

**Being Knowledgeable About Knowledge:
Gaining competitive advantage through the management of intellectual assets**

**Sam Berner
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1. A SHORT HISTORY OF KNOWLEDGE MANAGEMENT

The pursuit of any significant human activity typically leads to the acquisition by those involved of know-how and expertise as to how the activity may be successfully conducted. Insofar as what is learned in the process can be captured, and communicated and shared with others, it can enable subsequent practitioners - or even generations - to build on earlier experience and obviate the need of costly rework or of learning by making the same repetitive mistakes.

In the village, from time immemorial, the elder, the traditional healer and the midwife have been the living repositories of distilled experience in the life of the community. Even in highly sophisticated modern knowledge organizations, the most valuable knowledge - know-how in terms of what really gets results and what mistakes to avoid - often resides mainly in people's minds.

Interactive knowledge-sharing mechanisms have always been used - from palavers under the baobab, village square debates, and town meetings, to conclaves, professional consultations, meetings, workshops, and conferences - all functioning to enable individuals to share what they know with others in the relevant area of knowledge. Migrations of people have been a principal mode of knowledge transfer across continents. Today, a range of technologies from computers to video-conferencing for distance learning offers unprecedented opportunities to disseminate know-how and insights rapidly and cheaply to a worldwide audience.

Karl Wiig (1999) and Ives et. al. (1998) both state that KM has a long history. Wiig tries to summarise a history of Knowledge and how KM fits into it. Knowledge, what it is, what it means, and its roles for work and spiritual life, has a long history. The abstract considerations and speculations by philosophers and religious thinkers have been of particular significance. In addition, the emphasis on knowledge has always had a practical work related and secular side. Ives mentions libraries in Sumer, Akkad and then Alexandria as first attempts at managing knowledge.

Fig. 1 shows a chart prepared by Debra M. Amidon Rogers (undated) of Entovation to graphically represent the history of the KM concept. Please refer to the appendix for a graphical representation of the development of Knowledge Management.

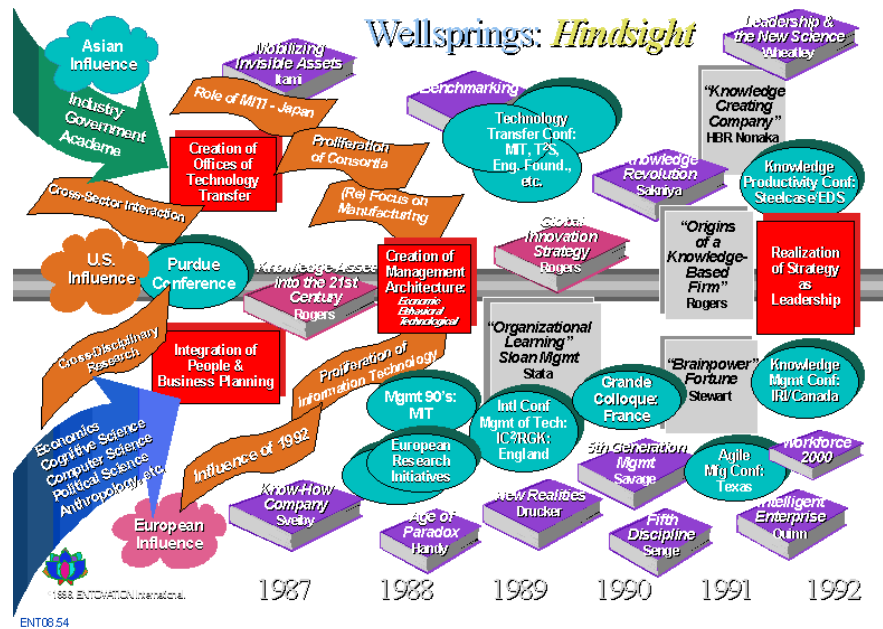


Fig. 1 A Chart Mapping the History of the KM Concept

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The reach of know-how and experience possessed by individuals can be greatly extended once it is captured and explicated so that others can easily find it and understand and use it. In ancient Greece, the philosopher Plato, captured and elaborated in his dialogues the thinking of his mentor Socrates, and so succeeding generations have been able to discover and share that thinking, and in turn reinterpret those thoughts and to be stimulated to achieve fresh insights and creativity.

In other cultures, the Analects of Confucius, The Art of War of Sun Tzu, or the pyramids of Egypt and Mexico, have served similar knowledge sharing functions. In modern times, reports of activities, minutes of meetings, memoranda, proceedings of conferences, and document filing systems maintained by organizations are traditional commonly-used devices for recording content in paper format so that it can be transferred to others.

More recently, the unit costs of computers, communications and transactions are declining towards zero, and electronic transfer is proliferating. Electronic databases, audio and video recordings, interactive tools and multimedia presentations have become available to extend the techniques for capturing and disseminating content. Although these tools are not yet everywhere available in the developing world, they are spreading rapidly and present a unique opportunity for developing countries to benefit most from the technological revolution now unfolding: low-cost telecommunications systems could help countries to leapfrog ahead through distance education, distance health services, and much better access to markets and private sector partners abroad.

Nevertheless, even with modern tools, the process of knowledge transfer is inherently difficult, since those who have knowledge may not be conscious of what they know or how significant it is. Thus know-how is “sticky” and tends to stay in people’s heads (Denning, 2000).

Before the 18th century inventors usually didn’t get their due. Changes were not considered desirable. Only since the industrial revolution inventors were honoured and became famous. Sometimes they were even considered heroic and magnificent. During the second industrial revolution, which took place around the end of the 19th and the beginning of the 20th century, a close relation between science and technology developed. Knowledge was applied on the layout of labour processes. Scientific knowledge and technological experience were increasingly integrated. This process of ‘scientification’ impacted upon labour and upon labour relationships. This became visible by a division of tasks and standardisation and routinisation of work to the greatest possible extent. This resulted first of all in a higher labour productivity. Secondly it meant that at the lowest operational level less knowledge and skills were required to fulfil the task. At first this created the possibility of mechanisation and later on of automation as well. The greater emphasis on knowledge became clear as compulsory education was introduced. Thus circumstances for labourers slowly improved and jobs of a higher knowledge level became possible for a greater part of the labour force. In the fifties and sixties the importance of self fulfilment of people in their working environment was emphasised. In the seventies supporters of institutionalisation state that people should be considered responsible persons who should also participate in the management of their organisations. This responsibility can be seen in the social policy (rise of employee management), of which not only employee participation forms a major part but also recruitment policy, career planning and training. In this vision knowledge becomes ever more important. In the eighties employee management is replaced by human resource management (HRM) which is also based on the assumption that (knowledge of) people as a strategic resource contribute(s) to the realisation of a competitive advantage. Some express the view to consider people not as a cost item anymore but as an asset that should be included in the balance sheet accordingly (Boersa, undated).

In past eras, most employees had to fit into their organizational structures by means of performance standards based upon strictly defined job descriptions. Employment was secure as long as they performed assigned tasks and minded their own business. Out-of-the-box thinking was not likely and knowledge hoarding was the order of the day.

During the era of business process reengineering, cost accountants saw the most knowledgeable workers as an unnecessary expense, a liability to be eliminated through down sizing or early retirement. Many organizations made the strategic mistake of pushing their intellectual assets out the door. Knowledge hoarding was then replaced by a culture of knowledge hiding.

In the past, consultancies practiced knowledge management on the fly. International networks of consultants communicated through computer networks by sharing their own problem-solving expertise with other consultants whose clients had the same problems. But consultants are in the business of selling their own knowledge and had little inclination to share it, especially with their colleagues and peers.

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During the 1990s chief executives in the consulting trades realized that the foundation of our economy had been shifting from natural resources toward intellectual assets. They began evaluating how knowledge was being used in their organizations. The biggest shock came with the discovery that 80 percent of corporate knowledge assets were not owned by the companies. They went home every night with the employees. As a result, questions such as how knowledge is acquired, used and delivered became paramount.

These early pioneers knew that their organizations had to adapt quickly. They spent their time rethinking what they were doing, how they were doing it and why. They tore down barriers and ancient processes and replaced them with a systematic approach to knowledge sharing based on the fluid dynamics of a networked economy.

As CEOs evaluated their knowledge management dynamics, it became apparent that the people who drove their enterprises were those who were creating and accumulating knowledge. And as time went on, the value of these people and what they knew was exerting an increasing influence on the success of their organizations. The challenge then became how to create the information, organizational intelligence, business models, communication tools and learning systems around these extremely important people. This goal had to become a central mission, a basic purpose for the existence of these consulting organizations – if they were to be successful.

The lessons learned by these early adopters of knowledge management indicated that though they knew what knowledge was, finding out who has it, reorganizing operations to nourish and manage it, changing the work culture to support it and building knowledge networks around it were the real challenges of the future.

With the advent of networked resources, new ways to codify, share, store and deliver knowledge enabled organizations to strategically use critical knowledge more easily and cheaply. The challenge, however, became how to develop a successful knowledge management model—there were too few examples from which to work. The result was a new knowledge management industry that was born out of the few models that were developed in those early days. Today, a group of leading edge companies like Lotus, Open Text, Documentum and others have developed knowledge management tools that enable corporations to manage and deliver strategic knowledge. It is no longer necessary to reinvent the wheel, and since many of the tools available were created for management consulting firms, it is possible to select and integrate a full-featured Knowledge Management System that includes and integrates key components like document management and collaborative software (Villegas, 2000).

A number of management theorists have contributed to the evolution of knowledge management, among them such notables as Peter Drucker, Paul Strassmann, and Peter Senge in the United States (Barclay & Murray, 1997). Chris Argyris, Christopher Bartlett, and Dorothy Leonard-Barton (Leonard-Barton, 1995) of Harvard Business School have examined various facets of managing knowledge.

Everett Rogers' work at Stanford in the diffusion of innovation (Rogers, 1995) and Thomas Allen's research at MIT in information and technology transfer (Allen, 1977), both of which date from the late 1970s, have also contributed to our understanding of how knowledge is produced, used, and diffused within organizations. By the mid-1980s, the importance of knowledge (and its expression in professional competence) as a competitive asset was apparent, even though classical economic theory ignores the value of knowledge as an asset and most organizations still lack strategies and methods for managing it.

Recognition of the growing importance of organizational knowledge was accompanied by concern over how to deal with exponential increases in the amount of available knowledge and increasingly complex products and processes. The computer technology that contributed so heavily to superabundance of information started to become part of the solution, in a variety of domains. Doug Engelbart's Augment (for "augmenting human intelligence"), which was introduced in 1978, was an early hypertext/groupware application capable of interfacing with other applications and systems (Engelbart, 1962). Rob Akcsyn's and Don McCracken's Knowledge Management System (KMS), an open distributed hypermedia tool, is another notable example and one that predates the World Wide Web by a decade (Akcsyn et al. 1988).

The 1980s also saw the development of systems for managing knowledge that relied on work done in artificial intelligence and expert systems, giving us such concepts as "knowledge acquisition," "knowledge engineering," "knowledge-base systems, and computer-based ontologies.

The phrase "knowledge management" entered the lexicon in earnest. To provide a technological base for managing knowledge, a consortium of U.S. companies started the Initiative for Managing Knowledge Assets in 1989. Knowledge management-related articles began appearing in journals like *Sloan Management Review*

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[<http://mitsloan.mit.edu/smr/index.html>], *Organizational Science* [<http://web.gsm.uci.edu/orgsci/>], *Harvard Business Review* [<http://www.hbsp.harvard.edu/products/hbr/index.html>], and others, and the first books on organizational learning and knowledge management were published [for example, Senge's *The Fifth Discipline* (Senge, 1994) and Sakaiya's *The Knowledge Value Revolution*] (Sakaiya, 1985).

By 1990, a number of management consulting firms had begun in-house knowledge management programs, and several well known U.S., European, and Japanese firms had instituted focused knowledge management programs. Knowledge management was introduced in the popular press in 1991, when Tom Stewart published "Brainpower" in *Fortune* magazine (Stewart, 1992). Perhaps the most widely read work to date is Ikujiro Nonaka's and Hirotaka Takeuchi's *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation* (Nonaka & Takeuchi, 1995).

By the mid-1990s, knowledge management initiatives were flourishing, thanks in part to the Internet. The International Knowledge Management Network [<http://kmn.cibit.hvu.nl/index.html>] begun in Europe in 1989, went online in 1994 and was soon joined by the U.S.-based Knowledge Management Forum [<http://www.km-forum.org/>] and other KM-related groups and publications [see, for example, the list on Brint at <http://www.brint.com/OrgLrng.htm>]. The number of knowledge management conferences and seminars is growing as organizations focus on managing and leveraging explicit and tacit knowledge resources to achieve competitive advantage. In 1994 the IKMN published the results of a knowledge management survey conducted among European firms, and the European Community began offering funding for KM-related projects through the ESPRIT program [<http://www.cordis.lu/esprit/>] in 1995.

Knowledge management, which appears to offer a highly desirable alternative to failed TQM and business process re-engineering initiatives, has become big business for such major international consulting firms as Ernst & Young [<http://www.cbi.cgey.com/>], Arthur Andersen [<http://www.andersen.com/>], and Booz-Allen & Hamilton [<http://www.bah.com/>]. In addition, a number of professional organizations interested in such related areas as benchmarking, best practices, risk management, and change management are exploring the relationship of knowledge management to their areas of special expertise (for example, the American Productivity and Quality Council [<http://www.apqc.org/home.cfm>] and American Society for Information Science [<http://www.asis.org/>]).

An excellent exposition of the history of Knowledge Management in Europe is Prof. Ronald Day's paper on Totality and representation (Boersa, undated). Prof. Day tackles KM from a socio-political point, which is slightly out of place in the context of this paper.

2. KM DEFINITIONS

There are literally thousands of definitions of the term "Knowledge Management", so I will make an attempt in this report to represent as many differing facets of KM as possible while limiting myself to those pronounced by the most "guru"-like of KM consultants.

As one might expect in a relatively new field whose body of research is still forming, there is no widespread agreement on a definition of knowledge management or a description of its core components and practices. Some commentators take a narrow view, and focus on the role that technology plays in assisting organizations to store and access knowledge; others take a more expansive view, and consider an organization's overall culture, organizational design, processes, human dynamics, and performance measures.

Analysts say the term means something different to every firm, and advice firms to learn to define what KM is for them and then focus on developing a KM system that can effectively capture this knowledge. Knowledge Management is a very broad umbrella and includes by necessity many people of diverse educational and experiential backgrounds. Many of these people are outside the field of IT and Computer Science and are playing an important role in defining and developing the overall understanding of Knowledge Management.

Stephen Denning says that there is "no agreed definition of "knowledge management", even among practitioners and that the term is used loosely to refer to a broad collection of organizational practices and approaches related to generating, capturing, disseminating know-how and other content relevant to the organization's business. Some would argue that "knowledge management" is a contradiction in terms, as knowledge is not just an explicit tangible "thing", like information, but information combined with experience, context, interpretation and reflection. Knowledge involves the full person, integrating the

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elements of both thinking and feeling. Hence some object to the implicit suggestion in the use of the term "knowledge management" that knowledge can be so managed, as revealing a fundamental misunderstanding of the nature of knowledge. Many practitioners increasingly see "knowledge sharing" as a better description of what they are about than "knowledge management". Advantages of "knowledge sharing" include its commonsense comprehensibility, along with a certain degree of inter-activity implicit in any sharing. Drawbacks include the possibility that even "sharing" is insufficiently interactive, and that it implies (falsely) that the existence of knowledge precedes the sharing process, thereby (wrongly) separating knowledge management from "innovation" and "research". Others would prefer to emphasize "learning", since the real challenge in implementing knowledge management is less in the "sending" and more in the "receiving", particularly the processes of sense making, understanding, and being able to act upon the information available (Denning, 2000).

The KM Forum [<http://www.km-forum.org/>] has a number of definitions of KM, ranging from the KMF creator Brian Newman's who defines KM as a "collection of processes that govern the creation, dissemination, and utilization of knowledge" ;Thomas Bertels' "the management of the organization towards the continuous renewal of the organizational knowledge base" and Denham Gray's "an audit of "intellectual assets" that highlights unique sources, critical functions and potential bottlenecks which hinder knowledge flows to the point of use"(Knowledge Management Forum, 1996). David Skyrme has a working definition of KM. "Knowledge Management is the explicit and systematic management of vital knowledge - and its associated processes of creation, organization, diffusion, use and exploitation (Skyrme, 1999). All these writers agree that that KM is an ongoing process.

Karl Sveiby, on the other hand, finds KM difficult to define, and that the best way to do so is by looking at what people in the field are doing. Sveiby divides these into vendors and users, each working on one of two tracks: managing information or managing people (Sveiby, 2001)

There are two trends in defining KM. One is IT based, and defines KM in terms of software applications and networking hardware. The second is people-based, and defines KM in terms of organizational behaviour and management theories. The IT trend is so much ahead of the people trend that there are simply no theories good enough to support the functionality of KM software and its application across organisations. Among those who see knowledge management as a technology issue is just about everyone who makes software. These days it seems as if every maker of software or computer technology is striving to reposition themselves as a knowledge-management vendor. This is done most often by force-fitting the term "knowledge management" into already existing materials.

Yogesh Malhotra of Brint [<http://www.brint.com/>] states that neither IT alone nor people alone can create successful KM projects. Malhotra defines KM as "obsolescing what you know before others obsolete it and profit by creating the challenges and opportunities others haven't even thought about" (Malhotra, 1999). A few years later, Malhotra came up with a more structured definition. KM, he states, "caters to the critical issues of organizational adaptation, survival, and competence in face of increasingly discontinuous environmental change. Essentially, it embodies organizational processes that seek synergistic combination of data and information-processing capacity of information technologies, and the creative and innovative capacity of human beings" (Malhotra, 2001).

Gene Bellinger (Bellinger, 1998) defines KM as consisting of all the activities required to develop, maintain, and evolve the "knowledge environment", and support its interaction with people. The term "environment" encompasses the hardware and software in use, the people with whom one interacts (either directly or online), the knowledge base, and the whole set of interactions between these components. David Skyrme (Skyrme, 1998) says that "Knowledge management is the explicit and systematic management of vital knowledge and associated processes - creating, gathering and organising knowledge, distributing, using and exploiting it. In the strategic sense, knowledge management means transforming personal knowledge into a corporate resource that can be widely shared throughout an organisation and appropriately applied."

Two interesting studies, one by Ernst & Young, and the other by Delphi Group, reflect how the term KM is perceived by corporate workers. In 1997, Ernst & Young did a survey (431 US and European firms) called "Executive Perspectives on Knowledge in the Organization." 87% of their respondents named knowledge as critical to competitiveness. 44% reported that they were poor or very poor at transferring knowledge within their organization (Ernst & Young, 1997). The When the Delphi Group did its survey of knowledge management in corporations, they surveyed, 500 professionals with experience and interest in electronic document technologies. 43% of those folks saw knowledge management as, "an opportunity to add value to

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information inside the organization." 37% saw knowledge management as a, "major new strategic initiative for staying competitive."

The Gartner Group [www.gartner.com] defines Knowledge Management as what "promotes an integrated approach to identifying, capturing, retrieving, sharing, and evaluating an enterprises information assets. These information assets may include databases, documents, policies, procedures, as well as the uncaptured tacit expertise and experience stored in individual's heads" (Harris & Dresner, 1999). According to another source "Knowledge management is the identification, evolution, control, and ethical and moral use of knowledge to achieve an organization's objectives. Knowledge management encompasses the people who create and use knowledge; the processes by which knowledge is created, maintained, and accessed; the artifacts in which knowledge is stored (manuals, databases, books, intranets, etc.); and the technologies that enable and support the creation, evolution, and use, as well as the secure distribution and storage, of knowledge" (IDT Inc., 1999).

American Productivity & Quality Center [<http://www.apqc.org>] defines KM as "a conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that will improve organizational performance." (Ewyk, 2000) This comprehensive definition of knowledge management translates into a seamless organization that is able to manage and bridge its vertical, horizontal, external, and geographical boundaries, with trust (as defined earlier) at the center of its core values. This definition focuses on people "in whom knowledge truly resides" – the major asset of any organization, private or public.

As important as a definition of Knowledge Management is, it is equally as important to define what it is not:

- It is not simply the application of an expensive IT solution - although IT can act as a delivery vehicle for particular aspects of knowledge transfer;
- It should not be a means of collecting more useless information - the business benefits of information requirements should be analysed and prioritized;
- It should not be a means of introducing even more (often restrictive) procedures into the organisation - but should help to focus the procedural requirements;
- It cannot be a solution that can be implemented once and left alone - knowledge resources and requirements will constantly change;
- It is not another term for process re-engineering - although "knowledge processes" and "information processes" are important ;
- It will fail if it is based around toolsets that add complexity - it must be seen as adding value for the end user;
- It is not purely electronic delivery of documentation - it has to engender cultural aspects of an organisation.

Knowledge Management must go beyond a "quick fix" solution - it must become a strategic asset from which the whole of the organisation can benefit. Knowledge management is about connecting people to people and people to information to create competitive advantage. The intersection of these connections is where creativity spawns innovation and thus establishes competitive advantage. It is referred to as *connectedness*, and is accomplished through what is called Community-based Knowledge Management.

KM can also be seen as something that allows a corporation/business to:

- Harvest and generate high value information, even in a globally distributed environment,
- Identify and replicate its best practices,
- Better understand the key issues facing it. (Weinberger, 1999)

Nina Platt (Platt, 1997) says that KM is a concept "of many names", and includes among others such things as records management, case management, marketing information management, document management and contact management. I would gladly add to this customer relationship management and project management. While helping a friend edit her PhD thesis on "Integrated Information resources in Construction Industry", I was amazed at how much of what constituted her research was actual KM.

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The best definition by far is one I found in a presentation by a Computing Science student at the Napier University. It said, "**One Final Definition of Knowledge Management: Get some smart people. Put them in a room.**" (Hall, 2001) It will remain in force until such time as Artificial Intelligence wins the race against hominid IQ.

3. CAN KNOWLEDGE BE MANAGED?

Can knowledge be managed? According to David Skyrme, the words management and knowledge at first sight appear uneasy bedfellows. Knowledge is largely cognitive and highly personal, while management involves organisational processes. Many knowledge workers do not like to be managed in the traditional sense (Skyrme, 2000). However, knowledge is increasingly recognized as a crucial organisational resource that gives market leverage. Its management is therefore too important to be left to chance.

While many practitioners today argue that knowledge management has more to do with culture than technology, Richard Ballard advances the theory that only IT can make knowledge manageable. Yet to him, knowledge-based computing should be influenced not just by information but also by learning and experience (Barth, 2000).

Dr. R. Hanka thinks that although the efficient organisation of knowledge is a major challenge, it can be managed using IT in such a way that it can be conveyed to those who need it in the form they require according to their specific needs (Hanka, 1997).

How does one manage the never-ending process of acquiring, storing, sharing, growing knowledge? Larry Prusak, Managing Partner of IBM Global Services Consulting, realizes that it isn't really possible to manage knowledge, noting that, "What a company can do is manage the environment that optimizes knowledge." (Davenport & Prusak, 1998). Laura Epsom, a KM guru from USA, seems to agree. According to her, although 78 percent of large U.S businesses say they are moving toward management, the definition of KM is unclear and companies should consider whether it is possible to manage knowledge (Epsom, 1999).

Karl Wiig on the other hand, doesn't believe managing knowledge itself is possible at all. He says that "when pursuing comprehensive KM, a constant requirement is to identify and work towards the expected benefits. This is particularly important since 'managing knowledge' itself in reality is impossible - it is only possible to manage knowledge-related actions and conditions." (Wiig, 2000). Karl-Eric Sveiby seems to be of the same opinion. He sees "Knowledge Management" as poor term with which we are stuck (Sveiby, 2000). It seems paradoxical that Mr. Sveiby is seen in Australia as consulting in precisely this "poorly-termed" area of management.

The IT sector - as always - comes up with the minimalist solution to the problem. "With the advent of the patented KeyByte technology, it is possible to manage knowledge through the intelligent and rational manipulation and filtering of noise from data and information," claims one software website¹.

The fact is that today information proliferates in many forms and is stored in many ways. It is increasingly more difficult to manage. Knowledge takes time to experience and acquire. Employees have less and less time for this. There are trends for employees to retire earlier and for increasing mobility, leading to loss of knowledge. Net Academy's Knowledge Management website [<http://www.knowledgemedi.org/>] has this graphical explanation of why it is so difficult to manage intellectual resources in any organisation:

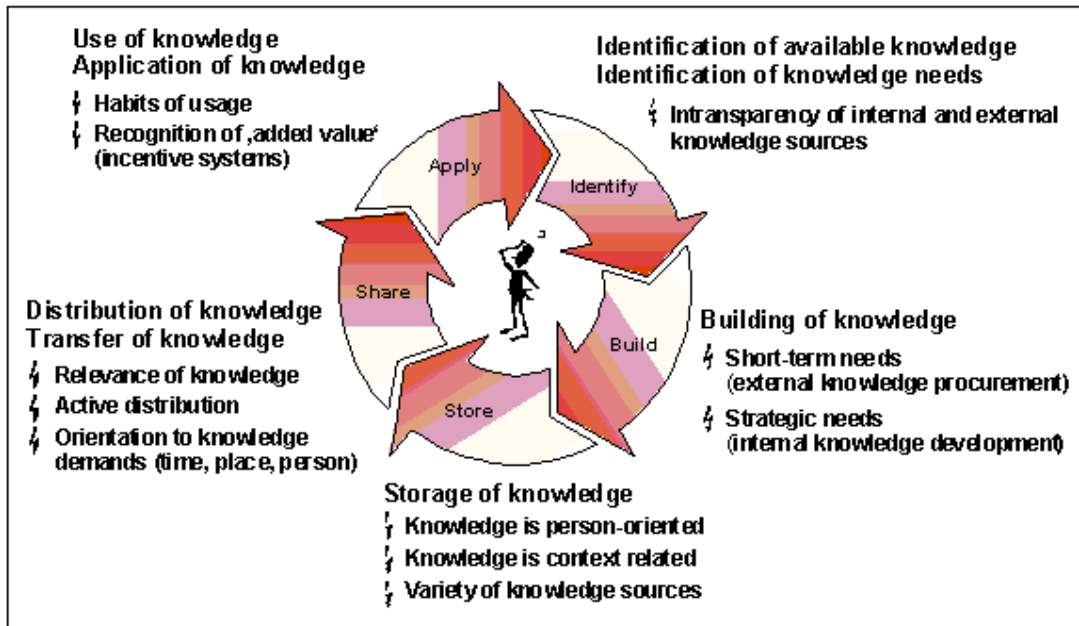


Fig. 2 Reasons why knowledge is difficult to manage (From

http://www.knowledgemedia.org/knowledgemedia/knowledgemedia.nsf/7081b15745c6b360c12564ec0052e1c1/ekm2_theory.html)

4. WHY MANAGE KNOWLEDGE?

Knowledge management is a means of competitive advantage if the company can control the movement of knowledge from its various sources in its various forms to create value. However the company needs to transform the knowledge into a tangible form that can be capitalized on to create value. A company needs to change to stay ahead of its competition, meet new customer requirements and achieve stakeholders' expectations. One of the reasons why a company fails is its inability to manage knowledge to meet changing internal and external requirements (Hodgson, 1999).

Knowledge management, it is reported, had its start in the Big Six Consulting firms and is now being embraced by other industries because of "the explosive growth of information resources such as the Internet, and the accelerating pace of technological change" (Hibbard, 1997) that is leaving workers "both overwhelmed by information and fearful that they're missing important details."

Given the right degree of investment in KM systems and technologies, and the right level of organizational commitment to their deployment, upkeep, and regular use, the following benefits for KM may be realized:

- Re-use of existing knowledge elements prevents recurring costs related to repeated research of the same topics, and repeated formulation of the same solutions.
- Access to in-depth knowledge elements for support staff, partners, and customers improves the customer service experience and speeds the time from problem statement to problem resolution.
- Support organizations can deliver faster, more accurate responses to questions. Be it from a successful self-service support, or from an assisted service call, customer satisfaction improves when problems are resolved quickly.
- Faster resolution of support calls means improved support staff productivity: support organizations can handle more incidents overall (particularly when self-service works for common problems and queries), and support staff can concentrate on helping customers with more serious problems or questions.
- As a knowledge base is used over time, continuous feedback from its users helps the system improve relevance ranking, identify new and improved solutions, and establish the applicability of known solutions

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to all related problems. This increases the value and usability of the knowledge in the knowledge base. (Ryan, 2000)

- Because KM systems can capture and manage knowledge from just about any subject area, organizations can use their KM systems to handle problems across a broad range of topics and job functions. This permits the knowledge base to become a real repository of collective organizational wisdom.
- Because support volume can increase dramatically with little or no increases in cost for support personnel, and the most needed knowledge is available online 24 hours a day, 7 days a week, organizations that deploy KM systems become much more competitive than those, which don't. They can offer more services more often at the same price as those organizations that still rely on 8-hour or half-day telephone support coverage.

The proper use of a KM system to support even tough calls ensures that answers based on shared knowledge come up quickly, and are far more likely to be correct. The paybacks from a committed investment in KM systems and technology go beyond controlling escalating support costs. They also involve an increase in customer satisfaction, the ability to capture knowledge and resolve related problems of all kinds, and an increasing ability to recognize and deal with an organization's problems, no matter where and how they occur.

As a result, proper deployment and use of KM systems and tools promise a substantial payback. Not only can organizations do more with the same or fewer resources, they can also deliver a better quality of service to their customers.

In short, Knowledge management increases speed to market through the reuse of proven resources and methods; reduces costly mistakes; and ensures consistent excellent service. It enables rapid absorption and diffusion of new ideas, allowing CSC and our clients to sustain a competitive advantage by improving:

- Organizational agility
- Operational efficiency
- Growth in core capabilities
- Rate of innovation
- Employee growth and learning opportunities.
- Improving business decisions
- Assisting customers and increasing customer service and satisfaction
- Enhancing learning within the organisation
- Maximising the potential for re-usability (rather than wheel re-invention)
- Developing culture
- Expanding market share
- Increasing quality (for example of products, projects)
- Improving customer response, service and satisfaction
- Enabling knowledge and experiences to be retained in-house
- Improving information and knowledge flows within the organisation
- Making better use of (and adding value to) internal systems and resources
- Offering a new/enhanced market proposition
- Encouraging growth of knowledge sharing and working
- Improving the leverage of tangible and intangible assets, and enabling their valuation
- Decreasing corporate amnesia
- Enhancing the accessibility of information and knowledge sources

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- Improving productivity
- Improving organisational "recognition"
- "Future-proofing" an organisation
- Increasing innovation
- Enabling cross-fertilisation of best practice
- Decreasing reliance on external expertise
- Exploiting the internal capabilities that already exist
- Decreasing costs
- Improving revenues
- Improving the bottom-line

A knowledge program provides a systematic means of achieving continual change that is aligned with the organization's overall business strategy.

5. HOW TO MANAGE KNOWLEDGE?

After having discussed the why and whether of KM, it is now time to get to the crux of the matter, and ask how knowledge can be managed (if at all). A key contributor to the effective management of this cycle is the concept of learning. Without the learning component, the cycle is devoid of knowledge. It merely, becomes an information delivery strategy, which becomes disconnected from the leverage of more effective human experience. The application of the delivered knowledge to operating the business (Find, Acquire and Use) will have some initial value but the delivered knowledge will be immediately out of date unless continuously renewed with the latest lessons learned from the application of the delivered knowledge (Learn, Create and Store). Another crucial concept is documentation and training of staff (paradoxically, the best staff to train is that which already has some form of personal/organizational KM in place). According to Ron Miskie of Knowledge Transfer (Miskie, 1998), A key element of knowledge management is the ability to select the proper specialist (writer, business system or procedure analyst, consultant, etc.) with the appropriate skills, tools and technical aptitude to produce results in an economically efficient manner for clients. It requires that the specialist be knowledgeable about the tools of the documentation industry and how these tools will benefit clients.

Skyrme identifies a number of factors for a successful KM project. Of these, he mentions:

- A knowledge leader or champion - someone who actively drives the knowledge agenda forward, creates enthusiasm and commitment
- Top management support - a CEO who recognizes the value of knowledge and who actively supports the knowledge team in its work
- A clear value proposition - identification of the link between knowledge and the bottom line business benefit; new measures of performance and appropriate rewards.
- A compelling vision and architecture - frameworks that drive the agenda forward
- Creation of a culture that supports innovation, learning and knowledge sharing. This is usually supported by appropriate reward mechanisms.
- A technical infrastructure that supports knowledge work - from simple knowledge support tools to Intranets and ultimately more sophisticated groupware and decision support. Simulation, data mining and good document management also have a role.
- Systematic knowledge processes, supported by specialists in information management (librarians) but with close partnership between users and providers of information (Skyrme, 2000).

Real knowledge management is much more than managing the flow of information. It means nothing less than setting knowledge free to find its own paths. It means fueling the creative fire of self-questioning in

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organizations. This means thinking less about knowledge management and more about knowledge partnering (Allee, 1997).

One main difficulty with managing knowledge is deciding what intellectual assets need to be managed in the first place. Enterprises need:

- to have an enterprise-wide vocabulary to ensure that the knowledge is correctly understood;
- to be able to identify, model and explicitly represent their knowledge;
- to share and re-use their knowledge among differing applications for various types of users; this implies being able to share existing knowledge sources and also future ones;
- to create a culture that encourages knowledge sharing.

One has to be careful, though, with implementation of KM projects. Tom Davenport (Davenport, 1997) mentions seven pitfalls an organisation could fall into and fail. These are:

- Spending too much time on technology and not enough on content,
- Neglecting to put useful information into a repository,
- Being afraid to confidently use the word “knowledge”,
- Assuming that every worker makes a fine knowledge manager,
- Failing to quantify KM’s return on investment,
- Giving people access to information but failing to get them excited about it,
- And finally, believing that knowledge is not hierarchical.

At E-Cognus, we believe that the knowledge modeling techniques that exist to support the use of the knowledge, along with traditional business management techniques, provide a starting point to manage the knowledge assets within a company. Our recommended approach is a multi-perspective modeling approach. Several models need to be developed, each of which represents a different perspective on the organisation which can be characterised as “How, What, Who, Where, When and Why”

- How the organisation carries out its business - modeling the business processes
- What the processes manipulate - modeling the resources
- Who carries out the processes - modeling capabilities, roles and authority
- Where a process is carried out - modeling of the communication between agents
- When a process is carried out - this specifies the control over processes

6. CREATING KNOWLEDGE WORKERS

Knowledge Management cannot exist in a vacuum. Many organisations where the management was not prepared to move with technological advancement simply failed to compete in the “new economy” and fell by the sideways. Thousands of middle management “professionals” are faced with the grim choice of either retraining or being retrenched. No company can afford to run its accounts in ledger books using pen and paper, or do banking the old way.

So what is the main pre-requisite of KM being implemented in the workplace? The Knowledge Worker. I agree that to some extent we all are knowledge workers, and that any person performing a task that required some form of expertise was to an extent also a prototype of “knowledge worker”. But the world economy has moved far ahead of prototypes. The new economy needs a new work force; one that is skilled and educated in the basic tasks of managing knowledge.

“A curriculum developed by Knowledge Network, a South African company, which equips learners with information technology and life skills is in use in a number of South Africa's top schools. Over 22,000 learners in South Africa are currently attending classes using this curriculum. The curriculum provides learners with a fun way to learn how to apply technology to everyday life, and develops creativity and

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lateral thinking," (Knowledge Network, 2000). The Australian Government and Opposition are peddling a new version of "Knowledge Economy", while universities here are bemoaning the lowered educational standards. In Canada, the government is actively funding learning-for-life ventures. The CIA and FBI managed their knowledge so well, that it cost the USA more than 6000 dead and missing, and will cause the world many more in terms of wars and terrorist attacks. Knowledge, according to an Arabic proverb, is a double-sided weapon. Do we have any skilled fencers?

Workers who are unable to adapt to advances, or who lack expertise with the new technologies, slow down the benefits of innovations for everyone. Post-secondary institutions provide the resources and training opportunities for workers to acquire these skills. Without sufficient investment in core education and training, the full benefit of technological advances cannot be achieved. The ability of businesses to realize full productivity is directly proportional to society's investment in its workers. Colleges and universities are essential to creating the workers needed to fill these jobs. Creating knowledge workers is not enough, however. Experts currently estimate that one in seven workers needs the equivalent of seven credit hours per year just to stay current in his or her field. Colleges and universities must focus on making the changes necessary to maintain the knowledge and skills of their alumni and the workers in their community (Tait, 1998).

The individual units of this human capital have become known as 'Knowledge Workers'. Renowned economists have noted that remarkable technological growth has created an unprecedented demand for highly educated workers, not only to advance and manage the technologies themselves, but also to serve as experts in the financing, production and marketing of the resulting new products and services.

The sustenance and growth of a knowledge-based economy requires:

- strong research and development, and
- corresponding investments in education and training.

Without these two critical ingredients, today's knowledge-based economy will quickly stagnate and flounder.

A company striving to implement KM has to embrace learning. "Creating knowledge workers is easy if you're a software company filled with PhDs," he says. "It's more difficult in a company of manual laborers," as the Mexican PIPSA has learnt (Matson, 1997). In 1997, PIPSA implemented learning through story telling. Each of PIPSA's learning cells agreed to embrace three basic learning principles. The first is to focus on productive knowledge, helps the company achieve one of four goals: increase market share, reduce costs, increase product quality, enhance service quality. The second principle is to respect different ways of expressing and collecting knowledge. The third principle is that learning extends beyond the factory walls -- and applies to people of all ages.

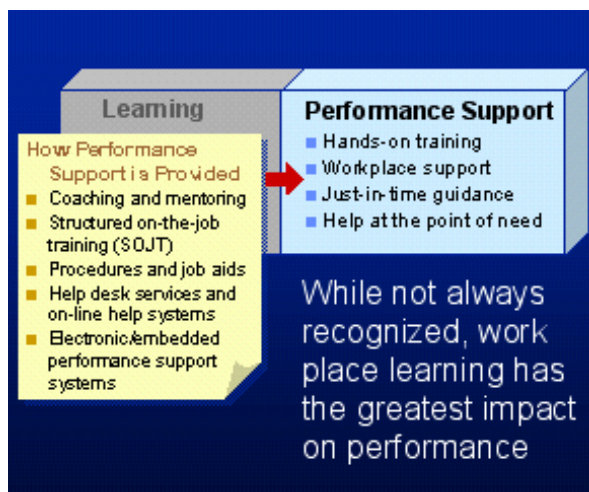


Fig. 3 Learning and Knowledge Management

This is all the more true in a knowledge-based economy, where people, and the innovation and creativity they bring to the workplace, are at the core of the success of each of your companies, and of Australia's success as a nation. The government's challenge is to identify and implement policies that promote the development of workers capable of succeeding in knowledge economy. With the rising concern about the brain drain, developing our human resources is only part of the challenge. Opportunities for learning are often one of the benefits most appreciated by employees, and personal development is a win-win for both the employee and the employer. And, as Peter Drucker observed in a recent article, it will soon take more than salary and stock incentives to keep knowledge workers happy. Increasingly, performance in these new knowledge-based industries will come to depend on running the institution so as to attract, hold, and motivate knowledge workers. When this can no longer be done by satisfying knowledge workers' greed, as we are now trying to do, it will have to be done by satisfying their values, and by giving them social recognition and social power. It will have to be done by turning them from subordinates into fellow executives, and from employees, however well paid, into partners.

As the business world is well aware, the effective use of technology requires a huge investment in human capital that can far exceed the direct cost of the technology itself. This simple truism has become more manifest over the past three decades, during which time the world has experienced unprecedented technological growth and change. In many smaller organisations, the main problem with creating knowledge workers is the fact that those in decision-making positions see training as time and funds-consuming, or even fear that empowering employees to become knowledge workers can detract from the management's authority. There is also the fear that a re-trained employee who has become a "knowledge worker" would necessarily demand higher wages than an untrained one. They fail to see that creating knowledge workers who continually focus on improvement is the essence of what it means to be competitive.

7. GETTING ROI ON KM: DOES IT REALLY WORK

When Knowledge Management was all the rage in mid-nineties, many of the Fortune 500 claimed that their particular implementation of KM projects would bring manifold return on investment (ROI). Encouraged by software and hardware companies who saw in KM a gold mine, these and many other companies spent and over-spent funds on IT, neglecting more important aspects of KM, namely human beings.

Beyond the focus on productivity, KM's core value remains the new wealth that can be derived from the innovations of knowledge workers who are freed from routine administrative burdens (that at root are due to poor knowledge sharing) and are provided with collaborative, knowledge-intensive environments that support their creativity and ability to support business objectives in the fast-paced new economy. Gartner estimates as much as a 30 percent, bottom-line differential for enterprises that proactively manage their intellectual assets over those that do not (Caldwell, 2000).

As an article published by the APQC shows, measuring KM is a very complex task (Hartz et al., 2001). In a research performed by the Delphi Group in 2001, many respondents were not required to prove ROI before embarking on a KM project. Organizations continue to struggle with how to measure the value of knowledge and many decide not to try, looking instead to soft metrics to justify their KM systems investments.

Those that did translate their knowledge value into dollars said overwhelming that ROI was demonstrated through productivity increases. This makes sense; given that KM is a driver of organizational and individual responsiveness. It also underscores the role that KM, content management, and other technologies have played in increasing productivity and creating economic value in the workplace, even during the downshifting economy (Delphi Group, 2001).

Although there have been cries for a standard measurement tool that can identify the return a company will realize from implementing KM, we are far from reaching that goal. Methods such as the Balanced Scorecard, which was introduced in 1991 by Kaplan & Norton, and the work of Scandia Insurance have helped raise awareness about the importance of measuring intangible assets, but none has been completely accepted. In the USA, certain companies such as the DPT CONSULTING GROUP [<http://www.dpt-consulting.com/index2.htm>] have even developed methodologies for measuring ROI on Knowledge Management. How effective such 'methodologies' are remains to be seen. The ROI System that they developed combines traditional measurement approaches (such as the four level evaluation and accounting

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ROI approach) with a proprietary measurement method that can effectively isolate the impact of other intervening factors from the impact produced by specific training programs.

One method is the examination of current processes and costs vs. new KM processes. That approach reverts to the business process re-engineering (BPR) days and assumes that an organization has either mapped current processes and costs or is willing to devote the resources needed to undertake that task. The process can be costly and time-consuming, and may not have a direct correlation to the KM-related changes--e.g. a new initiative to encourage communities of practices or an incentive program to foster the exchange of tacit knowledge. A better way to start the value determination process is to capture success stories for KM programs and extrapolate a meaning into tangible numbers (KM World, 1998).

In my opinion, KM is not as much about making profits as about remaining competitive in the new "information economy". Companies that cannot afford KM will soon not be in business. Whereas e-learning and software tools could be a cornerstone of knowledge management, most e-learning companies and IT "solution providers" have failed to master the basic theory and practice of knowledge management. They not only cannot intelligently speak about knowledge management practice from a marketing perspective, they don't even have a coherent internal understanding of knowledge management or a serious knowledge management strategy of their own. Nor can they speak the language of business results other than in terms of ROI (return on investment), completely missing the huge strategic impact of intangibles and intellectual capital measures (Allee, 2000).

8. APPENDIX

1. <http://www.noisetoknowledge.com/keybyte.htm>

9. REFERENCES

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