Introduction to Knowledge Management

Knowledge management was the business and technology term *du jour* of 1997. What is its current state? This introduction takes a current perspective on knowledge management. It includes:

- identification of currently popular knowledge-based applications;
- current debate over the value and reality of knowledge management;
  and
- listing of organizations whose intellectual capital represents significant value to their bottom line.
“If HP Knew what HP Knows we would be three times more profitable.”

_Lew Platt, former CEO of Hewlett Packard_

1997: knowledge management (KM) suddenly emerged from the world of academia and became a burning issue for business and technology leaders. Two short years later, technology media lost interest. And the business press moved on to B2B mania.

In fact, some industry pundits have announced that knowledge management is dead. This of course brings to my mind the Mark Twain quote, “Rumors of my death are greatly exaggerated.” Knowledge management did not die; it has been quietly smoldering within corporations. In practice, knowledge management is rising like the phoenix, with great velocity. It has morphed into a series of killer applications including portals, e-learning, e-analysis, and content management. Corporations such as Northrop Grumman, Hallmark, Pillsbury, Pfizer, and Beckman Labs have successful KM practices - and these are the companies that are willing to talk about their efforts. Add to this group the scores of enterprises that have implemented KM under the umbrella of a portal or an e-learning initiative and the number is easily quadrupled.

But the nay-sayers and doubting Thomases persist. While knowledge management has slowly matured within global organizations, familiarity has also bred skepticism. The hype fueled by vendors anxious to position their respective technologies as a knowledge panacea has been challenged by pertinent questions posed in mainstream media. Trade publications such as _MIS_ and _CIO_ magazines have launched attacks on the fundamental concepts behind knowledge management. The May 2001 issue of _CIO_ featured an article that positioned KM as a “solid concept that fell in with the wrong company.” “Unfortunately, this is knowledge management today - a good idea gone awry,” said _CIO_. “KM has fallen victim to a mixture of bad implementation practices and software vendors eager to turn a complex process into a pure technology play. The result: like many a business concept, KM has evolved from a hot buzzword to a phrase that now evokes more skepticism than enthusiasm.”

This position on KM is not the only viewpoint in the media. On the other side of the debate, specialist KM press such as _Knowledge Management Magazine_ paint a more positive picture. In a study commissioned by _Knowledge Management Magazine_ for its May 2001 issue, companies were said to “put a high priority on the success of KM deployments. Executive managers lead more than 40 percent of all KM deployments.” Other conclusions from the study support the positive spin, but with a voice of reality. The survey found that a pivotal issue in migrating to a knowledge strategy is the creation of a culture to support trust and collaboration.

The debate could rage on forever. Indeed, in the academic world, which is the root of KM, the debate over whether knowledge can be properly managed will forever rage on. This title will not participate in this exercise. The point is that knowledge management has demonstrated an impact on business. We must move beyond the academic and focus on practical, albeit imperfect applications of knowledge management strategies and practices in business. In a 2002 online discussion on KM chaired by myself and hosted by AK, Debora Amidon, chairman and CEO of ENTOVATION International Ltd (a global innovation research and consulting network), put it best: “So many of the well-intended knowledge programs are dwelling on the unnecessary questions, spending inordinate precious intellectual talent on sub-optimal activities and not realizing that what we are creating is a dynamic management system for a viable business strategy, not just a storage capacity for accumulated knowledge . . . albeit sometimes useful.” She stresses that KM can be about academic debate and discussion, or about taking calculated strategic action to harness and leverage as much intellectual capital as possible to advance business and scientific causes.

I have witnessed knowledge management practices make bottom line differences to organizations ranging from government to manufacturing. Call it KM, call it an executive information portal, call it content management, call it intellectual capital - it is still knowledge management and it makes a difference.

KM enables taking informed action in previously unencumbered/unknown circumstances. In the current economic climate, although companies are careful about undertaking new technology initiatives, they are realizing that leveraging the already accumulated corporate intellectual property is by far the lowest-cost way available to increase their competitive stature. In a knowledge-based economy,
knowledge management is the critical element of a business strategy that will allow the organization to accelerate the rate at which it handles new market challenges and opportunities, and it does so by leveraging its most precious of resources, collective know-how, talent and experience - intellectual capital.

Some forward-thinking companies list intellectual capital as a line item in their annual reports. One need only look at the deltas between the market capitalization of organizations such as GE, and Google and their net worth to appreciate the value that is placed on knowledge management (in each case intellectual capital can be attributed to 82 percent, and 98 percent of these companies’ capitalization respectively). Rules and tenets that were once central to the formation of organizations, employment, and work itself are being challenged. Still not convinced? Consider that in 1995, IBM bought Lotus for $3.5 billion. This was 14 times Lotus’s book value. What was IBM paying for? In a word, knowledge: knowledge of the collaboration market, of the knowledge management market, and an ability to act on that knowledge. Organizations are no longer valued solely for what they have done - but the potential of what they might be able to do. A new breed of organizational manager is emerging, valued for their ability to leverage knowledge to make unparalleled advances in their organization’s ability to innovate, compete and connect with their customers. The promise and interest in knowledge management is not in knowing - but in being able to act creatively based on what you know. Therein lies the flaw in Lew Platt’s quote that started this introduction. Companies are valued and succeed not just for what they know, but their ability to leverage what they know creatively and proactively (see the definition of knowledge management in Chapter 2 for more detail on the role of proactive innovation in KM). This is the asset that pushes market capitalization beyond net worth. Microsoft is not valued so much for its current products and market share, but for its potential to leverage the vast intellectual resources – read experience and know-how – it has amassed. Bill Gates was quoted to say that the web browser was not going to become popular. He was sure that users would insist on serious desktop machines. But, when the market began to prove him wrong, Gates reassessed Microsoft’s capacity to innovate and met the then market leader Netscape head-on with Explorer. The rest is an evolving history. Similarly, when it witnessed the rise of the Internet, it was Sun Microsystems’ ability to quickly reposition a stalling, virtually unknown platform-independent interface and programming language product as the Internet programming language Java that exemplifies the value of Sun – not the Java product itself. This type of innovation is the fruit of knowledge management, and the reason it is a critical element to business success in the current business climate.

But if innovation is the fruit, we must not forget the infrastructure behind knowledge management. In this regard, Lew Platt was right. You still need to know what you know. The raw goods of intellectual capital - experience and know-how - must be channelled and made available, otherwise innovation can be hampered. This is a very real problem for many organizations. Consider the issue that NASA faces. Virtually everyone involved with the Apollo project is now either retired or dead. With them went the know-how on how to land a man on the moon. While the planned approaches were captured, the dynamically acquired knowledge base that emerged through facing the challenges that each Apollo mission presented were not captured anywhere but in the brains of these now departed employees. PriceWaterhouseCoopers reported that 50 percent of their employees are typically in their first or last year with the firm. In our volatile job market, where and how is the intellectual capital being captured?

Knowledge management represents a means by which to capture and monitor ever-developing bodies of intellectual capital, and to promote its leverage by communities of practice. KM promotes practices and technologies that facilitate the efficient creation and exchange of knowledge on an organization-wide level. When you extend this definition to include partners, suppliers and customers as well, you extend the KM practice into the collaborative commerce space. The advent of the Internet as a worldwide common interface is making this vision possible, but it also raises the bar on the scope of success and failure. Given the potential plethora of knowledge available both inside and outside the organization, any business strategy today that ignores the tenets of knowledge management is a formula for certain failure. As Dr Peter Drucker put it in his Managing in a Time of Great Change, “Knowledge has become the key economic resource and the dominate - and perhaps the only - source of competitive advantage.”
What is Knowledge Management?

Knowledge management brings to mind many things to many people. But in a business setting, a practical definition prevails. The basic definition of knowledge management is discussed, as well as those concepts critical to its effective deployment. This section examines:

- the effect of knowledge management;
- how knowledge management is different from information management;
- types of knowledge;
- the knowledge chain and its role in measuring the success of knowledge practices; and
- the basic knowledge management applications.
"A little knowledge that acts is worth more than much knowledge that is idle."

Kahlil Gibran, The Prophet

Defining knowledge management is not a simple issue. It is not a technology, although technology should be exploited as an enabler. It is not a directive, although strategic leadership is imperative to success in knowledge management. It is not a business strategy, although one aligned with the tenets of knowledge management must exist. It requires a culture that promotes faith in collectively sharing and thinking. But, culture alone will not render a vital knowledge management practice. It is perhaps the lack of a singular definition that has delayed the more widespread deployment of knowledge management.

Put succinctly:

Knowledge management is the leveraging of collective wisdom to increase responsiveness and innovation.

It is important that you discern from this definition three critical points. This definition implies that three criteria must be met before information can be considered knowledge.

- Knowledge is connected. It exists in a collection (collective wisdom) of multiple experiences and perspectives.
- Knowledge management is a catalyst. It is an action - leveraging. Knowledge is always relevant to environmental conditions, and stimulates action in response to these conditions. Information that does not precipitate action of some kind is not knowledge. In the words of Peter Drucker, "Knowledge for the most part exists only in application."
- Knowledge is applicable in unencountered environments. Information becomes knowledge when it is used to address novel situations for which no direct precedent exists. Information that is merely "plugged in" to a previously encountered model is not knowledge and lacks innovation.

It is important, therefore, to draw a clear line of distinction between information management and knowledge management. Both are important to an organization's success, but each addresses different needs and requires different approaches. Information management consists of predetermined responses to anticipated stimuli. Knowledge management consists of innovative responses to new opportunities and challenges. In business, planned responses to controlled stimuli can be, and have been, automated through traditional IT approaches. Knowledge-based solutions, however, focus on the application of innovative new responses in a volatile work environment, as illustrated in Fig. 2.1. Knowledge must be internalized; it co-exists with intelligence and experience and emanates at the points where decisions are made. For this reason, the primary repository for knowledge is people's heads (at least until we agree that machines have intelligence). Electronic and paper-based "knowledge repositories," then, are merely intermediate storage points for information on route between people's heads.

![Fig. 2.1 The focus of knowledge-based solutions in a dynamic work environment.](image)

But there is more needed to develop a complete understanding of knowledge and knowledge management than these basic premises. Understanding knowledge management begins with two basic characteristics: knowledge complexity and knowledge applications. The
former refers to the physical manifestations and depth of knowledge available, the latter to approaches to connecting knowledge to people and processes. Each is discussed below.

THE COMPLEXITY OF KNOWLEDGE: FROM EXPLICIT TO TACIT

All knowledge can be classified according to its complexity on a continuum from explicit to tacit. Michael Polanyi identified the distinction between these two types of knowledge in 1966 (Polanyi, M., The Tacit Dimension, Routledge & Kegan Paul, 1966).

Explicit knowledge is knowledge that is articulated in formal language and easily transmitted among individuals both synchronously and asynchronously. Tacit knowledge, on the other hand, is personal knowledge embedded in individual experience and involving such intangible factors as personal belief, perspective, instinct, and values.

Explicit knowledge is referred to as information in the context of our discussion. The challenge of explicit knowledge is one of handling the sheer volume of information that is available. On the other hand, while tacit knowledge potentially can represent great value to the organization, it is, by its very nature, far more difficult to capture and diffuse. The challenges represented by each type of knowledge at a very high level are the same - to build a bridge between seekers and providers of knowledge. But from a practical level the challenges are very different. Explicit knowledge can be adequately transferred with the help of electronic tools. On the other hand, the most efficient way to convey tacit knowledge throughout the organization is face to face. Practices such as apprenticeships, mentoring and communities of practice prove effective.

For decades, organizations have focused their information technology investments on explicit knowledge, rather than tacit knowledge (see Chapter 4 for more details on technology approaches to handling Explicit knowledge). There are three reasons for this: first, explicit knowledge is often conveyed as a standard part of most transaction-based information systems; second, explicit knowledge is much easier to convey and capture than tacit knowledge; and, third, we have an inherent mistrust of anything that cannot be conveyed objectively and quantified (i.e. tacit knowledge). The primary challenge when facing explicit knowledge is to manage its volume, ensure its relevance and quality, and make it easily accessible - in a phrase, handling infoglut.

There is no doubt that tacit knowledge plays a pivotal role in distinguishing companies and poised them for success. For this reason, an ability to expand the level of tacit knowledge throughout an organization through its proactive sharing is regarded as one of the core objectives of knowledge management. It also happens to be one of the most challenging. For tacit knowledge, the challenge is to formulate the knowledge into communicable form. But, tacit knowledge defies being systematically cataloged and made available in an asynchronous manner; by its very definition, it is forever changing, growing and being reshaped by the owners' latest experiences. Tacit knowledge should be approached with greater scrutiny and a determination made as to what degree or depth the knowledge can be captured or tracked.

From tacit to implicit

In some cases, knowledge believed to be tacit is only so labeled because no one has ever taken the time or energy to codify the knowledge. Users may be too quick to reply, "It's just too difficult to explain; it defies explanation." This is a real problem and one not easily resolved. You must determine if bodies of uncodified knowledge can be captured and made explicit. However, it is critical to first be sure that a culture that promotes and supports knowledge sharing is in place, or users may recoil by hoarding even more of what they know (see more on establishing and measuring culture via a knowledge audit in Chapter 10). In any case, it is imperative that you appreciate that perfect management of tacit knowledge is not possible. Do not get preoccupied with getting it perfect, because you could miss out on great success without ever achieving 100 percent accuracy.

Certain knowledge can be harvested from its owner and codified in such a way as to make it more readily shareable. Using such a process you can create a third type of knowledge in the organization: implicit knowledge. The value and leveragability of implicit knowledge is vast. However, an organization must take several strategic steps in order to position it adequately. First, the sources and nature of the implicit bodies of knowledge must be identified and quantified (this is where a knowledge audit proves useful – see Chapter 10). Getting to implicit
knowledge mandates taking a second look at all so-called tacit knowledge resources to determine whether that knowledge could be codified if it were subjected to some type of mining and translation process. Then, it requires implementing that mining/translation process. Often, much of the work done in businesses is not in the deep tacit realm. Rather, it is a logical, methodical thinking process that simply is not recognized as such, even by the thinker.

Implicit knowledge management employs tools, techniques and methodologies that capture these previously elusive processes and make them more generally available to the organization. Thus, the thought processes used by your best thinkers become a leverageable asset for the organization. Again, I must stress that not all tacit knowledge can be transfigured into implicit knowledge. There will always be bodies of know-how and experience that remain tacit.

Also tacit knowledge is not an effective way to achieve alignment between personal and organizational values (storytelling and mentoring are better ways to achieve value alignment). Finally, there are some intellectual assets too novel for capture and transfer. The goal of implicit knowledge management is to determine how much of the tacit knowledge in your organization defies any form of codification, and to mine that which does not.

GRAPEVINES, COMMUNITIES OF PRACTICES AND THE INFORMAL KNOWLEDGE NETWORK

Where knowledge legitimately exists in tacit bodies, knowledge-based strategies should not focus on collecting and disseminating information, but rather on creating a mechanism for practitioners to easily identify and reach out to other practitioners. Such mechanisms, like communities of practice, have special characteristics. They emerge of their own accord: they collaborate directly, use one another as sounding boards, and teach one another. They are built on a bond of obvious trust - a key word for any knowledge management solution.

Communities of this sort are difficult to construct and easy to destroy but, in my experience, almost always exist in every organization, both formally and informally. Where present, it behooves you to recognize them and encourage them, support them. They are among the most important structures of any organization where thinking matters, but they almost inevitably undermine its formal structures and structures if improperly managed. Remember that knowledge is connected. For information to be transformed into knowledge you must recognize, support and administer the connections and, most importantly, the people, who are the ultimate owners of all knowledge. (In Chapter 4 the technology approach to personal profiling is explained, an approach to tracking and defining what individuals seem to exhibit interest in, or knowledge about. These profiles are used to intermediate knowledge seekers with knowledge providers, establishing online communities.)

As stated in Chapter 1, organizational strength does not come from knowledge of the past per se; rather, it comes from the ability to regenerate knowledge of the organization, its processes and its markets - to take timely innovative action on an ongoing basis. This is where knowledge management clearly differentiates itself from other approaches to governing expertise such as reengineering (for more detail on the differences between knowledge management and reengineering and TQM, see Chapter 3). Knowledge management assumes a constant vigilance of change, and encourages constant modification - innovation - at a rate that at least keeps pace with changing market dynamics.

Make no mistake, knowledge management emphasizes the re-use of previous experiences and practices, but its focus is on mapping these to the changing landscape of the market. If that sounds simple, then try answering the following question: What is your organization's core competency? If you answered with a product name, you are shackled by the past. The chances are, if you answered in this manner, you are referring to a most successful product. Success forms the most restrictive shackles. Your competency must outlive product success. Products should exist at the vortex of the whirlpool - constantly changing. Your core competencies should live at the outer limits of the whirlpool.

Knowledge management suggests that an organization makes a subtle yet profound shift - from relying on its "experience" (or knowledge of the past) to relying on its "competencies" (or resourcefulness to handle the future). Knowledge of the past is only valuable inasmuch as it provides a perspective on the future. Competency, on the other hand, equips the organization to respond to as yet unknown forces for change.
THE KNOWLEDGE CHAIN

Fundamental to the practical definition of knowledge management is the concept of the knowledge chain. The knowledge chain was first recognized by Koulopoulos, Toms and Spinello in doing research for their book *Corporate Instinct*. There are four links in the knowledge chain that determine the uniqueness and longevity of any organization. These four links are:

- internal awareness;
- internal responsiveness;
- external responsiveness; and
- external awareness.

The knowledge chain (K-chain) is a series of interactions that constitute an organization's cycle of innovation. Knowledge management creates permeability between the four cells of the K-chain and accelerates the speed of innovation. The four stages of the knowledge chain define the flow of knowledge through an enterprise, as shown in Fig. 2.2. The ability to quickly traverse through the four cells of the knowledge chain is the essence of the benefit of knowledge management.

Internal awareness

In its simplest terms, internal awareness is the ability of an organization to quickly assess its inventory of skills and core competency. It is the awareness of past history in terms of talent, know-how, interaction, process performance, and communities of practice. Strong emphasis on functional organization structures, which often permeate traditional companies, inhibits the development of internal awareness. Organizations with a rigid functional structure most often define their core competency as their products and services, not their skills. Strong internal awareness is built on an ongoing challenge of what is done and a focus on what is possible. This is what Peter Drucker refers to as "organizational abandonment."

Internal responsiveness

Internal responsiveness is the ability to exploit internal awareness. An organization may be well aware of its strengths and market demand,
small market shifts over an extended period of time (see Chapter 3 for more detail on the differences between reengineering and knowledge management). It must be stressed that successful KM is the coordinated ability to exercise internal responsiveness based on what is known via continuous awareness (both external and internal) and perception through all levels and functional areas.

**External responsiveness**

Simply put, external responsiveness is the ability to best meet the requirements of the market. When all is said and done, an organization's ability to better satisfy this cell in the knowledge chain than its competitors will determine its success or failure. External responsiveness is measured by the ability to effectively respond to opportunities and threats outside of the organization in a timely manner. This is the essence of competitive advantage - a level of responsiveness to environmental conditions that is significantly faster than that of its competitors.

**External awareness**

External awareness is the mirror image of internal awareness. It is the organization's ability to understand how the market perceives the value associated with its products and services, to understand who are its customers, what those customers want, who are their competitors, competencies of competitors, market trends, competitive actions, government regulations, and any other relevant market forces that exist outside the organization itself. When coupled with internal awareness, external awareness may lead to entirely new markets.

External awareness is one of the cornerstones of the Internet, where new business models are sprouting up at an unprecedented pace. The velocity of the Internet provides an incredible opportunity to act upon the market's reaction to new products. However, new models for capturing market responses are just as critical. For example, Amazon.com's ability to capture buying trends of many book buyers and then use these to suggest books with similar themes and authors is the very essence of external awareness coupled with external responsiveness. A body of knowledge (customer buying habits) is productized and offered as a value-add, differentiating the online bookstore from its brick and mortar counterpart.

External awareness is more than just a function of extensive focus groups and market research. These provide testimony to what the market needs today, or yesterday, rather than what it will need in the future. In the worst case it provides only the answers that the market thinks you want to hear. The "classic" example is that of New Coke, which, despite heavy market analysis, proved the ultimate folly of most focus groups. As markets move at an ever-faster pace, traditional market research is reaching the end of its useful life cycle.

The knowledge chain of an organization is often a mix of positive and negative attributes. Table 2.1 depicts the four cells of the knowledge chain within an organization that is not knowledge driven; this is, therefore, a typical profile of a poorly positioned enterprise.

**Table 2.1** Status of the knowledge chain within an organisation that is not knowledge driven.

<table>
<thead>
<tr>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Awareness</strong></td>
<td><strong>Protracted customer</strong></td>
</tr>
<tr>
<td>Poor internal awareness is</td>
<td>feedback loops result</td>
</tr>
<tr>
<td>indicated by extensive</td>
<td>from belaboured market</td>
</tr>
<tr>
<td>use of organization</td>
<td>research and a reliance</td>
</tr>
<tr>
<td>charts, management by</td>
<td>on product branding</td>
</tr>
<tr>
<td>edict, lack of knowledge</td>
<td>Few opportunities are</td>
</tr>
<tr>
<td>sharing, and static policies</td>
<td>given to react directly</td>
</tr>
<tr>
<td>and procedures.</td>
<td>and dynamically with</td>
</tr>
<tr>
<td>Focus is on product lines and</td>
<td>customers and prospects</td>
</tr>
<tr>
<td>process awareness and</td>
<td>Customers are looked at</td>
</tr>
<tr>
<td>intimacy with core</td>
<td>in terms of sales volume</td>
</tr>
<tr>
<td>competencies and</td>
<td>only. There is little effort</td>
</tr>
<tr>
<td>experiences learned.</td>
<td>to &quot;predict&quot; the market.</td>
</tr>
</tbody>
</table>

| Responsiveness                  | Slow distribution channels    |
| New ideas are stifled by        | result in standardized        |
| reliance on how things          | products, long durations      |
| "should get done," a            | between innovation             |
| hierarchical command           | cycles, and extensive         |
| and control structure,          | emphasis on internal rate of  |
| and extensive                   | return.                        |
| departmental                    |                               |
| organization.                   |                               |
In organizations that are knowledge driven, all four cells are permeable, allowing the immediate transfer of knowledge between the cells. Table 2.2 illustrates the four cells of the knowledge chain within an organization that leverages knowledge; this is, then, a typical profile of an exemplary, well-positioned enterprise.

<table>
<thead>
<tr>
<th>Table 2.2</th>
<th>Status of the knowledge chain within an organization that leverages knowledge.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Internal</td>
</tr>
<tr>
<td>Awareness</td>
<td>Always collectively aware of its strengths and weaknesses across structural silos and functional boundaries. Experiences are openly communicated; focus is on competencies and talents, not products.</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>Able to instantly organize skills based on an unfiltered assessment of the internal awareness of its resources and external market demands/opportunities.</td>
</tr>
</tbody>
</table>

In summary, success is not gained by excelling in any one of these quadrants, but by proficiency in each and, more importantly, measured by the speed with which knowledge flows through these four links (see Chapter 6 for a discussion on return on time).

As stated before, this flow of knowledge across the links is about the connections that exist between bodies of knowledge, actions taken and knowledge known, and knowledge seekers and knowledge providers. These connections are best understood by viewing them in terms of the four basic applications of knowledge management.

**Knowledge Management Applications**

The four key applications of knowledge management are based on a model that regards knowledge management's primary role as the sharing of knowledge throughout the organization in a way that each individual or group understands the knowledge with sufficient depth and in sufficient context to apply it effectively in decision making and innovation.

These four applications of knowledge management are:

- intermediation;
- externalization;
- internalization; and
- cognition.

These applications are affected across all bodies of knowledge, ranging from the explicit to the tacit. Each application has a particular focus, but is in turn best realized through integration with the other applications. In Chapter 4 the technologies available to address each of the knowledge applications are overviewed. But first, it is important to understand the applications themselves and their role in a knowledge environment.

**Intermediation**

Intermediation is the connection between knowledge and people. Intermediation refers to the brokerage function of bringing together those who seek a certain piece of knowledge with those who are able to provide that piece of knowledge. It is a fundamental step in internal and external responsiveness. Its role is to "match" a knowledge seeker with the optimal personal source(s) of knowledge for that seeker. Two types of intermediation are common, asynchronous and synchronous.
Asynchronous intermediation occurs when externalization and internalization do not occur simultaneously. In this case, an external knowledge repository stores the knowledge while it is in transit. Knowledge is captured in the knowledge base, often before a specific need for that knowledge elsewhere in the organization has arisen. When a knowledge seeker requires that knowledge, the knowledge base can be searched and the relevant knowledge extracted. This approach is typically best suited to explicit knowledge.

Synchronous intermediation occurs when externalization and internalization occur simultaneously. Knowledge is not stored while being transferred. Knowledge provider and knowledge seeker engage in direct communication. The challenge is to match knowledge providers with knowledge seekers intuitively and in a timely manner. This approach is far more common in tacit knowledge transfer.

Externalization
Externalization is the connection of knowledge to knowledge. It refers to the process of capturing knowledge in an external repository and organizing the knowledge according to some classification framework or ontology. A map or structure of the knowledge collection is provided as a facilitator to knowledge discovery. It is focused on bringing order to internal and external awareness.

Far too many organizations focus their efforts on how to get knowledge out of their knowledge management systems and too few, if any, focus on getting knowledge into the system. A knowledge management system, like an ecosystem, cannot be constantly depleted of its resource without constant replenishment. There are two fundamental components to externalization: the capture and storage of the knowledge in a suitable repository, and the classification or organization of the knowledge.

Capture and storage can take the form of a database, a document, or a videotape. The repository for this knowledge should be appropriate for the kind of knowledge being dealt with. For example, highly numerate data may best be stored in a structured database, while visual knowledge may best be captured using videotape.

Classification or organization of the knowledge is the more difficult of the two functions. It relies on the knowledge possessed by the knowledge provider to shape the classification of the information into the most usable form. The aim here is to make the knowledge digestible to the knowledge seeker in the most efficient way possible. (For more information, see the discussion on portals in Chapter 4 and the discussion on the dilemma of organization in Chapter 10.)

Internalization
Internalization is the connection of knowledge to query. It is the extraction of knowledge from an externalized repository, and filtering it to provide personal relevance to the knowledge seeker. Closely tied to an externalized knowledge base, internalization reshapes the knowledge base specifically to address the focal point of the query issuer.

Cognition
Cognition is the linking of knowledge to process. It is the process of making or mapping decisions based on available knowledge. Cognition is the application of knowledge that has been exchanged through the preceding three functions. It is a highly proactive form of internal and external responsiveness. In its simplest form, cognition is achieved by applying experience to determine the most suitable outcome to an unprecedented event, opportunity or challenge.

**KEY LEARNING POINTS**

- Knowledge management is more about action than being.
- Knowledge management deals with the unanticipated stimuli and creative unplanned reactions.
- Knowledge types:
  - explicit;
  - tacit; and
  - implicit.
- The knowledge chain - a means by which to rate your organization's:
  - internal awareness;
  - external awareness;
The Evolution of Knowledge Management

Knowledge is as old as time itself. But as a formalized business practice, it finds its roots in the educated workforce that arose out of WWII. From this time, it has evolved into a series of practices and philosophical beliefs. This section traces the evolution of knowledge management over the last 50-odd years, highlighting major milestones and thinkers along the way, including:

- the advent of the knowledge worker;
- the discovery of intellectual capital as a tangible asset;
- the types of intellectual capital;
- the initial definition of knowledge types;
- the difference between knowledge management and reengineering; and
- the technological timeline.

- internal responsiveness;
- external responsiveness,
- The basic applications of knowledge management are:
- intermediation – brokering knowledge owner to knowledge seeker;
- externalization – capturing and categorizing knowledge;
- internalization – retrieving knowledge in a personal manner;
- and
- cognition – applying knowledge to the business process.
As outlined in the Introduction, and illustrated in the timeline, the technology fervor regarding knowledge management waned rather quickly. It gave way to the next technology-promised panacea, including B2B, portals, e-learning enterprise content management, Information architectures and Taxonomies. These are in reality tactical manifestations of knowledge management from a technology standpoint.

Knowledge management continues to be the subject of adamant debate and evolving theory in the business world. Knowledge management-related technology evolves under many names - targeted applications of specific functionality fine-tuned to address specific business institutions. The technology application of knowledge learning is the focus of the next chapter.

**KEY LEARNING POINTS**
- Outgrowth of an educated workforce starting in the 1950s.
- The European and Asian influences in the 1950s and 1960s.
- Identification of the knowledge worker by Peter Drucker in 1959.
- Identification of explicit and tacit knowledge by Polanyi in 1966.
- Paul Strassmann pioneers the concept of information and knowledge assets in 1985.
- Hammer and Champy introduce the corporate world to the idea of reengineering in 1992.
- Knowledge management reacts years later as a more constant and permanent form of reengineering.
- Nonaka introduces the world to "organizational knowledge creation" in 1995.
- The rise and fall of knowledge management in the late 1990s.
- The technology timeline and the practical applications of knowledge management.

**The E-Dimension of Knowledge Management**

Clearly, knowledge management is not about technology. But, technology has heightened the need for, and powers of, knowledge management. Practical technology approaches to knowledge management include:

- personal profiling;
- categorization/taxonomy;
- visualization of knowledge;
- search and retrieval;
- agents;
- workflow;
- decision-support; and
- the portal as a killer application.
"The new source of power is not money in the hands of a few but information in the hands of many."

John Naisbitt, author of Megatrends

Clearly, knowledge management is not about technology. But, as discussed in Chapter 3, technology has played a role in heightening awareness of knowledge management, and in facilitating knowledge management practices in the corporation. No amount of technology can make up for a corporation whose mission and culture do not recognize and support knowledge sharing practices and investments in intellectual capital and innovation practices. But, given the advances made in technology that can affect and augment these practices and cultures, no knowledge management strategy is complete without a technology component.

Furthermore, technology, namely the Internet and intranets, sparked a wide-scale interest in the need for knowledge management. The sudden availability of a universal platform that provided simplified access to entire collections of explicit knowledge was a wake-up call to technicians and businessmen alike. To this day, technology is evolving to provide means for people to capture and store knowledge, broker sources of knowledge, and leverage knowledge in business settings (read knowledge management).

![Knowledge Complexity Diagram](image)

**Fig. 4.1** Application of technology to knowledge management.

Fig. 4.1 illustrates how commonly used technologies form part of a knowledge management solution. Note that all the technologies are positioned on the explicit side of the diagram, while the solutions listed on the tacit side are all human-based. The application of technology to knowledge management is best understood when mapped to the knowledge management applications introduced and defined in Chapter 2. Technology should be tactically applied, not universally distributed. Technology will not replace the value of, and need for, face-to-face synchronous communication with regards to tacit knowledge, but technology can assist in brokering the owners of tacit knowledge and facilitating the creation of people-based networks.

**Technologies for intermediation**

A range of technologies can facilitate intermediation. These technologies are especially valuable for organizations that are highly distributed geographically and therefore less likely to encounter face-to-face or synchronous communication in the normal course of interaction among knowledge workers.

In support of the need for personal communication, intranets, instant messaging, online collaboration, e-mail and groupware applications can serve as meeting-places for establishing contact between knowledge seekers and knowledge providers. At a more powerful level, personal profiling systems can create online dossiers of individuals (i.e. tracking who they are, what projects they have worked on, search habits, what documents they have authored, edited, read, etc.). Subsequently, in response to a user query, these intermediation tools can provide the name and contact information for probable owners of relevant insight (i.e. tacit knowledge) on the subject of the query.

**Technologies for externalization**

The advent of the Web proved that the capturing and storage of knowledge sources was not as straightforward as one might have believed. Volumes of knowledge sources require intelligent approaches to categorization and navigation. Knowledge cannot be simply stored. To be effective it must be put into context.

Consider the complexity of creating and maintaining hypertext-linked World Wide Web documents, compared to a word processing
file, and the required level of control becomes evident. Links should accurately denote the obvious and covert ties between separate forms of information to portray the knowledge value that comes from information in context.

Intelligent inventory systems that catalog knowledge both as it is needed and as it is encountered (i.e. entered) are required. The approach used must be dynamic. We are not categorizing information that can be stored in predefined categories and standard hierarchies, but knowledge that is changing continuously. Knowledge-based externalization technology reassesses the relationship of each body of knowledge with every other body of knowledge and maintains an ontology or taxonomy for the knowledge collection.

Visualization tools provide a graphical front end to these knowledge collections, illustrating the availability of the bodies of knowledge and their dependencies. These can be navigated to facilitate a knowledge discovery process.

**Technologies for internalization**

While externalization provides a view into the myriad connections it contains, internalization allows users to impose their perspective into the knowledge base and succinctly pluck out the relevant bodies of knowledge. Internalization technology is perhaps the oldest among the knowledge management tools, with its roots in simple search and retrieval engines. But, within the realm of knowledge management, the tools of internalization represent functionality that goes beyond simple word searches, to include functionality such as conceptual retrieval tools.

**Technologies for cognition**

Up until now, we have differentiated information from knowledge through the need for linkages and intelligence, or putting the information in context. However, both the links and the information need to follow certain rules in order to convey knowledge. This is the role of cognition tools.

Consider a salesperson that accesses a knowledge base to assess the buying habits of a competitor's customer. Numerous documents collected over time reflect prior sales opportunities with the prospect and the history of wins and losses. The history is linked to descriptive information about the prospect's business plans, markets, and strategy. These in turn may be linked to recent market activities that indicate the prospect's success in tapping new opportunities. All of this is important information. Yet, can the salesperson readily infer why the prospect might buy from his company, given the current circumstances in the market? With enough time and resources, perhaps.

An alternative would be to bundle certain analytical tools along with the knowledge. A simulation tool could create market profiles based on the current demand for the prospect's products. This tool could create the basis for a business case to buy from the salesperson's company rather than a competitor, perhaps due to an increased ability of the salesperson's company to deliver key support in an area of critical importance to the prospect's current market.

Most knowledge management cognition tools today are vertically focused. Decision support trees and case management and decision support tools are more easily created when focused on a finite problem, such as call centers, and sales force automation.

Finally, consider leveraging the powers of a workflow or BPM system as a cognition tool. These are tools that provide a means to automate the logic of business processes and execute that process repetitively. The focus of workflow is to ensure process integrity and decrease process time. Vicariously, however, these workflow tools also create audit trails, or histories of the business processes they automate.

Over time, these audit trails represent a body of knowledge regarding how different stimuli affect the business process (e.g. does the process move more readily when certain customers are involved, certain employees are involved, at certain times of the day, etc.). While this information is captured in the audit trail, it remains dormant in most products. By integrating investigative/analysis tools, the smart manager can unleash the knowledge within these audit trails, and possibly create automated decisions (cognition at its highest form) by having the workflow system alter process logic based on trends it recognizes.

**KILLER APPLICATION NO. 1 – THE PORTAL**

Portal technology is listed at every level of the knowledge application diagram. Emanating circa 1999, portals garnered much attention, more
than virtually any other Internet technology over the past five years. Why?

As mentioned earlier, the rise of Internet technology resulted in a common frustrating experience for nearly everyone using the Web. From home users to knowledge workers, interaction with the computer environment rarely involves a single information resource. Even the simplest searches on the Web typically result in myriad references to myriad sources of data, processes, and people. In response, companies such as Yahoo! delivered integrated, categorized and personalized front ends to the Internet - portals. Corporate portals quickly followed on the heels of this technology approach, providing similar functionality and control over the organization's collective knowledge base.

From the point of view of the information work now driving business success, the portal is primarily a tool for accelerating and supporting knowledge and innovation processes. Companies deploy portals to combat the negative challenges of overabundance of information, discontinuity in the work environment, and disorganization in the computer systems' infrastructure.

The ideal habitat for the application of corporate portals it is at the intersection of the front and back office. This "middle office" operations space is best defined by the role and function of knowledge workers who constitute the linkage mechanism between front office and back office information systems and processes. In its ability to coordinate the many information streams, people, and knowledge that create sound business practices, middle office work tends to have a direct and pivotal impact on maximizing profit, minimizing risk, and fostering innovation. Simply put, it is where organizations ultimately fail or succeed.

To provide a simplistic expansion on these definitions, back office functions focus on cost management and front office functions focus on revenue enhancement. While front and back office functions (from an information systems standpoint) have reached a stage of relative equilibrium and parity across most industries (thanks to extensive enterprise applications deployment encompassing common structured transactions), middle office workers live in a dynamic, unpredictable, and still largely manual work-world. Application of technology here has a payback that is measured in orders of magnitude.

Viewing the function of the middle office in the context of the knowledge chain (see Chapter 2 for more detail) makes clear that, as demand and fulfillment processes increasingly run on multiple tracks through a single individual (i.e. the middle office worker), there is increasing need to provide automation support to enhance that worker's performance. Consider, for example, the transformation going on today in the scope of the role of the customer service representative. No longer viewed as an afterthought function needed to deal with the consequences of customer confusion or process quality breakdowns, the service representative now occupies a middle office position addressing an increasingly broad set of customer needs. In forward-thinking companies, this role is now as much involved in market analysis and sales as it is in customer problem resolution.

The role of corporate portals in the middle office is to offer a tool that will automate the "linkage" aspect of the work environment. The great attraction to the idea of portals is based on their ability to create a "single point of access," which integrates, within one interface, the unstructured content of knowledge work with information from the wide variety of ERP, document, and CRM systems. This interface has the potential to render obsolete the contemporary standard of Windows-based application metaphors we use today.

It is important to establish that the portal is not a thing, but an application of a broad set of technologies following a very customized information design. The corporate portal design derives from the unique business and information landscape of the individual organization.

Because of the importance role that both existing corporate information systems and external information sources play in supporting an organization's knowledge workers, and because the principal charter of the portal is to provide a single point of access to all information sources, the portal must take on the unprecedented role of universal integration mechanism. At the same time, since every individual's professional (and personal) information needs are different, the portal takes on the unprecedented role of delivering a personalized, function-centered desktop. Given the complexity of these challenges, portal
implementations require a substantial set of architectural elements and components, as illustrated in Fig. 4.2 and in the following discussion.

![Diagram of portal software architecture components]

**Fig. 4.2** Portal software architecture components.

**Integration**

The integration facility provides the foundation function of accessing information from the wide range of internal and external information sources and making them available for display at the portal. It allows a knowledge base of tacit and explicit sources, from image to video, to function as one virtual repository.

**Categorization**

The categorization facility implements the organization-specific taxonomy that helps contextualize portal information to support rapid recognition and productive use. This is a direct tie to the knowledge application of externalization.

**Search**

The search component provides a centralized facility for pinpoint access to specific information items. An effective search offering should include comprehensive indexing, metadata access, full-text access, and concept-based search. It should also support single point of access by providing a single point of search, i.e., the issuance of a single query results in relevant knowledge from multiple repositories, properly contextualized and ranked in a single result set.

**Publishing and distribution**

This functionality moves the portal beyond a research environment and into an interactive one. It supports content creation, authorization, and posting to the portal and should ensure accuracy, authentication, and timeliness.

**Process support**

Because the focus of the portal should include e-business management, process support is a critical foundation element. Process automation applications route documents and forms, receive and respond to intermediate “state changes” in a business process (e.g., credit approval messages from authorization systems, initiate transactions, trigger events in invoicing, inventory, or distribution systems), and provide audit and housekeeping services to monitor predefined process flows.

**Collaboration**

Collaboration enables community and expands the role of the corporate portal to a new forum for organizational interactions: between employees and among employees, customers, partners, and other stakeholders. Both synchronous (chat forums) and asynchronous communications (e.g., threaded discussions, team rooms that centrally collect documents, work schedules, and so on for a particular team) can be available.

**Personalization**

The personalization facility is a critical ingredient in productivity enhancement and effective individual information management. It
supports the "My!" view of the knowledge base popularized by the Internet portal environments. The "My!" facility gives the portal interface a new value proposition at two levels: users can select categories or channels of content for display in their view; and users can control the placement and prominence of the content items they require. Corporate portal applications should also provide the ability to personalize portal content by centralizing, managing, and prioritizing the delivery of information on a job-function or interest basis.

**Presentation**

Portals must integrate information display, context and case of use at the same time. Today, most users accept the hierarchical foldering metaphor, although newer alternatives, in richer media and a fuller communications range (e.g. PDAs and cell phones), are gaining popularity.

**Learning loops**

The portal learning loop differs from the other architectural elements in that it is not concerned with a specific aspect of information management, but in the ongoing effectiveness of the portal itself. The learning loop is an application of knowledge management itself, rather than an application for knowledge management. The learning loop dynamically collects and analyzes the collective wisdom innate in the interaction between user and portal. These metrics are used to detect and adjust to ongoing changes in user information needs in Internet time. It can affect changes in any of the other layers of portal functionality without directly involving the user. The knowledge environment adapts to the user’s evolving needs.

**BEST PRACTICES IN KM**

**The World Bank**

Created in 1944, and owned by 183 member countries, the World Bank is an international financial institution and development agency. Recently, the bank repositioned its strategy to directly address the issue of poverty in the global community. As part of that effort, in 1996, the then president of the bank, James Wolfensohn, began a strategic knowledge management initiative throughout the bank. Wolfensohn believed that the bank’s involvement with governments, institutions and development projects around the world created a valuable knowledge base. He stated: "To capture this potential we need to invest in the necessary systems that will enhance our ability to gather development information and experience and share it with our clients. We need to become, in effect, the ‘Knowledge Bank.’"

A task force was formed to make this vision a reality. By Fall 1996, the bank was ready to roll out its first knowledge network: EKMS – the Education Knowledge Management System. EKMS served approximately 300 users from the bank’s education sector. EKMS facilitates collaboration, knowledge sharing and discovery of areas to be addressed. The EKMS staff identify best practices and provide training for education staff. Within EKMS, nine separate focus groups were formed, targeted at specific educational issues such as education technology, effective schools and teachers, and the economics of education. EKMS supports a Website that provides worldwide access to documented best practices, tools, creative ideas, key readings, links to related Websites and bibliographical information. Thus an online community is being propagated. By the end of 1998, there were over 100 theme-based communities in place. The bank learned that to be successful, the communities each needed a facilitator who is somewhat familiar with the subject matter of focus, has good team-building skills, and good communication skills. This person is also responsible for keeping web content current.

Additionally, a manned help desk is provided that will answer specific questions. A log of all questions and answers is maintained and provided as yet another resource. The logs are examined, looking for trends. Where arising knowledge needs are seen, specific projects are spun off to fill that information need and add the research to the online library.
Simultaneously, the bank's IT staff was working to create a
technology backbone to support this effort. This team started by
looking at a legacy of multiple disparate systems. The knowledge
management infrastructure used to tie the legacy together is a
suite of Lotus Notes tools and Website platforms.

The World Bank still considers its knowledge management
initiative in its infancy, and views cultural resistance as the biggest
hurdle yet to be fully scaled. Despite this, a poll of bank employees
found that 90 percent find the results to date useful or very useful;
70 percent found that EKMS made their work more effective. A
good example of the system's usefulness is when a staff member
in Nepal needed insight on implementation plan models to help
clients in the Nepalese Ministry of Education prepare for the next
phase of a primary education project. Using the EKMS system,
the staff member located not only a generic implementation plan,
but also contacts in Hungary and Turkey with best practices
experiences in rolling out similar education projects.

**KEY LEARNING POINTS**

- The effect of insight on the need for knowledge management.
- Technology enablers to a knowledge management practice:
  - personal profiling;
  - categorization;
  - visualization of knowledge;
  - search and retrieval;
  - agents;
  - workflow and c-process; and
  - decision support.
- The portal as knowledge management killer application.
- Best practices in knowledge management:
- case study of the World bank.

---

**The Global Dimension of Knowledge Management**

Knowledge management is about the complete and open sharing of
knowledge across all boundaries, whether departmental, corporate
or regional. By its very definition it elicits global cooperation. The
examination of basic knowledge management practices at the global
level includes:

- the effect of the World Wide Web on knowledge management;
- global knowledge communities; and
- global knowledge markets.