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

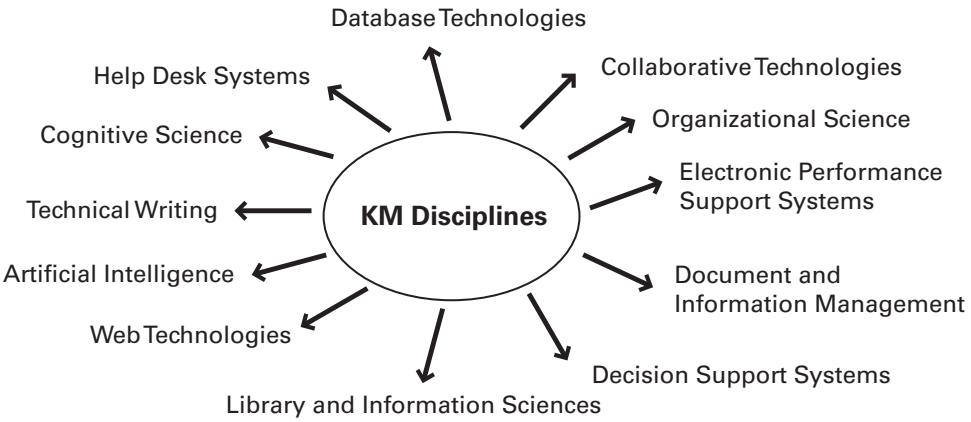

Figure 1.1
Interdisciplinary nature of knowledge management

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

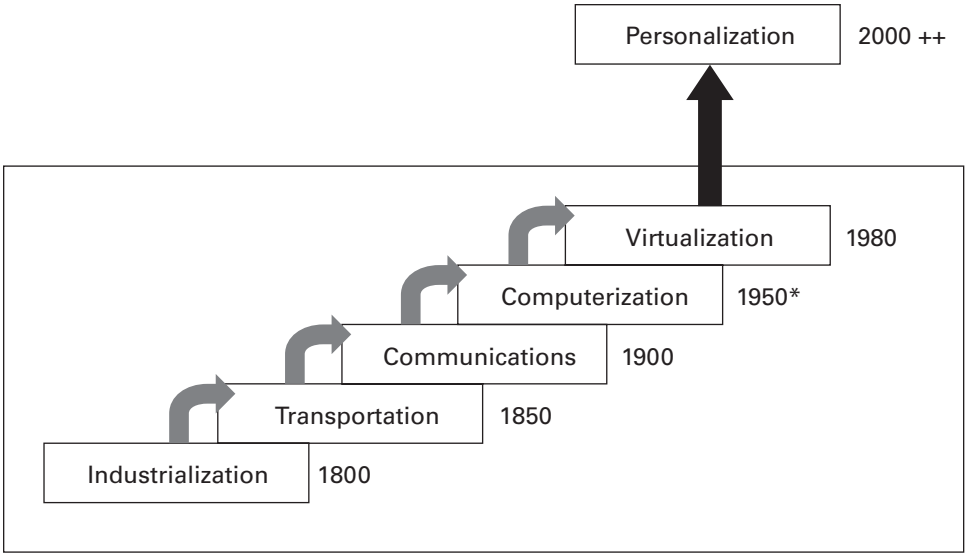

Figure 1.4
Developmental phases in KM history

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.

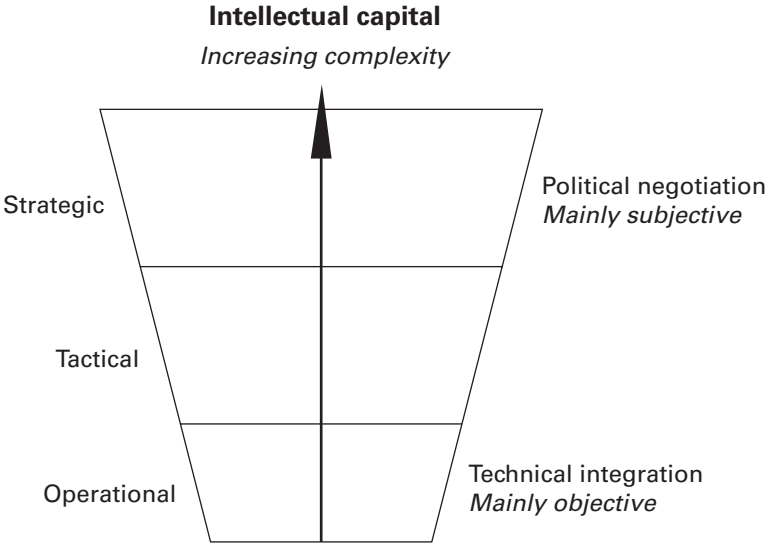

Figure 1.5
Three levels of intellectual capital

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

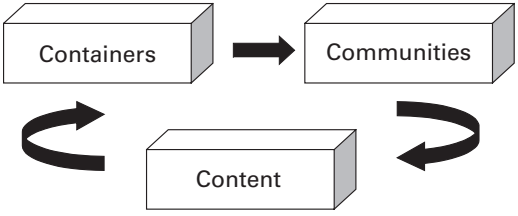

Figure 1.6
Summary of the three major components of KM

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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