng et al., 2005:p.1033). Although this is the case, universities are expected to take on market-like behaviours to expand their funding base, and engage in knowledge transfer with business using their intellectual capital and intellectual property; however, fundamentally, universities are non-profit organisations, having to, more and more take on business-like behaviours. Although the literature did not have a wealth of examples of KM implementation in Higher Education, this research was interested to uncover, whether management type tools like KM, was being used on an organisational level to enhance its competitive advantage. Stankosky (2007) contends that many organizations all over the world have changed their organizational structure by creating KM departments and creating a Chief Knowledge Officer position, and suggests that educational organizations have recently begun to understand the importance of those changes. The literature, however, did not at the time have a substantial body of knowledge on the perceptions, and practices of organizational wide KM implementation within Higher Education, particularly focusing on universities, and more specifically in the UK. Although KM has been legitimised as an academic subject, through a variety of means, the question of KM being used as a university-wide management tool to enhance organisational performance within universities,

Opportunities and Challenges of Knowledge Management in Educational Institutions: Use of Social Networks

PETER KROČITÝ
Vysoká škola manažmentu, Trenčín, Slovakia

Abstract: Success of an organization is increasingly determined by its ability to improve its performance through learning. Those organizations that do not know and passively wait until the consequences of change begin to cause problems do not have a chance to survive. At present, knowledge and work with it are at the forefront of the interest of experts in many areas. These include areas such as national and transnational policy, management at organizational level, computer science at the level of knowledge management as well as academic area at all levels. In our work, we try to focus on the challenges and opportunities that application of modern tools of knowledge management in educational institutions may bring.

Keywords: knowledge management, social networks, educational institution.

1 Introduction

The world has begun to rely more on knowledge after finding out that the economic functioning of the society has changed. First, there was a focus on how to make the most of the minimum of resources. Later, the focus was on the production of smart products. At present, modern organizations are focusing on cost-effective solutions and relationships with clients for their successful marketing. Emphasis on knowledge management is a natural consequence of economic, industrial, and cultural development. Many former developing countries can compete with developed countries in technology, software development, advanced product design, and more. Competitiveness in offering the best products and services based on relevant knowledge has become truly international. Companies that have applied knowledge management for some time can boast tangible and intangible benefits. The benefits of applying knowledge management are also visible in their leading position within various sectors of the economy.

At present, we are all bombarded by a huge amount of information of every kind on every side. This trend gives scope for the use of knowledge management tools in virtually all areas of human effort. Educational institutions, whose mission is to collect and manage information and share knowledge with students and the public, should be the leaders in the use of knowledge systems.

Educational institutions are aware of the need to manage their growing academic and intellectual resources by more effective methods and practices, especially those that are produced electronically and can easily be lost or devalued [1]. There is an increasing need to retain knowledge such as procedural practices, individual and collective presentations, online materials, or ongoing research, whether in the form of tacit or as explicit knowledge. Knowledge management can help achieve these institutions' resource conservation goals, understanding their knowledge, sharing knowledge within the academic community, and understanding processes to streamline administrative and professional activities.

Preparing successful graduates for the needs of a knowledge-based economy requires a learning environment that promotes creativity and commitment to lifelong learning. Educational institutions are trying to educate graduates capable of competing in the knowledge society. This effort forces these institutions to function in a state of continuous progress, analysis and response to external opportunities and threats arising from knowledge creation and sharing [2].

2 KM Strategies in Educational Institutions

McCarty's [1] research focused on the application of the knowledge management principles used in the corporate economy as well as in educational institutions. As for the issue of growing academic and intellectual resources in the field of education, research revealed a mix of ways to solve this problem. One of them was application of a knowledge system aimed at protecting, organizing and indexing formal knowledge, which can be kept in the form of documents and databases. Another solution was to create a knowledge-based community. This strategy involved the use of groupware for formal and informal communication, which became the source of lessons learned or expert database. The results indicate that not all intellectual resources have the same need for retention. It is, therefore, necessary to decide what is necessary to preserve. These decisions were left to individual academic departments.

Another area of research was finding out how a successful process of building knowledge increases the activity of academic staff and students. The outcomes show that those institutions which use knowledge management are doing better although there are still problems with the formation of knowledge-making communities. The concept of knowledge management has not led to consistency in defining this term or consistency in how it is applied in different departments. The communication networks of knowledge workers and their exposure to various interest communities have led to broad sharing of experience and professional skills.

The third area of research was the role of the technical system in sharing knowledge. It was found that the possibilities of storage and retention of knowledge generated by technologies are indispensable for the interconnection of essential competencies and the maintenance of communities. Knowledge systems have linked knowledge workers and supported existing and emerging communities. The technical infrastructure has been used to acquire tacit knowledge and transform it into explicit knowledge. These were expert databases, repositories, and online blogs as collaborative spaces. The key benefit of the knowledge system was better access to information in one place [1].

The findings of the Knowledge Management application research show that concepts of learning, sharing and knowledge transfer are the cornerstones of educational institutions, and processes and technologies such as knowledge systems can be powerful means of linking communities within the institution.

The results of the research on the knowledge management implementation in educational institutions led to provision of several priorities for a particular organization. First of all, it is creating a favorable environment for knowledge acquisition and creation (so-called Ba) [3]. It is about gathering information about the latest research results in a particular field of study, the processes and practices used in other institutions, and the possibilities of working with other institutions in the field. In order to create a favorable environment for knowledge creation, it is necessary to organize regular meetings, seminars, working groups or conferences.

It is necessary to create conditions for both physical and online interaction between members of the academic staff and students to achieve constant sharing of the best practices. The purpose of creating and sharing of knowledge is its use and application. It will, of course, vary depending on whether it is used by students, administrators or members of the teaching staff.

Two universities with an identical number of teachers, study programs, spending, and number of students can vary considerably based on ratings by official institutions as well as the public. The difference often lies in the intangible added value created by the effective knowledge management. It is applied through web based portals that are used for teamwork, sharing the best practice information, as well as anywhere and anytime available learning platform.

N. Aharony [4] focused his research on the use of a wiki as a part of knowledge management training to promote discussion in the process of creating and sharing knowledge. A wiki was used as a means of presenting information and projects, as a means of discussion between the teacher and the student, as well as a knowledge repository. The findings showed that the discussion section of the wiki included collaborative, content-related comments as well as social comments. The major part, however, focused on the content related comments and reflected the use of deep knowledge. Yet, this way of learning requires the instructor and students to participate in, encourage and maintain discussion.

The knowledge portal Info-Ca-Sh created by a team of staff at the Government College of Engineering in Salem, India [5], is also an example of a platform for sharing knowledge among teachers and students. This portal is aimed at improving the sharing and codification of knowledge and analysis of social networks of educational institutions.

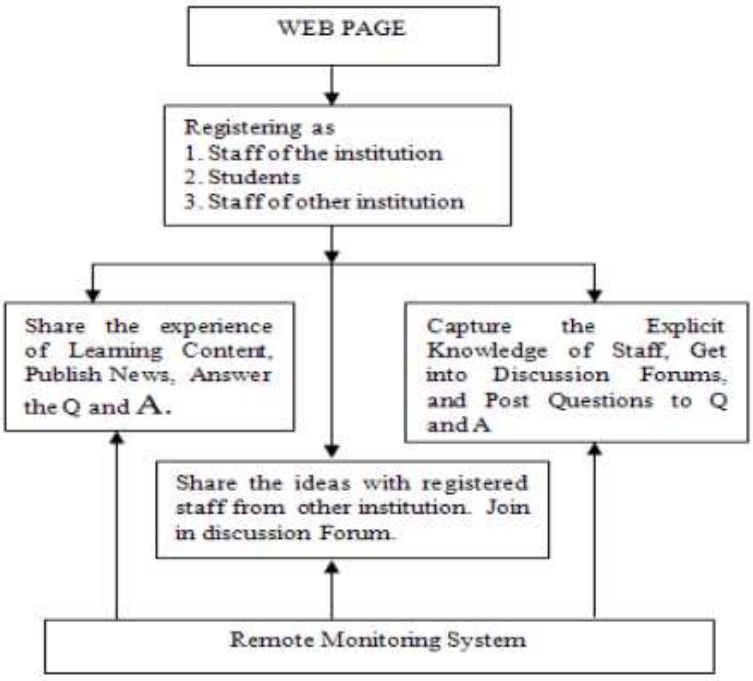

Fig. 1 *Entity Relationship Diagram of Info-Ca-sh [5]*

Figure 1 shows the entity relationship of the Info-Ca-Sh knowledge portal. The portal has a data repository of academic staff and students of the institution. It also involves sharing and capturing tacit knowledge through blogging. Of course, the portal provides space for discussion, too. It serves as a base for a social network consisting of faculty and students, creating nodes representing some type of interdependency based on similar interests, beliefs, knowledge or prestige.

3 Social Networks as a Learning Tool

According to Xiang Liu [6] from the Marymount University in the US, 65% of university students prefer the Internet as a source of knowledge and 20% turn to teachers or classmates. Only the remaining 15% use a library for this purpose. The author considers Web 2.0 tools, along with social networking tools, to be a great opportunity and a way to bring students to a "knowledge country".

Anam Ali's [7] study done at a medical school in the UK focused on usage of Facebook as a learning tool. Students used their profiles, groups, and pages to post questions and discuss work. The results showed evidence of collaborative learning occurring on Facebook through peer teaching and sharing of learning experience. Facebook also assisted students in creating and maintaining connections with peer students, keeping them updated on social events and societies. In addition, it helped them in transmission and sharing of academic resources in various media forms, such as documents, videos, Power Point presentations, and websites. The study suggests that Facebook can be used as a complementary educational platform that allows each learner to create a personalized online learning space.

A recent survey in Slovakia showed that up to 93% of students and 75% of intellectuals use social networks and the most preferred platform is Facebook, which is used by 49% of the Slovak population over 14 years of age [8]

All of the above mentioned examples support the precondition that current students are digital natives preferring online resources and platforms as their primary source of information and knowledge sharing. That can be designated as the most important aspect of knowledge management, since the majority of KM initiatives depend upon it.

Current trends in education reflect an increase in popularity of online learning all around the globe. This mode of study has a great potential of contributing to worldwide mobility, lifelong learning and equal chances in international education [9]. It provides several advantages to students compared to the traditional classroom mode. It is more accessible since students are less bound by time and location. It provides a higher degree of flexibility as students are not limited by fixed schedules and can continue in their personal activities and obligations. Finally, distance learning is more affordable since it is often less expensive than the classroom mode. This way, it brings a learning opportunity to those who otherwise could not afford studying for a degree.

Increasing use of both distance learning and social networking platforms leads to a logical conclusion of merging the two in order to improve online teaching and learning. Social networks provide space for sharing information among students, as they are personal or learning-centered and help create intimacy among online students, as they have the ability to connect and build community in a socially and educationally constructed network.

On the contrary, course management systems like Moodle or Blackboard are narrowly focused and miss the personal aspect as well as the capacity provided by social networks. The use of traditional online learning modules is rather a question and answer type of mode than interaction. Social networks are user-centered rather than class-centered and increase student engagement. They can actively encourage online community building, extending learning beyond the boundaries of the classroom [10]. Figure 2 shows comparison of a traditional course management system (CMS) and a typical social networking site (SNS).

Tools	SNS	Traditional CMS
Forum	X	X
Blog	X	X
Media Sharing	X	
Messaging	X	X
Wiki		
RSS	X	
Chat	X	X
Calendar	X	X
Tagging	X	
Own Brand & Visual Design	X	
Realtime Activity Stream	X	
Groups	X	
Friends	X	
Profile Pages	X	
File sharing		X

Fig. 2 *Comparison of a social network site and a course management system [10]*

When used correctly, social networks can get students to practice lower level thinking at home and prepare them for higher level thinking in the classroom [11]. The opportunities provided by the use of social networks as an online learning platform can be defined as follows:

Increasing student collaboration – social media networks serve as an easy contact link with other students to discuss school projects and assignments. They can easily ask peers as well as instructors for help, and the whole class can have access to various feedback.

- Encouraging participation – shy students who do not participate in class can see the social network as a convenient platform for expressing their ideas. Current students are raised by the internet and social networks, which are a natural way for them to interact. It helps them build self-confidence and encourages them to participate.
- Easy resource sharing – websites, videos, tutorials are easily shared by a click of a button.
- Preparing students for future employment – students can easily make contact with employers and other job seekers. With LinkedIn, students can establish a professional web presence or post a resume [12].

Of course, there are also several threats coming out of the social networks used in education:

- Distracting from classroom participation – students can start using the social networks for their personal purposes and not pay attention to class content.
- Posting inapropriate content – bad language or images can be harmful to the institution's reputation as well as to students.
- Cyberbullying – malicious behavior, harassing students by hurtful messages.
- Social networks divert from face-to-face interaction – for many individuals it is easier to interact online; students lose real-life social skills [12].

4 Conclusion

The way in which a knowledge management strategy is implemented in a sustainable manner in an educational organization is not simple, and potential solutions need a broad range of strategies and strong and visionary leadership in institutionalization of such a practice. One of the efficient strategies seems to be the use of social networks in education. There are some threats to be considered that require continuous review of practice. Social network guidelines and policies are useful tools in supporting their use in schools and colleges, but these should not hinder creativity. Social networks provide real opportunities for innovative and engaging practice with authenticity and informality, something that represents effective educational features.

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Contact data:

Peter Kročitý, PhD., MBA
Vysoká škola manažmentu v Trenčíne
Bezručova 64
911 01 Trenčín, Slovakia
pkrocity@vsm.sk

Improving Teaching and Learning at Universities- the Use of Knowledge management

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Dalal Mohammad Al- Zoubi
Albalqa Applied University, Irbid , Jordan

***Abstract*—Investment in universities is a long term investment, requiring the adoption of an effective management system like the KM system. The implementation of KM framework in universities has become an apparent phenomenon in the age of globalization, accelerating technological change, and increased competition. Therefore, this paper aims to come up with a vision for the successful use of KM applications in teaching and learning at universities. This can be done by proposing an integrated framework to regulate the use of KM at all administrative and educational levels of the university, and show the factors affecting the successful use of KM to improve the learning outcomes.**

***Index Terms*—Knowledge management, learning outcomes, teaching & learning.**

I. INTRODUCTION

Universities are the main instruments of society for the constant pursuit of knowledge. Knowledge management in educational settings should provide a set of designs for linking people, processes, and technologies and discuss how organizations can promote policies and practices that help people share and manage knowledge [1].

The university is a scientific and intellectual center resorted to in order to solve the most difficult problems facing society. It is also credited for technology innovation and highly qualified personnel. Basically, Its activity is academic, the direct output of which is thought and knowledge which are subject to different principles in terms of production and marketing compared with those of other institutions [2].

The investment in this field is a long-term investment requiring the adoption of an effective management system like knowledge management (KM) system. So, the university can shift from managing teaching staff and students to managing knowledge and innovation to achieve their goals [3].

Educators at universities are prime examples of knowledge workers because they typically have considerable personal discretion and responsibility in analyzing, developing, and implementing their curricular goals. The most exciting part about applying these ideas is that the primary 'customers' – the learners – can also become an integral part of the university, as they can play a critical role in helping to create and share knowledge throughout the system. Thus, in universities, learners need not simply be perceived as passive 'customers', but can rather become knowledge workers themselves, playing a unique role in producing and managing knowledge within the university. One of the key challenges posed by the advent of the knowledge economy is to develop the role of educators and learners as knowledge workers within broader, integrated education systems [4].

Universities, are knowledge-oriented and they reflect excellence. They are the solid ground for assuming principles and practice of KM, which are enthusiastically adopted by the business world [5]. These principles could be applied to universities with equal success chances [6]. So, universities should seek to aim at the discovery and dissemination of new and useful knowledge which is a vital issue, and to be among the first institutions to implement KM practice. Nevertheless, universities have been slow in KM practices [7].

Thus, the implementation of KM frame work in universities has become an apparent phenomenon in the age of globalization, accelerating technological change, and increased competition [8,9].

Therefore, this paper aims to come up with a vision for the successful use of KM applications in teaching and learning at universities. This can be done by proposing an integrated framework to regulate the use of KM at all administrative and educational levels of the university and show the factors affecting the successful use of KM to improve the learning outcomes.

The importance of this subject stems from situation where the use of KM in universities is still in need for further research and study. This is because KM system, one of modern management systems, has not been adopted and applied in this sector at a large scale. Awareness of KM is still in its infancy at universities compared with its status in the business sector.

It is expected that this paper adds some information about the concept of KM in general and its use in teaching and learning in particular. Some universities would benefit from the framework of the use of KM proposed. The paper also emphasizes the need for continuation of research on how universities can benefit from KM in managing its affairs.

II. KM AND UNIVERSITY

Knowledge is power and wealth at the same time. The power of knowledge characterizes the twenty first century as it is the most important source which has been built accumulatively and does not decrease through use [10].The increased importance of knowledge in the process of production is evident in the debate regarding the type of knowledge that is deemed to be most important to economic creations [11].

The knowledge management system is the framework of an integration of organizational elements in organizational culture, organizational information technology in-

frastructure and the organization's store of individual and collective experiences, learning, insights, values, etc.. Members can effectively accomplish organizational goals through knowledge management processes and procedures. An organization that effectively manages knowledge is likely to be considered a learning organization. Knowledge dissemination and responsiveness to knowledge are cited repeatedly as the most effective way to a competitive advantage. While the need for effective managing of knowledge is accepted, much of the literature continues to explore measurement and its effect on outcomes [1].

Tremendous changes are taking place in advanced industrial societies, as a result of intended and unintended consequences of economic and technological development. The educational sector is not an exception from such changes, since relevant development pose several challenges for the transformation of the whole educational process, including educational curricula, learning materials, instructional practices and education stakeholders [11].

In the education sector, it is of great advantage for the different institutions to know how to manage information in order to achieve their goals, accomplish their mission, deliver their services and cope with change. Particularly, within the context of teaching and learning systems, KM efforts can help both teachers and students to share valuable insights with each other, to reduce redundant work, to practice self-paced learning, to undertake research using, among others, archival data/information and to embark on reflective practice for promoting ongoing personal and professional development [12].

Cross and Baird (2000) [8,6] identifies five types of knowledge commonly used in organization. The first type is that embedded in the mind of individuals, and is gained through working experience, research, teaching, and operational activities. The second kind is knowledge presented in work group, such as consensus on work rules. The third kind is knowledge that has been documented and organized for use, such as course syllabi or data malls. The fourth kind is knowledge that is embedded in organizational process, like laboratory exercises. The fifth kind is embedded in products and services, such as the skills of graduating students, patents, or research publication, each type of knowledge can be used to achieve organization missions and goals.

Some writers stress that scientific knowledge is the most important kind, other writers argue that organizations must exploit the tacit knowledge and information held by workers, while Reich (1991) suggests that economic progress will involve the combination of scientific and tacit knowledge [11].

KM has four major strands that can be used to categories KM projects as follows: [13]

1. The creation of knowledge repositories or knowledge banks which draw together all the explicit knowledge in the organization, which can be shared with others.
2. Approaches and tools that promote access to knowledge, internet, extranet… etc.
3. Knowledge- based culture, in which the senior management establishes expectation about the sharing of knowledge (policy statement, job descriptions… etc).
4. Valuing knowledge as an asset or the intellectual capital strand of KM is important in developing the fact that knowledge is a key resource.

The KM literature suggests that re-use of externalized knowledge is fundamental for improved efficiency, reduced cost and dependency on individuals know-how, rather than considering knowledge as a specific thing, explores the relationship between knowledge and the work that people do [14]. This leads to the learning organization which is an organization that facilitates individual and organizational learning in such a way so as to support success in responding to continuing change [13].

Universities are widely regarded not only as teaching establishments, but also as organizations that create new knowledge and support social communities. KM is usually recommended as one of the important roles to improve efficiency and effectiveness of university mandate and provide many benefits to university [15]. The strength and weaknesses of knowledge strategy dominating the contemporary university are related to the loss of information that occurs by abstracting whatever to be studied from an unmanageable complex reality, to place it in the simpler and manageable context of a discipline or profession [16].

According to Butcher (n.d) ,it is possible to extract a set of principles that should inform the implementation of a knowledge management strategy as follows:

1. Start with a Strategy.
2. Involve users in the design of the knowledge management strategy and systems.
3. Clearly distinguish knowledge management strategies from technology implementation and information systems management.
4. Ensure that the broader organizational environment supports and rewards creation and sharing of knowledge.
5. Approach knowledge management as an iterative process.
6. Measure the impact of knowledge management. *[4]*.

Teaching is a core activity of any university, but there is an enormous pressure of academics to undertake research either through publication or undertaking research degree, and little attention is given to assisting with the philosophy and implementation of good teaching practices [17].

The quality of education is a matter of concern at all levels of society. This places a responsibility on educators and educational administrators to demonstrate that their educational institutions-a pre-school educational facility, a school district, a university, all of which are capable of providing high quality educational opportunities at a reasonable cost [18]. This means the need for a modern management system like KM system to manage teaching and learning at all levels of educational institutions, especially universities.

III. THE FRAMEWORK OF KM

Figure (1) shows a suggested framework which regulates the use of KM in universities. This framework is based on a set of assumptions as follows:

1. The successful use of KM in university management requires a holistic integrated view of applications of the system.

2. The use of KM in universities leads to improvement of the quality of education and learning outcomes.
3. The successful use of KM requires the involvement of academics, the management and students in this system.
4. There are factors affecting the successful use of KM by academics, management and students.
5. The successful learning outcomes are linked to the academics' success in evaluation process.
6. The outcomes of learning are the main inputs of institutions in a given society.
7. The assessment of the success of learning outcomes is identified by the feedback provided by different institutions.

Basically, the modern university comprises two cultural hemispheres, the academic and the managerial, and that bifurcation has important implications when it comes to thinking about the appropriateness of specific KM proposals and strategies. The two hemispheres of the university are populated, respectively by academics and managers [6].

A study examines the reason why KM is apparently so unpopular in universities, results show that corporate culture and organizational structure are the major factors affecting perceptions of relevance KM programs and projects [19]. It is important to recognize that learning at universities occurs in social contexts, and that the socio- cognitive characteristics will shape approaches to knowledge creation, transfer and utilization [6]. Therefore, the assumption was, as noted in the figure 1, that the successful use of KM system in running the various university affairs requires an integrated view by all parties, academics, administrators, and students. The successful use is affected by the extent of awareness of this system and its applications.

KM awareness is defined as the extent of knowledge that the academic, administrators and students have about

KM, its role in building the competitive advantage of the university, the way KM assets are used (tangible and intangible), the goals KM seeks to achieve, the benefits resulting from utilization KM, the importance of KM leader, the role and contribution of the prevailing institutional culture at the university using KM [20].

The successful use of KM system also requires the ability to practice the operations linked to this system. It is defined as the extent of generating knowledge by academics, and management staff through interaction between explicit and implicit knowledge, the sharing of such knowledge among the staff and the exercise of institutional learning processes leading to innovation in KM [20]. So, individuals are necessary for the production of knowledge operations, simply because they are knowledge themselves, and they only need little information to enable them produce knowledge [21].

In a study aimed to see if some factors like KM awareness, and the practice of KM operations affecting the utilization of KM at Jordanian universities. Result confirms that there is a significant impact of KM awareness and the practice of KM operations on the utilization of KM [20].

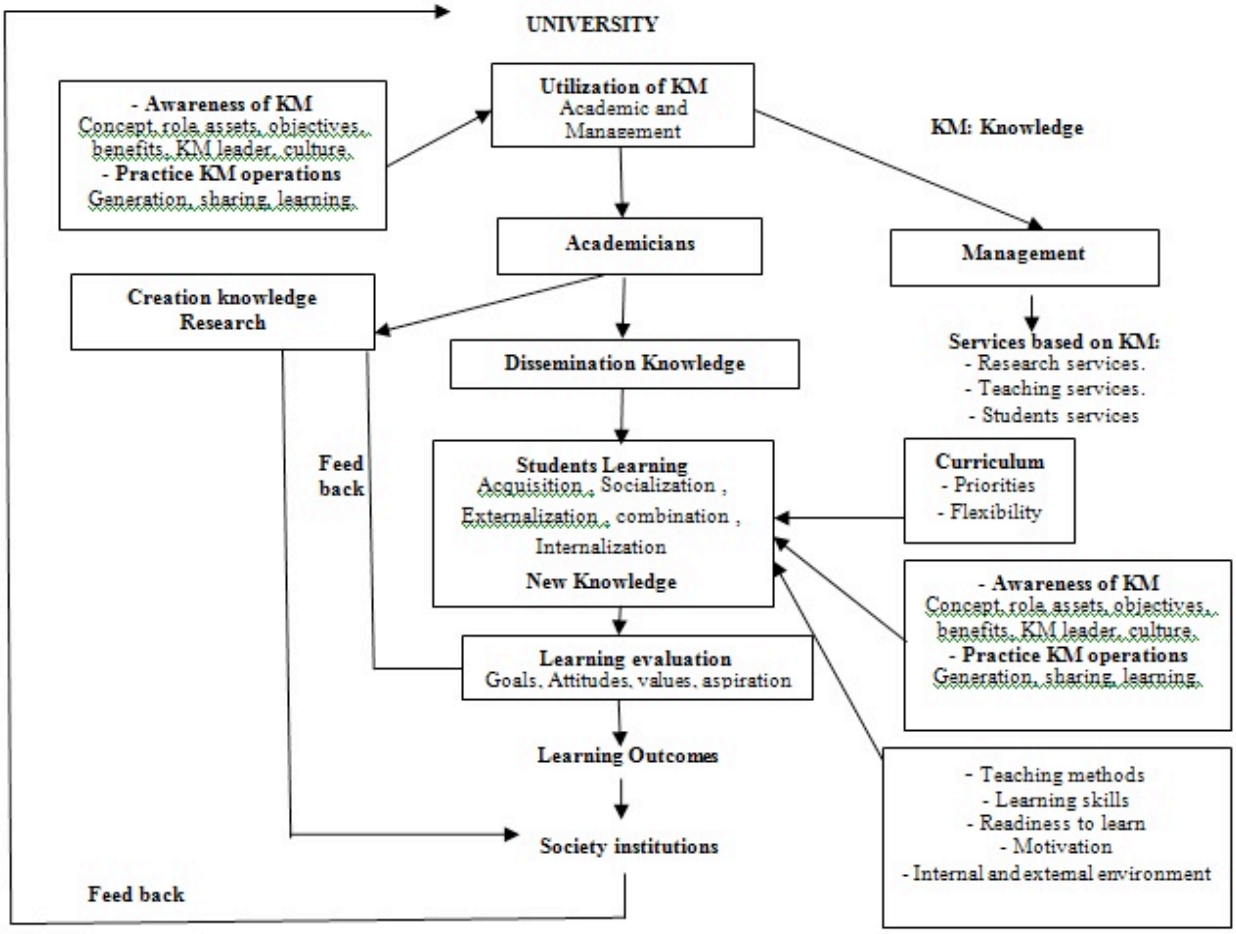

Figure 1. Framework of the Use of Knowledge Managment System at Universities

The application and implementation of an KM system improve the quality of education at universities. An effective KM system requires every academician to practice appropriate management of knowledge in his or her teaching activities, which includes, generating, sharing, acquiring, storing and disseminating knowledge effectively to users of knowledge, especially students [22, 5].

It is suggested that there are four major processes to form a culture of knowledge sharing and collaboration. They are: (1) making knowledge visible, (2) increasing knowledge intensity, (3) building knowledge infrastructure, and (4) developing a knowledge culture. From an academic knowledge perspective, the learning community should start at the individual level, create departmental knowledge, create domains of knowledge across departments that share academic interests or disciplines, create institutional knowledge networks and networks with other institutions and corporations. The capitalization of collective knowledge begins with sharing in knowledge communities: from individual, through teams and groups, to organizations. Individual strategy mainly deals with the teacher's individual professional growth. KM helps teachers develop their teaching ability, skill and experience, and action research. Once individual knowledge is captured, institutions and processes must be established to compel its dissemination throughout the organization. Knowledge management is then escalated to the organizational level. Institutional strategy emphasizes knowledge sharing through school-based teacher education, organizational learning, sharing culture, and teacher community. Knowledge sharing is not limited to the organization. Network strategy calls for establishment of knowledge map for teaching, knowledge database and instructional resource center [1].

In a study aimed to evaluate the level of practice among the academicians and to determine factors contributing to the effectiveness of KM practices at individual, faculty and university level at eight universities in Malaysia. The result indicates that info-structure, and knowledge acquisition, generation, storage and dissemination, are important factors in shaping the KM initiatives [22].

In another study aimed to studies the role of KM in facilitating knowledge sharing among stakeholders in technical educational institutions in India and elaborates on the need for knowledge management in the teaching-learning process. A KM framework for enhancement of knowledge sharing by the use of shared intellectual repositories is proposed. The findings show that the authors value the impact that KM can have in enhancing the quality of teaching and learning in technical educational institutions, and underscore the need for credible research into the benefits and challenges that the implementation of IT-based KM intervention will provide [23] .

Sharing of experience and best practice for academics can be achieved by:

- building repositories of course syllabi.
- Providing pointers to evaluation of different pedagogic styles and practices
- Highlighting lessons from distance education experiments.
- Creating online forums, or communities of practice, for the exchange of tacit knowledge and on the job experiences [6].

In describes the main informative products of university information services, emphasizing the use of web technology for building corporate portals, evaluated as the core of the organization and sharing of knowledge in universities [24].

At universities there are two branches of knowledge: scientific knowledge, and practical knowledge. Scientific knowledge is explicit and clear through education, research publishing, and conferences, it moves within the university through the integration of students in learning processes and the scholars studies of the research results, cooperation between universities and the labor market. In contrast, the practical knowledge is the support provided by workers, which generates explicit knowledge in areas such as computer services, management, research support, and student services [25,8] .

Scientific research is the core of higher education and it can be called "knowledge generation". It is clear that research is the real contribution of the university in knowledge community. The distinguishing feature of the university is the link between research and teaching where the research should have direct and changing impact on teaching.[5]. Suggested KM applications relating to research include building publicly accessible repositories of scholarly expertise and interest, to promote transparency and information exchange [6].

Much of the KM literature focuses on ways to increase the volume of knowledge available, ensure its quality, and improve its accessibility. Access to other expertise, experience, insights, and opinion is termed knowledge sourcing, which is one of many learning behaviors ; they fall into two categories: Individuals can learn from own experience or from the experiences of others, three generic forms of knowledge sourcing namely: one- to- one, one-to- many, or many- to- many. Examples include one- to-one conversation via telephone, email, or in persons. Examples include one-to- many, accessing a document that has been stored in a knowledge repository, printed in a book, or posted on an internet. Examples include many-to-many, communication via electronic discussion groups or face to face meetings [26].

The teaching process in student-oriented universities should lead to successful learning, which requires that university professors should concentrate on the learning process itself and its mechanisms represented by acquisition, socialization, externalization, combination, internalization, to produce new knowledge.

The learning process is influenced by a variety of factors, such as the curriculum in terms of priority of issues it addresses, flexibility in dealing with these issues, as well as students' awareness and their practice of operations associated with KM in their learning. The learning process is also affected by the teaching methods used by teachers, learning skills possessed by students which affected by cultural differences of a more diverse student body, students desire for a more participatory, experiential learning experience, and the need now and in the future for students to be able to synthesize vast amounts of rabidly updated, and therefore changing information [27]. The learning process is also affected by readiness and motivation for learning among students, as well as the climate that prevails in the learning environment.

The teachers need to have an open mind, designs teaching/learning environments which optimize the construc-

tion and discovery of knowledge, facilitates active learning and transfers conceptual networks to students, as needed.

They identify the emergence of individual and collective patterns and forks that arise from the interaction of different elements in the teaching/learning process (teachers, students, contents, projects, disciplines, cultures, context, etc), and adopt the required pedagogical measures to be able to manage instability and uncertainty through the implementation of strategies to face each new problem.

They provide diverse tools and didactic resources to optimize learning according to the situation, to bring students to a state of cognitive efficiency that facilitates integration, transformation and application of knowledge into creative processes and innovative solutions [28].

They possess effective and assertive communication skills, and exercise an adequate emotional and social intelligence providing empathy and motivation to the

student. They possess knowledge and expertise in the discipline. Therefore, the teacher is a mediator for the teaching/learning processes who facilitates the student the realization of his potential. However, even as a dynamic enabler of innovation, they can also become a barrier, when lacking the required training and skills.

Teachers found out that traditional methods of organization are not compatible with vast amount of digital resources available. Therefore, teachers need a KM tool that can integrate multiple types of resources, be flexible, can easily be searched, and has a user- friendly interface [29]. These tools enable students and teachers to process the information available to them and share their insights without mediation or censorship by others, so that they can not only make sense of information from elsewhere in the world, but also put it to immediate and possibly novel use. The adoption of such tools, for example, peer-to-peer learning becomes an important complement to formal teaching, giving communities far wider access to mentors across the world, drawn from higher education generally [30].

Effective KM is contingent upon the explication of a deep and shared understanding of the learning and teaching process. The most important transactions in education are those related to learning and teaching which are frequently the least explicated. Further, where such explication does occur, it is rarely specific enough to generate the kind of meaningful data required to make timely improvements in the learning experience of individual students [31]. Several skills and abilities needed to manage knowledge and to deal with information such as:

- Relative and organized knowledge.
- Solve complex problems.
- Collaborate, exchange knowledge, work with experts.
- Communicate, give persuasive presentation.
- Construct knowledge products.
- Integrate and critically evaluate knowledge.
- Identify and evaluate secondary effects [32].

Pintrich (1994) compared several taxonomies of learning components, and concluded that the common elements were student knowledge base, procedural skills, self- regulation of learning, and motivation and effect. The distinction between cognitive, meta cognitive, and affective motivational components of learning can also be found in the work of several other researchers [33].One of the main sources of student learning is the interaction with the teacher in classroom. In fact, the teachers' contribution to student knowledge is, arguably, the most important source of learning (other sources include self- learning through reading a text- book, or through a peer study group, for example). The teacher- student "knowledge transfer" process is measured by a student performance on homework assignments, midterm, and final exam [18].

Teachers' work activities include teaching, preparation, administration, in- service/ professional development, and other activities with teaching requiring the most time. Lesson planning, constructing and grading tests take a great deal of time. The rapid changes of technology complicates the effective delivery of efficient instruction to students, and teachers have to stay current in their field, and this means taking time out to attend in- service/ professional development [34,33].

At the university of western Sydney, the foundations of university learning and teaching program is offered to all new full time teaching staff. The key aspect of the program is to enhance their ability to structure an effective learning environment for students. In this regard the program states that its strategies are collaborative, emphasizing negotiated learning, working in collegial group, and pairs, and the sharing of experiences.

The Program aims to: value the diversity of student experiences, appreciate the ways in which student learn, design effective learning experiences fore students, use appropriate presentation techniques and information and communications technology to support teaching and learning, justify appropriate strategies for assessing student learning, value and share individual and colleagues experiences and knowledge of learning and teaching [17].

In a case study about how a wiki technology was used to support collaborative activities in a KM class graduate-level information systems and technology school, findings suggests that wikis can support collaborative knowledge creation and sharing in an academic environment. Success in attempts to provide such support may depend on: familiarity with wiki technology, careful planning for implementation and use, appropriate class size, and motivations of student to engage in discovery learning [35].

While under a design thinking paradigm, student would be encouraged to think broadly about problems, develop a deep understanding of issues, and plan a process to implement a good idea [36].

The use of small cases can be used to engage the student in an interactive learning experience that requires grappling with difficult issues and formulating well reasoned analysis for problems posed. The objective of a mini cases is to broaden, the thinking of students by raising difficult, focused questions [37].

Social constructivist teaching methods, such as problem- based learning, case- based instruction or collaborative research projects, require students to construct or create knowledge proactively by engaging with realistic problems. Three rationales for adopting social constructivist teaching methods in pre- professional undergraduate programs are that they may: 1- help student to construct a deeper understanding of the theoretical concepts that is better connected with practical experience, 2- help students to develop skills in performing the routine problem-

solving tasks of their intended profession, 3- develop students knowledge creation capacity [24]. Results of a study of the social constructivist teaching methods found that lecturers perceive association between the use of social constructivist teaching methods and the superior development of their students profession- specific skills and knowledge creation capacity [38].

Teaching functions refer to those functions that promote high quality student learning. The effective function refer to creating and maintaining a positive motivational and emotional climate for learners [33]. Many authors argue that active learning include:

- learning the content and improving the student skills of verbal delivery.
- Feedback which is essential in learning, Instead of providing feedback on the students actual performance, feedback should be about growth rather than grading.
- The ability to work effectively in a team/ group in higher education, then educators must develop student skills as cooperation and collaboration, resolving conflict negotiating, problem solving, critical thinking, and others.
- Motivation: The authors raise the issues of three types of motivation, namely, goal types, sources of enjoyment and general motivation to learn, as well as the four motivational conditions of interest, relevance, expectancy and satisfaction [39]. In a survey of 252,080, 1997 freshmen students at 464 two-and four-years institutions found that, in comparison to those surveyed 10 years ago, today's freshmen were more bored in class, more often overslept and missed classes or appointments, and were less likely to study or do homework six or more hours a week [27]. This findings emphasizes the importance of motivation in learning.

Teachers' evaluation of students' learning is the real indicator of successful teaching outcomes which enable students to get adapted and be in harmony with various institutions in the society. The importance of measuring performance in higher education has long been understood by all Stakeholders including teachers, students, administrators, and researchers [18].

Teaching / learning and evaluation are inextricably linked and it is virtually impossible to improve teaching without understanding its impact. Why does evaluation often get put on the back burner? Perhaps part of the answer can be attributed to a fairly common perception that doing evaluation requires a certain level of expertise in evaluation methodologies and data analysis. Another part of the answer might relate to the complexity of the task, learning is complex and multidimensional, and any serious attempt to evaluate learning must take a multimethods approach [40].

The focus on outcomes as a modification of individuals cognitive structures, without changes in cognitive structures, learning cannot have occurred, changes are the key of the transfer of knowledge. Learning outcomes defined as the extent to which an individuals cognitive structures have improved over times, and the focus on three distinct types of instrumental cognitive changes: replication, refers to the propagation at existing cognitive structure, adaptation, refers to incremental change in causal structures, paralleling the ongoing evaluation of work in response to new development. Innovation, refers to radical, discontinuous change [13].

Cognitive processing activities are those thinking activities that students use to process subject matter. They directly lead to learning outcomes in term of knowledge, understanding skills… etc. Affective activities involve emotions that arise during learning and lead to affective states that may positively, neutrally, or negatively influence the progress of learning process, like motivating one self, attributing learning outcomes to causal factors. Regulation activities steer the cognitive and affective activities and therefore, indirectly lead to learning outcomes [33].

In elementary, secondary, and higher education environment, the curriculume and its educational goals and objectives, found in all types of planning and curriculum review documents, determine the desired learning outcomes. Student learning outcomes, are not the only important arena of evaluation. It is equally important to measure and document personal experiences that directly contribute to the development of information literate individuals [40].

Learning outcomes generally identified to be essential for preparing the younger generation for the challenges of life in the knowledge society include the ability and readiness to engage in life long learning, to access and evaluate information, to communicate effectively and to collaborate with others in solving complex open- ended problems, with the appropriate use of technology [32], because there are not only more graduates going on to the job market, but more different types of graduates are being prepared for more diverse occupational specialities. This makes the transition from education to the workplace a more complex and problematic. Therefore, in most countries the role and organization of higher education are being questioned by new student demands and a more competitive environment for universities [41].

The involvement of the graduates working in various institutions in the community will give the university feedback on the success of KM system in the improvement of learning among students, and whether the outcomes of learning are appropriate to the nature of work in these institutions, and whether their expectations are met, their need of specialists in various fields. It is expected that this feedback will play an important role in bringing about the change and the continuous modernization of KM system at the university so that it constantly remains an effective management system in the management of the learning and education process, leading to maintaining the level of educational outcomes and its excellence so as to serve the community's goals.

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AUTHOR

D. M. Al-Zoubi is with the Education Science Department, Irbid University College, Al-balqa Applied University, Irbid 21110, Jordan. (dalalzoubi@yahoo.com).

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A Case Study in Knowledge Management Education - Historical Challenges and Future Opportunities

Denise Bedford
Kent State University, Kent, USA
Dbedfor3@kent.edu

Abstract: In 2001 Kent State University established a graduate level program that granted a Master of Science degree in Information Architecture and Knowledge Management. The Knowledge Management concentration was a cornerstone of that degree program. The Knowledge Management concentration has sustained and thrived over the past ten years, though the path has not always been easy or clear. This case study describes the challenges encountered and the solutions developed over the past ten years. The case study discusses nineteen challenges and their solutions, in hopes that other institutions may benefit from Kent State University's lessons learned and successes. The case study highlights issues that arise as an academic program matures, including: curriculum development and design, administrative support and alignment, faculty credentials and credibility, and research support.

Keywords: knowledge management education, knowledge management curriculum, course design, experiential learning, student learning models, knowledge management faculty credentials

1. Historical context and evolution

In 2001 the Information Architecture and Knowledge Management Master's program was established at Kent State University. The program was originally conceived as a new and distinct program that focused broadly on information and knowledge, their use and architectures. The program was unique in that it was founded on recognition of the difference between knowledge and information. It was also different from other programs at that time in its intent to be non-sector specific, and to be cross-areas of practice.

The knowledge management concentration was designed around some basic assumptions about knowledge management as a professional discipline. These assumptions provided a good grounding for all aspects of an academic program. They provided stability in a dynamic and evolving professional discipline. Some of the fundamental assumptions include:

- Knowledge Management is interdisciplinary -- a strong academic program must draw upon expertise in many disciplines;
- Knowledge management is a profession of practice – students must learn practice, as well as the theory;
- Knowledge management is an emerging field – faculty with academic credentials in knowledge management are scarce;
- Knowledge management research is grounded in practice -- this has implications for the traditional faculty model;
- Collaboration between public sector, business and academia is critical to advancing the discipline;
- Knowledge is different from information;
- Knowledge is a universal concept which pertains to and touches everyone and all aspects of life.

The knowledge management program began in 2001 as an onsite, in person program located at the Kent State University campus in Kent Ohio. In 2007 the knowledge program transitioned to a fully-online program. Furthermore, in 2007, there was sufficient interest to warrant the creation of a second academic product – a Graduate Certificate in Knowledge Management. In 2012, the program has grown to close to 100 students, has a faculty of twelve full and part-time instructors, and is engaged in research with public and private organizations.

This case study discusses challenges faced and solutions implemented in five areas, including: (1) Curriculum Scope and Design; (2) Faculty Credentials and Recruitment; (3) Governance and Administration; (4) Learning Models and Delivery Channels; and (5) Student Models. The areas that have posed the most significant challenges are curriculum scope and design, faculty credentials and recruitment, and program governance. Fewer challenges have been encountered in learning models and delivery and student support due to the

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strong initial grounding. The goal in sharing these lessons learned and successes is to encourage other academic institutions beginning this journey or in progress. Knowledge management is a critical new profession in a 21st century knowledge society and knowledge economy. The more academic programs we have, the more educated professionals we have to offer.

2. Curriculum design and management

Curriculum design and delivery is challenging for several reasons. First, there is no established standard for knowledge management education upon which to design a curriculum. Second, the traditional semester-long academic curriculum model does not align well with the needs of a profession like knowledge management. Third, knowledge management professionals need to learn both technical and behavioral competencies to be successful in their career. Finally, knowledge management is a practical profession and the curriculum must support practice.

2.1 Challenge 1: No accepted scope and coverage description of the field

Because there is no widely accepted professional standard for knowledge management, we look to the published literature for guidance. The published literature provides a picture of graduate level knowledge management education programs and curricula from the late 1990s through 2008 (Abel and Oxbrow 1999; Abell, A., and Ward, S. 1999; Al-Hamadweh 2005; Al-Hawamdeh, 2005; Al-Hawamdeh, S*. et al* 2004; Argamon, S. et al. 2005; Bartczak, S. E. et al 2010; Becerra-Fernandez, I. and Gudi, A. 2008; Bontis, N. and Girardi, J. 2000; Bontis, N. *et al*. 2006; Brogan et al 2001; Chaudhry 2005; Chaudhry, A. S. and Higgins, S.E. 2001; Chaudhry, A. S. and Higgins, S.E. 2003; Chen et al 2005; Chua, A. Y. K. 2005; Cohen 2000; D'Arcy, S. 2000; Dunn and Hackney 2000; Erlach, C*. et al*.2000 ; Ferguson, S. and Hider, P. 2006; Gamal 2000; Hazeri and Martin 2006; Hazeri, A. 2006; Johannsen, K.G. 2007; Kenner and Fernandex 2011; Koenig 1999; Krivonos, P. *et al* 2005; Lai 2005; Lambe, P. 2006; Lamphun and Lee 2002; Lank, E. 2004; Lau, C. L. and Al-Hawamdeh, S. 2002; Loon, L. C. and Al-Hawamdeh, S. 2002; MacGillivray, A. 2003; Makkonen Siakas and Vaidza 2011; Malhotra, Y. 2003; Martin 1999; Martin et al 2006; Metcalfe, A. 2006; Morris 2001; Newman, B. D. 2002; Parycek, P. and Pircher, R. 2003; Pircher, R. 2003; Ponzi, L. J. and Koenig, M. 2002; Rehman and Chaudhry 2005; Rehman, S.U. and Sumait , H. 2010 ; Reynolds 2000; Ruth, S. *et al* 1999; Ruth, S. *et al* 2002; Saito et al 2004; Saito, A. 2007; Sarrafzadeh et al 2006; Shurville, S. J. *et al* 2005; Southon and Todd 2001; Srikantaiah, K. T 2004; Stankosky, M. A. 2005; Sutton, M. J. D. 2002 ; Sutton, M. J. D. 2007; Sutton, M. J. D. *et al* 2002; Sutton, M.J.D. 2007; Swanson and Hepner 2011; Theobald, J. 1998; Todd, R. J. and Southon, G. 2000; Todd, R. J. and Southon, G. 2001; Webb, J. 2002; Weidner, D. 2002; Wright Peachey Hemminger 2009) suggests that most graduate level programs offer courses in business intelligence, document and records management, knowledge economy and intellectual capital, organizational learning, and some aspect of data mining or semantics. Chaudhry and Higgins (2003) and Kgigongo-Bukenya and Kaddu (2011) suggest that curricula may be constructed around knowledge foundations, applications, strategies, processes and technologies.

The original Kent State curriculum designed in 2001 aligned with these models. However, feedback solicited in 2010 from employers, from students enrolled in and who had graduated from the program suggested the need for a curriculum revision and redirection. The review included extensive interviews with knowledge management thought leaders, critical reviews of successes and failures of current and past programs, conversations with past, present and potential students. We learned two things. First, we learned that business needs have changed and grown. This is because knowledge management is now an integral part of every sector of the economy – it permeates all types of organizations. In 2010 we find a rich set of knowledge professional roles and responsibilities. Some of these roles are strategic, some are aligned with business operations, some are specialized to particular areas of knowledge management, and some are general practice. Second, we heard that most current education programs are designed to train knowledge management directors or executives who may "talk about" but may not "do or practice" knowledge management.

In 2012 a substantially redesigned curriculum was approved and implemented. Today, the knowledge management curriculum is constructed around ten facets of knowledge management theory and practice. The ten facets (Figure 1) were identified through (1) a comprehensive review of the current and historical literature of knowledge management; (2) conversations with and lessons learned from other knowledge management educators and trainers, and (3) extensive consultations with business and organizations who hire knowledge professionals.

The ten facets include: (1) Intellectual Capital and Knowledge Economics; (2) Knowledge Technology; (3) Knowledge Strategy; (4) Knowledge Asset Management; (5) Collaboration and Communities; (6) Organizational Culture and Communications; (7) Organizational Learning; (8) Knowledge Operations; (9) Knowledge Architecture; and (10) Innovation. Each of the ten facets is supported by a limited number of traditional three-credit courses, by several short (1 or 2 credit) courses, and by workshops. A sampling of course topics offered in each of the facets is presented in Figure 2.

Forty-two credits are required to earn the Master of Science degree. Eight courses are core, including: Foundational Principles of Knowledge Management; Economics of Information; Foundations of Document and Records Management; Knowledge Assessment and Evaluation; Organizational Culture, Organizational Learning, Knowledge Organization Systems and Services, and Communities of Practice. The core courses provide students with a deep understanding of the facets. Students may then choose to focus on a particular facet of knowledge management, or design a generalist education.

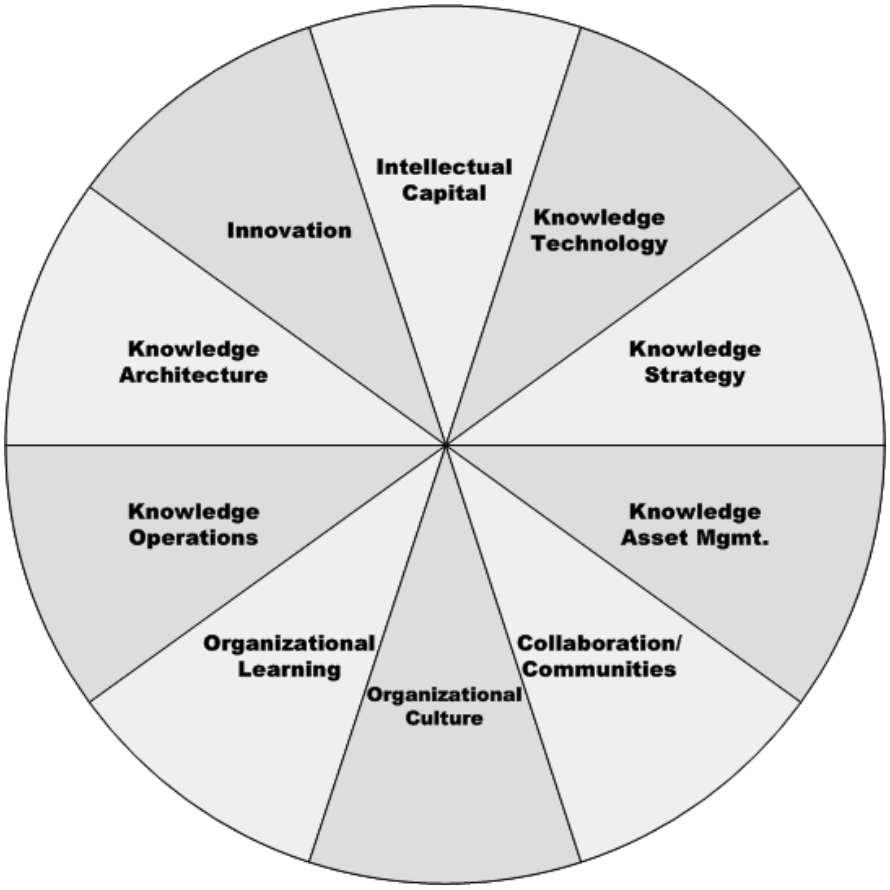

Figure 1: Ten facets of knowledge management

The curriculum is also designed to support students' professional career development. An important source of validation of the curriculum was the work of the Knowledge Management Education Forum (KMEF) (2012). The Knowledge Management Education Forum is an open community of individuals representing knowledge management professionals, faculty, and students who share a common interest in advancing the quality and accessibility of knowledge management education. KMEF was formed jointly by Kent State University and George Washington University with the goal of ensuring that knowledge management education address the knowledge management competencies students need to succeed in knowledge organizations across all sectors of the economy. In 2011, the KMEF formed two communities of practice to explore these needs: the Competencies Community of Practice, and the Roles and Functions Community of Practice. Working together, the two communities identified four categories of knowledge management roles (Table 1), including: (1) corporate level; (2) business embedded knowledge management roles; (3) specialized knowledge management roles; and (4) generalized knowledge worker roles. The Communities of Practice mapped these general categories to specific job titles to facilitate interpretation.

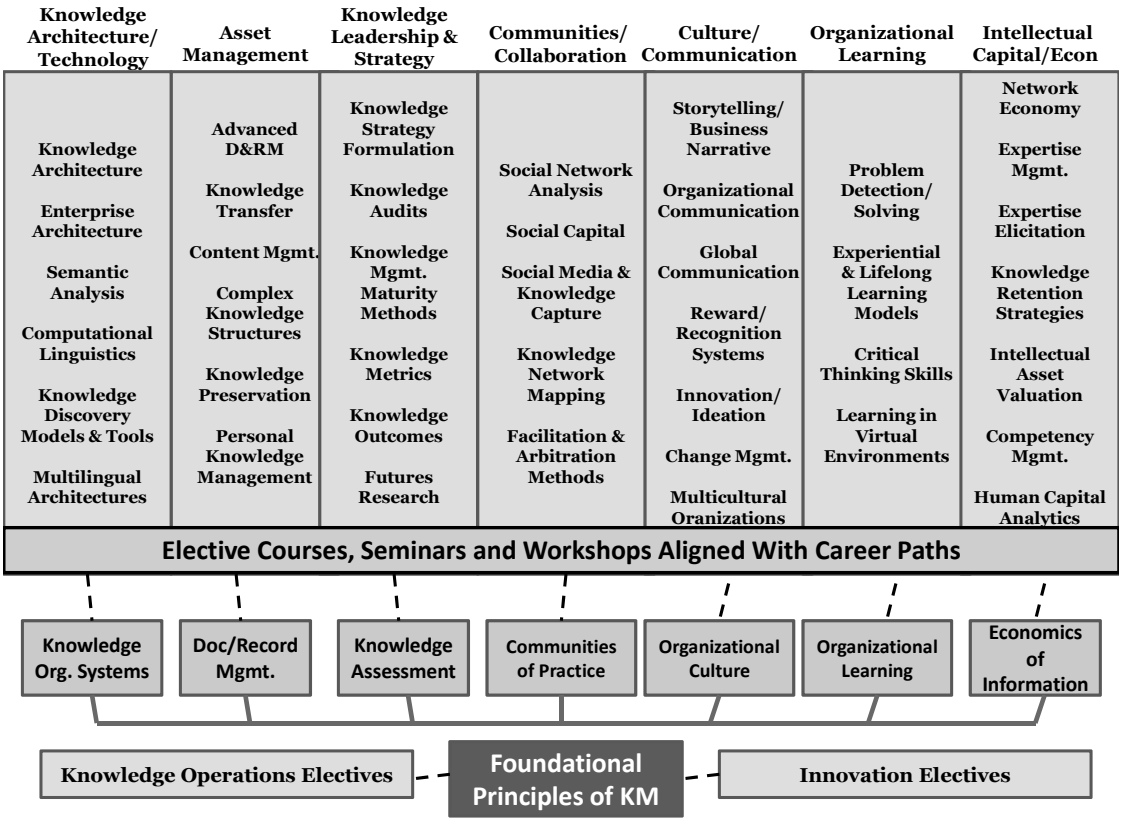

Figure 2: Curriculum support for 10 facets of knowledge management

Table 1: Knowledge management roles, job titles and competencies

Knowledge Management Roles	Sample Job Titles	Knowledge Management Competencies
Corporate and Executive Level Role	Chief Knowledge Officer (CKO) Chief Learning Officer (CLO) Chief Knowledge Strategist (CKS) Knowledge Management Director	Broad knowledge of all facets of knowledge management with particular focus on: Strategy and Leadership Intellectual Capital Communications and Culture Innovation Knowledge Assessment and Evaluation Innovation
Business Embedded or Aligned Role	Business Analyst Knowledge Analyst Knowledge Manger	Strong knowledge of business operations, a general knowledge of all facets of knowledge management, and deep knowledge of: Knowledge Operations Knowledge Architecture Knowledge Technologies
Specialized Knowledge Management Role	Knowledge Architect Learning Officer Content Manager Community Facilitator Cultural Information Officer Communications Specialist Business Process Designer Knowledge Economist Information Economist	Deep specialized knowledge of one of the facets of knowledge management: Knowledge Organization Systems Knowledge Asset Management Communities and Collaboration Organizational Learning Intellectual Capital and Knowledge Economy

Knowledge Management Roles	Sample Job Titles	Knowledge Management Competencies
Generalized Knowledge Work Role	Any and all roles in an organization	General awareness of all facets of knowledge management and strong knowledge-oriented behavioral competencies

It was important to Kent State University that the curriculum design and coverage address all four categories of knowledge management roles. A second review was conducted to ensure that there was a logical alignment between the courses and the competencies. Table 1 describes the alignment at a high level.

2.2 Challenge 2: Misalignment of traditional course design

Having updated the scope and coverage of the curriculum, our next challenge was to review the design and effectiveness of individual courses. We discovered that each instructor approached course design differently resulting in uneven treatment of theory and practice. There was also a significant amount of redundancy across courses. Furthermore, courses were not sufficiently rigorous to reflect a graduate level degree. As a result, students were not being introduced to the full body of professional knowledge or the extensive professional literature.

Starting in 2011, all new faculty began working from a single course design template. The template derives from good instructional design practices and includes such common elements as: (1) clearly defined learning outcomes; (2) extensive required and recommended readings reflecting a graduate level education and providing students with a strong introduction to the body of knowledge and published literature; (3) a variety of rigorous exercises designed to provide students with not only resource based but also experiential and situational learning opportunities; (4) built in discussion and engagement models among students; and (5) weekly feedback loops from students to instructor and instructor to student. As a result of working from a common template, faculty members now have a common basis for discussing course development across the curriculum. Course updates are shared across the faculty. The approach to course design is now rigorous but predictable for faculty. As a result, students have a common high quality learning experience across all courses.

2.3 Challenge 3: Shallow versus deep treatment of knowledge management subjects

In 2010, the message from business and industry was clear – students graduating from the program needed to be more than "book ready" and theory rich, they needed to be "work ready" and able to "do knowledge management." We also heard from students that there were not sufficient electives to build out a rich professional education. Addressing these concerns is not trivial challenges for a Master's program – how might we provide students with a rich practical learning experience within only forty-two credits? University administrations expect to see a very limited number of courses for Master's degrees. The more courses that are offered, the greater the chance that a course will not meet expected capacity and not achieve a breakeven point. The solution we devised was to provide a variety of learning options within each facet of the curriculum. Each facet of the curriculum is supported by a few traditional three-credit semester long courses. Short 1 and 2 credit courses enable them to build out their skills. And, finally workshops – both for and non-credit provide opportunities to learn about emerging or hot topics related to a facet. The curriculum for Intellectual Capital and Knowledge Economy is described in Table 2.

Table 2: Sample curriculum for intellectual capital and knowledge economy

Basic Course	Short Courses	Workshop
Economics of Information	Management of Knowledge Workers	Global Work Environment
Intellectual Capital Management	Talent Leadership	Intergenerational Workforce
The Knowledge Economy	Talent Management Strategy and Execution	Virtual Global Workforce
Expertise Elicitation	Mentoring and Coaching	High Performance Organizations
	Competency Modelling and Mapping	Information and Data Privacy
	Human Capital Analytics	
	Workforce Planning	
	Personal Knowledge Management	

2.4 Challenge 4: Curriculum for technical and behavioral competencies

The most effective knowledge management strategies are those that are well aligned with an organization's business goals and objectives. In order to succeed at knowledge management, knowledge professional must have not only strong technical skills – knowing how "to do" knowledge management, but they must have critical behavioral competencies. Education programs need to provide opportunities for students to learn these behavioral competencies. They need to learn how to make good business judgments, how to work in teams, how to exhibit leadership, and to create a knowledge organization by example rather than by dictate.

The solution to this challenge is an immersion in working with and learning from instructors and colleagues. The instructors who teach in the program have been selected in part because of the strong behavioral competencies they possess. Instructors teach by example, they teach through engagement in projects, and through personal feedback. In addition, the program values the early promotion of students into professional associations, conferences and engagements so they have further exposure to good behavioral competencies.

3. Learning models and delivery channels

Over the past decade we encountered four challenges related to learning models and delivery channels, including: (1) learning how to learn knowledge management; (2) learning anywhere and anytime; (3) the need for both formal and informal learning opportunities; and (4) the learning path that leads to knowledge management.

3.1 Challenge 5: Learning how to learn and unlearn

Thought leaders in knowledge management have two characteristics that set them apart – they have a wealth of experiences, in different economic sectors, different types of organizations, in different cultures, and through those experiences they have learned how to learn and unlearn. Another characteristic of the program's instructors is the willingness to learn from students, and continuous encouragement to students to come up with a new idea or a new perspective. Students are encouraged to challenge established knowledge – they learn to live McElroy's Knowledge Life Cycle as they go through each class. This model places a heavier burden on the instructors than a traditional teacher-student model. However, the results in terms of student accomplishments and innovation are noteworthy.

3.2 Challenge 6: Learning anywhere and any time

By definition, programs which are confined to a single physical location, which can draw upon faculty who live locally and can only deliver to students who live locally, may be more restricted in their content and the experiences than those which can draw faculty and students from around the globe. We have also found that many of our students are mid-career professionals who have been given knowledge management responsibilities within their organization. They need to come up to speed quickly without relocating.

In 2007, the program administrators understood that the future demand for knowledge management would be global and would come largely from within businesses and organizations. For this reason, the entire program was moved to an online degree. This means that all of the courses described in Figure 2 above are born and live digitally. The program administrators also understood that moving the program online meant creating a full electronic learning environment. There are four learning models in use today.

When the program transitioned from onsite to online, a new challenge surfaced. The challenge was the potential for isolated and heavy "resource-based learning." In other words, the potential for the online program to take on the format of a traditional "correspondence study course" similar to those used in the 1950s and 1960s. We have that found four general learning models provide strong support for the master's program (Figure 3). All four learning models are grounded in a strong course management system. The basic course management shell is designed into a full-service learning environment for each class. All courses have a common foundation which includes reading materials, discussions, assignments and interactions. The variations among the four models align with the most effective delivery method for the course subject. These variations focus primarily on how lectures are delivered, and how students interact with the instructor and with one another. Knowledge management is a multifaceted discipline which requires a rich set of teaching models.

Learning model 1 is grounded in asynchronous (pre-recorded) lectures which students absorb when it is convenient to them. Pre-recorded lectures may be narrated slide decks, digital videos, and interactive blackboard or design exercises. The pre-recorded lectures are punctuated with online student discussions which provide an opportunity for students to step back and internalize the lecture content before sharing their thoughts with other students. In addition, the pre-recorded lectures are captured as podcasts, which allow students to reinforce their learning experience while driving, jogging or doing other daily tasks. Because students learn from each other it is important for them to have an opportunity to build strong social relationships. Learning model 1 also provides weekly optional interactive sessions which give students opportunities to see and hear each other. This model works well when a course is made up of students who live in different time zones and in different countries, where scheduling a common time to meet interactively will by definition put some students at a disadvantage. It also works well for graduate students who are working professionals. It allows them to learn within a busy schedule. This model requires an additional effort from the instructor as all content must be prepared prior to launching the course.

Learning model 2 is designed around synchronous lectures. There are two instances when this model works well. It works well when the subject is best taught interactively – where students will expect to ask many questions, where the instructor cannot anticipate those questions, where the topic is exploratory and where learning thrives on brainstorming. In this case, the instructor may set a day and time when the majority of students can meet online, and record the session for those who cannot meet. For this model, both online interactive and asynchronous discussion rooms must be available to students. Because academic scheduling procedures generally recommend that a course be either synchronous with a scheduled date and time, or entirely asynchronous, this model requires multiple sections. This model requires administrative and technology support, but requires a lighter effort for the instructor.

There are some knowledge management courses which may benefit from in person delivery and direct in-class interaction and participation. For example, knowledge elicitation must be taught in a way that students can watch an instructor interview an expert, ask questions, then change places with the instructor and receive direct coaching. These types of courses must be taught in person. They will require multiple teaching sites where the student community is international. However, they should be digitally captured for later viewing. In this model, both synchronous and asynchronous conversations should be supported. To support this model, additional investments in technology support.

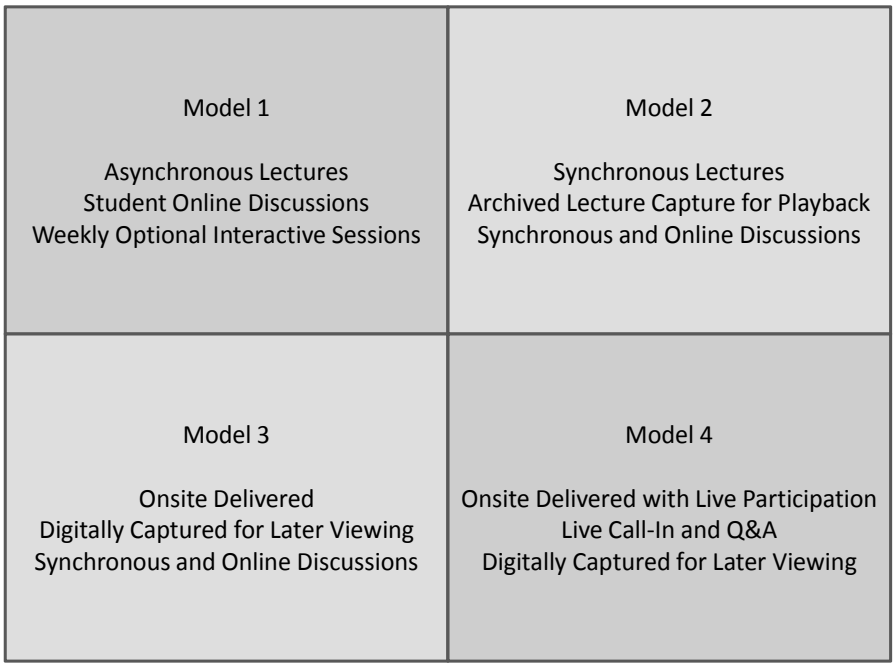

Figure 3: Four learning models supporting the master's program

Finally, learning model 4 expands upon Learning model 3 by supplementing live onsite delivery with live participation and call-in for remote students. As with the other three models, the course delivery is digitally

captured for later viewing. This model requires additional investments in administrative, technology and communication support. This model most closely resembles the traditional teaching model.

A frequent critique of online learning is the potential for isolation of students and the lack of opportunity for students and instructors to develop strong relationships. All four models have built in safeguards against isolation. First, all courses have optional class times set aside for interaction. Instructors and students, students and students, have several tools available to support interaction, including the course management system's electronic classroom, Skype, and WebEx. Second, instructors reach out to and interact with students in an advisor and mentoring capacity. Social networking across the student community is strongly encouraged and promoted.

3.3 Challenge 7: Formal and informal learning opportunities

Professional networking opportunities are among the values offered by a graduate degree program. This is challenging in an online program where students are scattered around the globe. We encourage students to participate in their local knowledge management communities, to represent the Kent State program in their actions, and to bring the value of those experiences back to their colleagues in the program.

In addition, by bringing in seasoned knowledge management experts to teach courses and lead workshops, our students have opportunities to build their professional networks. An important factor in selecting faculty is their interest in students and the promotion of student professional careers. This is not atypical of most part-time faculty models, but it is a foundational principle of the Kent State University program.

3.4 Challenge 8: Not just for graduate students

Another lesson we learned in our extensive conversations with business and industry was that knowledge management education is not just a program of graduate study. There must be pathways to graduate education programs from high school, from technical schools and colleges, and at the undergraduate level. Extending the educational model to lower level degrees is a major undertaking at any American university.

To address this challenge, the Kent State program partners with other institutions and professional associations to provide a wide range of learning opportunities. Workshops and continuing enrichment courses are open to students, non-students and community members. While graduate programs are important for the research and professionals they produce, our knowledge society will be built around knowledge workers. There must be a learning path for knowledge workers as well.

4. Faculty recruitment and credentials

This is an area of significant challenges, not all of which have been resolved. The first challenge pertains to faculty credentials given the fact that this is a relatively young field with few programs of advanced study in knowledge management. The second pertains to whether that faculty serve in tenured or non-tenured positions. Thirdly, is the full-time faculty model appropriate to knowledge management, or is it more important to leverage experts on a part-time basis? Dual appointments across academic departments and disciplines were also explored at one time. Finally, the faculty model has significant implications for academic and applied research opportunities.

4.1 Challenge 9: Faculty credentials

It is important to balance theory and practice in knowledge management education. One of the greatest challenges in creating a Master's program is finding faculty who have both a deep theoretical grounding in knowledge management, and relevant practical experience. In the early days of the Kent State University program, this was a major challenge simply because there were few institutions that offered an advanced degree in knowledge management. The University requires that instructors must have earned one degree higher than the students they are teaching. To teach in the knowledge management Master's program, that meant that all faculties must have earned a doctorate. There were few individuals with both practical experience and an earned doctorate in knowledge sciences.

Fulfilling the requirements for credentials and credibility was a major challenge in the early years. There are risks associated with moving beyond this balance in favor of either credentials or credibility. While knowledge

management practitioners bring credibility to the classroom, they frequently find it challenging to speak to broad theory rather than individual experiences. And, they may have no teaching experience. From an academic perspective, this may suggest that practitioners lack the appropriate credentials. Credentialed professionals may understand theory and have some teaching experience, but they are challenged to teach practice to the professionals who enter the program.

Knowledge management is a profession of practice. Students must learn the theory on which practice is grounded, but they must also learn practice. While it is possible to enrich learning through case studies, the most effective way to learn practice is from a seasoned practitioner. Learning from a practitioner transfer critical tacit knowledge that students need to succeed on the job. This speaks to the challenge of credibility. Is it possible for knowledge management faculty who lack practical experience to teach with credibility? Of course, the ideal situation is faculty who have both strong academic credentials and practical credibility.

These challenges were somewhat alleviated in 2010 when we broke knowledge management down into the ten facets. By breaking the field down into its components, it was much easier for find highly credentialed faculty with both practical and teaching experience. We were fortunate to find individuals who began their professional careers as subject matter experts in one of the ten facets, and who also had adjunct teaching experience. As a result, we have been able to set high standards for credentials, for credibility, and for teaching quality.

4.2 Challenge 10: Tenured versus non-tenured faculty model

The agenda for any tenure-track faculty member is research, publishing, and teaching. Consulting and engaging with business and industry is not highly rewarded for tenure track faculty. In addition, tenure track faculty members are encouraged to identify a single research focus, to delve into that area and develop expertise over time. Broad based interdisciplinary research – exactly what is needed in knowledge management – is not highly rewarded in tenure processes and decisions. It is clear that at the present time, the needs of the knowledge management field do not align well with the traditional tenure track model.

Faculty are key to advancing an emerging discipline such as knowledge management – through collaboration across disciplines, through experimentation, through continuous learning and unlearning, and by taking risks to move new ideas forward – and sometimes failing – but learning from failures. The traditional tenure track model benefits faculty members who take a safe and steady path by building upon previous research and incrementally advancing the current discipline. Tenure-track faculty positions may promote different goals and outcomes than what is currently needed to advance the field of knowledge management.

An additional challenge for tenure-track faculty pertains to communicating with the knowledge management community and publishing in peer-reviewed journals. In well-established fields, communication with peers involves publishing in high-impact peer-reviewed journals. In knowledge management, tenured and tenure-track faculty have a dual communication obligation. To have a practical impact, faculty must communicate research, development and new ideas to the knowledge management community through open-access journals, in peer-reviewed and open-access conferences, through trade journals, by contributing to organizational white papers, and through engagements with leading knowledge organizations. These activities, though, carry little weight in an academic sense. To have an academic impact, faculty must also publish in peer-reviewed journals in which have value to their home department, e.g. business administration, communication science, information science, engineering, education. This can translate to a double or triple level of effort for knowledge management faculty. This is not uncommon for faculty who are associated with transdisciplinary and emergent domains.

4.3 Challenge 11: Full Time versus part-time faculty

The traditional academic faculty model includes at least one full-time faculty member for each facet of the discipline. This model does not yet work for a knowledge management graduate degree program for simple economic reasons. While the demand for knowledge management credentials is growing, it is unlikely to be such as to justify ten full-time faculties. This would presume a student enrollment of 300 to 400 students. Should the enrollment reach those levels, the part-time expert faculty model will continue to be the preferred approach. At that level, an expansion of part-time faculty roles and responsibilities – specifically, to include advising and mentoring – would be requested.

Agility rather than rigidity is needed in a faculty model for knowledge management. Kent State University's solution to this challenge is to identify one tenure-track faculty member who coordinates administrative issues for the program, advises students, manages the curriculum and brings in faculty. All other faculty are internationally recognized experts in one or more of the facets. Kent State has the privilege of bringing these recognized experts onboard as part-time faculty. Because these are practicing professionals, they know the state of the field and make recommendations for new courses and workshops. They continuously update their course content to reflect the state of the profession.

4.4 Challenge 12: Borrowed faculty or dual appointments

In the early years of the program, the university explored borrowing faculty from other departments. This approach did not work and was abandoned for two reasons. The first reason was that faculty in other departments received no reward or recognition in their tenure decisions for teaching outside their home department. The second reason was that the courses had little or no knowledge management content – borrowed faculty were not able to translate their expertise to the new context. An approach which is being tried now is to collaborate with other faculty in developing new courses. This provides a common foundation from which to teach.

4.5 Challenge 13: Academic and applied research

Research in knowledge management is a relatively new effort at Kent State. While theoretical research is more highly valued for tenure decisions, its value to students and the academic program. The path that we see research following is rom practice to theory. Problems that need research are surfaced in the natural course of working with business and industry. This presents a risk for tenure-track faculty.

5. Student model

We encountered several challenges when designing an academic model to support students in knowledge management. The first challenge pertained to the common practice of building student communities around cohorts. The second challenge pertained to the age group of potential students – young professionals, mature or mid-career or retirees defining a second career. The third challenge pertained to segregating students by economic sector. And finally, while there was agreement that we wanted a multicultural and international student body, achieving that presented several challenges.

5.1 Challenge 14: Cohort or non-cohort model

The value of a cohort model is that students develop lasting networks and build strong professional relationships. We found that this same result can be achieved when instructors take the additional step to build relationships among students, and when course designs promote student interactions. We also have observed that students can build more extensive networks and peer relationships if the student community is strong and growing. A smaller peer community designed around a cohort model may lead to fewer relationships. We found that we had indirectly created a cohort model by offering the introductory course – Foundational Principles in Knowledge Management – only in the Fall semester. While students were applying for admission to the program year round, by default they could only begin their studies in the Fall Semester. In 2011, a course scheduling change was implemented and the Foundational Principles course is now offered year round. Student enrollment has significantly increased.

Another solution which we hope to put in place in the near future is a synthetic or virtual student lounge. The idea is to give students a virtual space in which to socialize and organize their own activities. Given the high rate of use of social media today, we believe that there are other ways to create professional relationships beyond the traditional physical cohort model.

5.2 Challenge 15: Non-traditional multigenerational community

The transition from an industrial economy to a knowledge economy touches everyone – all ages, all generations. Knowledge management theory and practice are important to succeeding in this new economy. As a result, the typical student community in a knowledge management program will be multigenerational. This presents a challenge to instructors and administrations alike. We need different recruitment strategies for young professionals, for mid-career professionals, and for retirees. Instructors need to establish a learning

environment which takes into account different values and expectations. And, most importantly, students must adapt to learning and collaborating across generations. While there are challenges, students who learn in this context are actually gaining behavioral competencies that will serve them well in their career. The learning environment is a microcosm of what they will encounter in business and industry.

5.3 Challenge 16: Segregate students by economic sectors

Knowledge management is practiced within an organization and aligned with its business goals and objectives. Preparing students to design and sustain knowledge-embedded business operations is an important aspect of knowledge management education. This means that students must have a strong knowledge of the business and the economic sector. We learn the intricacies of business operations and gain operational knowledge through work experience or through domain-specific education. Although knowledge management practices are embedded in and aligned with business operations, knowledge management competencies fundamentally transcend business operations. This understanding is important to knowledge management education programs.

We have encountered pressure to segregate students into classes which focus on a particular economic sector such as health, intelligence or finance. We have resisted these efforts based on the belief that students benefit from understanding knowledge management concepts in multiple contexts and from understanding their transcendent properties. A much richer learning experience results when military service officers, ministers, engineers, nurses, teachers, and business leaders discuss a concept from different viewpoints and share different perspectives. Isolating students by particular economic sectors will preclude opportunities to expand their thinking and to see their own domain challenges in a different light.

5.4 Challenge 17: Local or global student community

Knowledge management is a universal concept and a global practice. The knowledge economy is a global economy. New knowledge professionals must learn to work in a multicultural and global economy. Learning in a multicultural and global economy is another opportunity to build key behavioral competencies. Creating a multicultural student community brings challenges, though. A primary challenge is the perspective on online education programs held in many countries. The perception is that online degree programs resemble the correspondence course models of the 1950s and 1960s. Where online degree programs are not held in high esteem students will attend local programs, and miss the opportunity to engage internationally. While some countries provide financial support for students to study abroad, this practice is not widespread.

It is also important to be sensitive to cultural norms which may concern faculty-student relationships. For this reason, academic programs must ensure that the faculty, as well as students, has a multicultural representation.

Articulation agreements are another important tool that universities with knowledge management programs can use to create a global student community. Programs which offer courses year round will be better positioned to address differences in academic year schedules.

6. Governance and administration

Governance and administration surfaced only two challenges over the past decade. These challenges, while few, are significant, and speak to the fundamental aspects of support. The first challenge pertains to the academic home of the knowledge management program. The second challenge pertains to the governance model that applies to the program.

6.1 Challenge 18: Academic home of knowledge management

One challenge we encountered in updating the curriculum derived from the administrative location of the program. This is simply due to the fact that knowledge management is a multidisciplinary field, and most of the academic homes have a more traditional disciplinary focus. The literature suggests that knowledge management programs are generally housed within schools or colleges of business, communication or information, engineering and technology. Where a program is located within a college of engineering or technology, it may be challenging to justify courses in organizational culture, organizational learning or

knowledge economy. Where a program is located in a college of business, it may be challenging to justify courses in knowledge engineering and technology.

The home location may also influence admission requirements for students. We found this to be a challenge particularly for mid-career and senior professionals returning to school. Admission requirements may be designed for young professionals, and for students with a strong academic background in the field. Most students entering a knowledge management program will not have a strong academic grounding in knowledge management – simply because such programs do not exist at the undergraduate level. Experience and exposure are key admission requirements – these may not be valued by the home department. For this reason, we found it important to become more involved in the admission process – and to establish pertinent admission requirements to the knowledge management program.

6.2 Challenge 19: Administrative and governance model

Most academic departments and schools have internal governance models which have evolved from practice over time. When a knowledge management program is introduced to an established school or department, the existing governance models will apply. These models may or may not serve the management of the knowledge management program well. We encountered two challenges. The first was in representation of external advisory board members. Given the fact that the departmental focus was different than knowledge management, this introduced the potential for advice that was not in line with the direction of industry and business. The second pertained to the overall approval process for new courses, faculty and initiatives. While this presented some initial challenges in terms of slowing down the rate at which the program could respond to business and industry demands, it ultimately provided strong quality control. It further provided opportunities to communicate with faculty about the focus and purpose of knowledge management.

7. Observations and recommendations

Although knowledge management and science has been a topic in the public discourse for sixty years now, it is just coming of age as an academic discipline. This case study presents several challenges that universities and colleges may encounter when establishing and managing an academic program. Each of the challenges may play out in a different way across academia. All of the challenges can be met effectively – none is insurmountable. Knowledge management is among those new disciplines that operate at the border of existing disciplines. Because of its close alignment with business and industry, it presents challenges to some of the traditional academic models. As an emerging discipline it also presents challenges to traditional models of governance, faculty recruitment and retention, and student recruitment and support. For guidance, we recommend that knowledge management program administrators and faculty should look to and partner with otherv cross-disciplinary academic models. Knowledge management has the potential to design new academic models which will serve well the knowledge society of the 21st century.

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Knowledge Management in Technology Education

Diptendu Dutta diptendu@aunwesha.com
Sourav Chakraborty sourav@aunwesha.com
Piyal Sarkar piyal@aunwesha.com

Aunwesha Knowledge Technologies
http://www.aunwesha.com

Abstract
Knowledge Management (KM) principles recognize that it is important for organizations to "know what they know." Are the concepts of knowledge management (KM) applicable to colleges and universities? All institutions inherently store, access, and deliver knowledge in some manner and educational institutions are no exception. However, although some examples exist, the use of KM in education is the exception rather than the rule. Knowledge management is a new field, and experiments are just beginning in education. This short paper explores how KM practices might be useful in a technology education setting.

1. Introduction

Most organisations realise that “knowledge” is a strategic resource that gives them sustainable competitive advantage [Drucker] and helps them achieve long-term organisational goals. With the realization that knowledge is a core resource, organisations are now attempting to manage knowledge in a more systematic and more effective way. Knowledge Management is being gainfully used by organisations in leveraging knowledge to spur innovation, improve customer service, or achieve operational excellence.

Education today is subject to the same pressures of the marketplace. According to Brown and [Brown and Duguid], profound changes in competition have made universities and higher education institutions think like business. The educational markets are becoming global as universities attempt to internationalise their curricula and offer high quality programs to students regardless of location. Universities also have to adjust themselves and develop strategies to respond rapidly to the changes in technologies and increasing demands of stakeholders. Many have turned to a new paradigm that merges conventional distance education with computer and telecommunication technologies: “online distance education”.

Many authors have expressed their enthusiasm for introducing KM practices into the field of education. Higher education institutions have "significant opportunities to apply knowledge management practices to support every part of their mission," explains [Kidwell et al]. The problem is that it is such a "wide open area of study that it is difficult to understand the implications of knowledge management for an educational setting" [Thorn].

In the rest of the paper we provide some background information on Knowledge Management principles and practices and then go on to explore how KM may be useful in an educational setting.

2. Knowledge Management

2.1 Knowledge

What is knowledge? Knowledge starts as *data*—raw facts and numbers— for example, the market value of an institution's endowment. *Information* is data put into context—in the same example, the endowment per student at a particular institution. Information is readily captured in documents or in databases; even large amounts are fairly easy to retrieve with modern information technology systems.

Before acting on information, however, we need to take one more step. Only when information is combined with experience and judgment does it become *knowledge*. Knowledge can be highly subjective and hard to codify. It includes the insight and wisdom of employees. It may be shared through emailed "best practices" memos or even sticky notes on a cubicle wall. And once we have knowledge, we can put it to work and apply it to decision making.

A popular framework for thinking about knowledge proposes two main types of knowledge: *explicit* and *tacit* [Polyani]. Explicit knowledge is documented information that can facilitate action. It can be expressed in formal, shared language. Examples include formulas, equations, rules, and best practices.
Explicit knowledge is:
• Packaged
• Easily codified
• Communicable
• Transferable
Tacit knowledge is know-how and learning embedded within the minds of the people in an organization. It involves perceptions, insights, experiences, and craftsmanship. Tacit knowledge is:
• Personal
• Context-specific
• Difficult to formalize
• Difficult to communicate
• More difficult to transfer
Most business actions require the guidance of both explicit and tacit knowledge.

How does knowledge work in organizations? Knowledge originates in individuals, but it is embodied in teams and organizations. In an organization, examples of explicit knowledge are strategies, methodologies, processes, patents, products, and services. Examples of tacit knowledge in an organizational context are skills and competencies, experiences, relationships within and outside the organization, individual beliefs and values, and ideas.

Knowledge also is embedded in work processes, and it exists in all core functions of an organization as well as in its systems and infrastructure. Effective knowledge management programs identify and leverage the know-how embedded in work, with a focus on how it will be applied. The challenge in knowledge management is to make the *right* knowledge available to the *right* people at the *right* time.

2.2 Knowledge Management

The term "Knowledge Management" (KM) is used to describe everything from the application of new technology to the harnessing of the intellectual capital of an organisation [Sallis and Jones]. It is not one single discipline; rather, it is an integration of numerous endeavours and fields of study. [Rowley] describes the term KM as follows:

> *"Knowledge management is concerned with the exploitation and development of the knowledge assets of an organisation with a view to furthering the organisation's objectives. The knowledge to be managed includes both explicit, documented knowledge, and tacit, subjective knowledge. Management entails all of those processes associated with the identification, sharing, and creation of knowledge. This requires systems for the creation and maintenance of knowledge repositories, and to cultivate and facilitate the sharing of knowledge and organisational learning. Organisations that succeed in knowledge management are likely to view knowledge as an asset and to develop*
> *organisational norms and values, which support the creation, and sharing of knowledge"*

In brief, KM is the management of processes that govern the creation, dissemination, and utilisation of knowledge by merging technologies, organisational structures and people to create the most effective learning, problem solving, and decision-making in an organisation.

In order to reap the benefits of KM, the two major aspects of *community* and *collaboration* will have to be put into practice:

Community: Community is a group of people bound together by certain mutual concerns, interests, activities, and institutions. From KM perspectives, the concept of communities is essential because knowledge in an organisation is often built up and generated by small, informal, self-organising network of practitioners [Senge]. In addition, the current advances in Information and Communication Technologies (ICT) also create new forms of setting in which people can communicate and share their knowledge across both geographical and temporal boundaries.

Community is also regarded as the model for dynamic, productive knowledge creation and sharing in education. [Lave & Wenger] argue that all learning involves enculturation in communities. Though the content may differ, the form of academic communities is much like other communities.

Collaboration *:* Most organisations realise that they will improve performance if their staff work together. However, building collaboration is not an easy task. KM practitioners apply many different approaches to develop the type of culture that builds the desire for teamwork and a collaborative working [Senge] [Nonaka & Takeuchi]. Techniques such as meetings, forums and discussions are used extensively to create knowledge through the processes of social interaction and collaboration. Tools such as e-mail and intranets are also used to encourage active collaboration among people in organisation.

Collaboration is one of the most critical issues in educational context, especially in online distance education where people and knowledge are distributed across time and space. A number of studies in education have examined the relationship between collaboration and learning [Dobos]. According to [Christiansen & Dirckinck-Holmfeld], collaboration is a way of overcoming two major problems in distance learning: the problem of accommodating to the academic discourse and the problem of becoming part of the academic community living at a distance.

3. Applying KM in Education

Using knowledge management techniques and technologies in higher education is as vital as it is in the corporate sector. As public, private, and for profit higher education institutions alike respond to the phenomenal growth of online courses, cyber colleges, and virtual universities, these same reasons to adopt KM apply. It is with KM that colleges will be better able to increase student retention and graduation rates; retain a technology workforce in the face of severe employee shortages; expand new web based offerings; work to analyse the cost effective use of technology to meet more enrollment; transform existing transaction-based systems to provide information, not just data, for management; and compete in an environment where institutions cross state and national borders to meet student needs anytime/anywhere.

Consider the number of faculty and staff who possess institutional knowledge. For example, what institution does not have a faculty member who has led successful curriculum revision task forces? Or a educational administrator who knows how to navigate the complex proposal development or procurement processes? Or a researcher who has informal connections to the AICTE? Or a special assistant to the VC who has uncovered (or generated) useful reports that individual deans or department chairs could use to develop their own strategic plans? Relying on the institutional knowledge of unique individuals can hamper the flexibility and responsiveness of any organization. The challenge is to convert the information that currently resides in those individuals and make it widely and easily available to any faculty member, staff person, or other constituent. An institution-wide approach to knowledge management can lead to exponential improvements in sharing knowledge—both explicit and tacit— and the subsequent surge benefits.

Knowledge management applications could benefit a number of university processes and services including:

- The research process,
- Curriculum development process,
- Student and alumni services,
- Administrative services,
- Strategic planning process

3.1 Granting Body Case Study

An educational grant giving needs to better reflect on and share the lessons it is learning about effectiveness: How can they learn from what has worked – or hasn't – from previous education grants and strategies? How can foundations and donors access knowledge about effective practices and use it in decision-making? How can they shorten the cycle from research and experimentation to practice and the marketplace?

With these questions in mind, the organisation may develop a web-based system to help grantmakers collect and share knowledge with each other about effective education philanthropy. This "knowledge management" initiative will help grantmakers identify expert resources, sift through information about different education strategies, and share experiences and insights into successful and failed philanthropic interventions in education systems.

The challenge facing such organisations isn't just how to share explicit knowledge about effective education strategies, although this is important. It also includes figuring out ways to capture the tacit or implicit knowledge and experience of organisation officers as they work with grantees, watch projects develop over time, and test different hypotheses. And it includes how to make sense of a burgeoning amount of data and conflicting research findings that are easily accessible through the internet.

The organisation plans to build a knowledge management system that helps foundations and grantmakers share information they can apply to their work and that captures evolving lessons from the field about effective education grantmaking. The KM system will focus on the following:

What is – and isn't – working
Grantmakers want more information on what isn't working and understanding lessons learned. They would like more access to evaluation results, both of successful and unsuccessful projects. They lamented both the unwillingness of many foundations to share information about failure and the amount of reinventing the wheel that takes place in education philanthropy.

Networks
Grantmakers placed high value on person-to-person connections as a source of learning. They would welcome a system that helped them find people working on common issues to share expertise.

Measurement and assessment

Grantmakers are looking for metrics and methods that help them evaluate the impact of their foundation as well as the impact of programs. They are seeking better ways to link investments to impact and outcomes. And they want help setting expectations about the time horizon for achieving results

Synthesis and filtering
Many grantmakers say they are suffering from information overload and what they need most is some way to make sense of the information. They are looking for ways to synthesize and organize existing information – especially research. They struggle with how to reconcile contradictory research. Many rely on the web as a primary source for finding information, and they are troubled by the quality of what they find.

Who is funding what
Grantmakers want to know what projects are currently being funded and to learn what happens with these projects. They want to identify both collaboration opportunities and niche areas that are not currently being funded.

3.2 Challenges To Implementing KM

There are obvious challenges to the implementation of KM. Some of them are the following:

--Employees have no time for KM
--Current culture does not encourage sharing
--Lack of understanding of KM and benefits
--Inability to measure financial benefits of KM
--Lack of skill in KM techniques
--Organization's processes are not designed for KM
--Lack of funding for KM
--Lack of incentives, rewards to share
--Have not yet begun implementing KM
--Lack of appropriate technology
--Lack of commitment from senior management

Educational institutions would have to overcome these challenges in order to reap the benefits of KM.

4 Conclusion

Colleges and universities have significant opportunities to apply knowledge management practices to support every part of their mission—from education to public service to research. Knowledge management should not strike higher education institutions as a radically new idea; rather, it is a new spin on their *raison d'être*. But implementing knowledge management practices wisely is a lesson that the smartest organizations in the corporate and not-for-profit sectors are learning all over again.

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