

Knowledge Praxis

Finally, a publication about the practical aspects of managing knowledge.



What is knowledge management?

Rebecca O. Barclay

Managing Editor, *Knowledge Praxis*

Philip C. Murray

Editor-in-Chief, *Knowledge Praxis*

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At *Knowledge Praxis*, we define knowledge management as a business activity with two primary aspects:

- Treating the knowledge component of business activities as an explicit concern of business reflected in strategy, policy, and practice at all levels of the organization.
- Making a direct connection between an organization's intellectual assets — both explicit [recorded] and tacit [personal know-how] — and positive business results.

In practice, knowledge management often encompasses identifying and mapping intellectual assets within the organization, generating new knowledge for competitive advantage within the organization, making vast amounts of corporate information accessible, sharing of best practices, and technology that enables all of the above — including groupware and intranets.

That covers a lot of ground. And it should, because applying knowledge to work is integral to most business activities.

Knowledge management is hard to define precisely and simply. (The definition also leapfrogs the task of defining "knowledge" itself. We'll get to that later.) That's not surprising. How would a nurse or doctor define "health care" succinctly? How would a CEO describe "management"? How would a CFO describe "compensation"? Each of those domains is complex, with many sub-areas of specialization. Nevertheless, we know "health care" and "management" when we see them, and we understand the major goals and activities of those domains.

Business strategies related to knowledge management

As you explore other explanations of knowledge management — Bo Newman's [Knowledge Management Forum](#) is a good starting point — you'll detect connections with several well-known management strategies, practices, and business issues, including

- Change management
- Best practices

- Risk management
- Benchmarking

A significant element of the business community also views knowledge management as a natural extension of "business process reengineering," a fact underscored by the recent announcement that John Wiley's *Business Change and Reengineering* will become *Knowledge and Process Management* in March, 1997. See (<http://www.mgmt.utoronto.ca/~wensle/journal1.htm>)

There is a common thread among these and many other recent business strategies: A recognition that information and knowledge are corporate assets, and that businesses need strategies, policies, and tools to manage those assets.

The need to manage knowledge seems obvious, and discussions of intellectual capital have proliferated, but few businesses have acted on that understanding. Where companies **have** take action — and a growing number are doing so — implementations of "knowledge management" may range from technology-driven methods of accessing, controlling, and delivering information to massive efforts to change corporate culture.

Opinions about the paths, methods, and even the objectives of knowledge management abound. Some efforts focus on enhancing creativity — creating new knowledge value — while other programs emphasize leveraging existing knowledge. (See below, "[Categorization of knowledge management approaches.](#)")

What is "knowledge"?

Aren't we managing **knowledge** already? Well, no. In fact, most of the time we're making a really ugly mess of managing **information**. In practice, the terms *information* and *knowledge* are often used interchangeably by business writers.

Let's choose a simple working definition and get on with it:

Knowledge has two basic definitions of interest. The first pertains to a defined body of information. Depending on the definition, the body of information might consist of facts, opinions, ideas, theories, principles, and models (or other frameworks). Clearly, other categories are possible, too. Subject matter (e.g., chemistry, mathematics, etc.) is just one possibility.

Knowledge also refers to a person's state of being with respect to some body of information. These states include ignorance, awareness, familiarity, understanding, facility, and so on.

Email from Fred Nickols, Executive Director — Strategic Planning & Management,
Educational Testing Service.

There are many thoughtful and thought-provoking definitions of "knowledge" — including the important distinctions Gene Bellinger et al. make in "[Data, Information, Knowledge, and Wisdom](#)". Nevertheless, Nickols provides a good, sensible, functional definition, and it is sufficient for our purposes.

Nickols' two kinds of knowledge parallel Michael Polanyi's often-quoted distinction between *explicit knowledge* (sometimes referred to as *formal knowledge*), which can be articulated in language and transmitted among individuals, and *tacit knowledge* (also, *informal knowledge*),

personal knowledge rooted in individual experience and involving personal belief, perspective, and values. (Polanyi, Michael. *The Tacit Dimension*. London: Routledge & Kegan Paul. See also Karl E. Sveiby's online description, "[Tacit Knowledge](#)."

In traditional perceptions of the role of knowledge in business organizations, *tacit knowledge* is often viewed as the real key to getting things done and creating new value. Not explicit knowledge. Thus we often encounter an emphasis on the "learning organization" and other approaches that stress internalization of information (through experience and action) and generation of new knowledge through managed interaction.

In the opinion of the editors of *Knowledge Praxis*, quibbles about fine distinctions in the meaning of knowledge are just not very important. (See [Rant #1: Thinking objectively about subjective knowing](#)) It doesn't matter whether a written procedure or a subject matter expert provides a solution to a particular problem, as long as a positive result is achieved. However, observing how knowledge is acquired and how we can apply knowledge — whether tacit or explicit — in order to achieve a positive result that meets business requirements ... that's a different and very important issue.

Why we need knowledge management now

Why do we need to manage knowledge? Ann Macintosh of the Artificial Intelligence Applications Institute (University of Edinburgh) has written a "[Position Paper on Knowledge Asset Management](#)" that identifies some of the specific business factors, including:

- Marketplaces are increasingly competitive and the rate of innovation is rising.
- Reductions in staffing create a need to replace informal knowledge with formal methods.
- Competitive pressures reduce the size of the work force that holds valuable business knowledge.
- The amount of time available to experience and acquire knowledge has diminished.
- Early retirements and increasing mobility of the work force lead to loss of knowledge.
- There is a need to manage increasing complexity as small operating companies are trans-national sourcing operations.
- Changes in strategic direction may result in the loss of knowledge in a specific area.

To these paraphrases of Ms. Macintosh's observations we would add:

- Most of our work is information based.
- Organizations compete on the basis of knowledge.
- Products and services are increasingly complex, endowing them with a significant information component.
- The need for life-long learning is an inescapable reality.

In brief, knowledge and information have become the medium in which business problems occur. As a result, managing knowledge represents the **primary** opportunity for achieving substantial savings, significant improvements in human performance, and competitive advantage.

It's not just a Fortune 500 business problem. Small companies need formal approaches to

knowledge management even more, because they don't have the market leverage, inertia, and resources that big companies do. They have to be much more flexible, more responsive, and more "right" (make better decisions) — because even small mistakes can be fatal to them.

Roadblocks to adoption of knowledge management solutions

There have been many roadblocks to adoption of formal knowledge management activities. In general, managing knowledge has been perceived as an **unmanageable** kind of problem — an implicitly human, individual activity — that was intractable with traditional management methods and technology.

We tend to treat the activities of knowledge work as necessary, but ill-defined, costs of human resources, and we treat the explicit manifestations of knowledge work as forms of publishing — as byproducts of "real" work.

As a result, the metrics associated with knowledge resources — and our ability to manage those resources in meaningful ways — have not become part of business infrastructure.

But it isn't necessary to throw up one's hands in despair. We **do** know a lot about how people learn. We know more and more about how organizations develop and use knowledge. The body of literature about managing intellectual capital is growing. We have new insights and solutions from a variety of domains and disciplines that can be applied to making knowledge work manageable and measurable. And computer technology — itself a cause of the problem — can provide new tools to make it all work.

We don't need another "paradigm shift" (Please!), but we do have to accept that the nature of business itself has changed, in at least two important ways:

1. Knowledge work is fundamentally different in character from physical labor.
2. The knowledge worker is almost completely immersed in a computing environment. This new reality dramatically alters the methods by which we must manage, learn, represent knowledge, interact, solve problems, and act.

You can't solve the problems of Information Age business or gain a competitive advantage simply by throwing more information and people at the problems. And you can't solve knowledge-based problems with approaches borrowed from the product-oriented, print-based economy. Those solutions are **reactive** and inappropriate.

Applying technology blindly to knowledge-related business problems is a mistake, too, but the computerized business environment provides opportunities and new methods for representing "knowledge" and leveraging its value. It's not an issue of finding the right computer interface — although that would help, too. We simply have not defined in a rigorous, clear, widely accepted way the fundamental characteristics of "knowledge" in the computing environment. (See ["Cooperative development of a classification of knowledge management functions."](#))

A brief history of knowledge management

An overarching theory of knowledge management has yet to emerge, perhaps because the practices associated with managing knowledge have their roots in a variety of disciplines and domains. Special thanks to Karl Wiig for supplying us with a pre-publication copy of "Knowledge Management: Where Did It Come From and Where Will It Go?" which will appear in *The Journal of Expert Systems with*

Applications. This section draws heavily on that work but supplies only a small part of that value.

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. Drucker and Strassmann have stressed the growing importance of information and explicit knowledge as organizational resources, and Senge has focused on the "learning organization," a cultural dimension of managing knowledge. Chris Argyris, Christopher Bartlett, and Dorothy Leonard-Barton of Harvard Business School have examined various facets of managing knowledge. In fact, Leonard-Barton's well-known case study of Chaparral Steel, a company which has had an effective knowledge management strategy in place since the mid-1970s, inspired the research documented in her *Wellsprings of Knowledge — Building and Sustaining Sources of Innovation* (Harvard Business School Press, 1995).

Everett Rogers' work at Stanford in the diffusion of innovation and Thomas Allen's research at MIT in information and technology transfer, 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. Rob Acksyn'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.

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*, *Organizational Science*, *Harvard Business Review*, and others, and the first books on organizational learning and knowledge management were published (for example, Senge's *The Fifth Discipline* and Sakaiya's *The Knowledge Value Revolution*).

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. 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* (1995).

By the mid-1990s, knowledge management initiatives were flourishing, thanks in part to the Internet. The International Knowledge Management Network (IKMN), begun in Europe in 1989, went online in 1994 and was soon joined by the U.S.-based Knowledge Management Forum and other KM-related groups and publications. 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 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, Arthur Andersen, and Booz-Allen & Hamilton. 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 APQC [American Productivity and Quality Council] and ASIS [American Society for Information Science]).

Knowledge management: a cross-disciplinary domain

Knowledge management draws from a wide range of disciplines and technologies.

- **Cognitive science.** Insights from **how** we learn and know will certainly improve tools and techniques for gathering and transferring knowledge.
- **Expert systems, artificial intelligence and knowledge base management systems (KBMS).** AI and related technologies have acquired an undeserved reputation of having failed to meet their own — and the marketplace's — high expectations. In fact, these technologies continue to be applied widely, and the lessons practitioners have learned are directly applicable to knowledge management.
- **Computer-supported collaborative work (groupware).** In Europe, *knowledge management* is almost synonymous with *groupware* ... and therefore with Lotus Notes. Sharing and collaboration are clearly vital to organizational knowledge management — with or without supporting technology.
- **Library and information science.** We take it for granted that card catalogs in libraries will help us find the right book when we need it. The body of research and practice in classification and knowledge organization that makes libraries work will be even more vital as we are inundated by information in business. Tools for thesaurus construction and controlled vocabularies are already helping us manage knowledge.
- **Technical writing.** Also under-appreciated — even sneered at — as a professional activity, technical writing (often referred to by its practitioners as *technical communication*) forms a body of theory and practice that is directly relevant to effective representation and transfer of knowledge.
- **Document management.** Originally concerned primarily with managing the accessibility of images, document management has moved on to making content accessible and re-usable at the component level. Early recognition of the need to associate "metainformation" with each document object prefigures document management technology's growing role in knowledge management activities.

- **Decision support systems.** According to Daniel J. Power, "Researchers working on Decision Support Systems have brought together insights from the fields of cognitive sciences, management sciences, computer sciences, operations research, and systems engineering in order to produce both computerised artifacts for helping knowledge workers in their performance of cognitive tasks, and to integrate such artifacts within the decision-making processes of modern organisations." [See Powers' [DSS Research Resources Home page](#).] That already sounds a lot like knowledge management, but in practice the emphasis has been on quantitative analysis rather than qualitative analysis, and on tools for managers rather than everyone in the organization.
- **Semantic networks.** Semantic networks are formed from ideas and typed relationships among them — sort of "hypertext without the content," but with far more systematic structure according to meaning. Often applied in such arcane tasks as textual analysis, semantic nets are now in use in mainstream professional applications, including medicine, to represent domain knowledge in an explicit way that can be shared.
- **Relational and object databases.** Although relational databases are currently used primarily as tools for managing "structured" data — and object-oriented databases are considered more appropriate for "unstructured" content — we have only begun to apply the models on which they are founded to representing and managing knowledge resources.
- **Simulation.** Knowledge Management expert Karl-Erik Sveiby suggests "simulation" as a component technology of knowledge management, referring to "computer simulations, manual simulations as well as role plays and micro arenas for testing out skills." (Source: Email from Karl-Erik Sveiby, July 29, 1996)
- **Organizational science.** The science of managing organizations increasingly deals with the need to manage knowledge — often explicitly. It's not a surprise that the American Management Association's APQC has sponsored major knowledge management events.

That's only a partial list. Other technologies include: object-oriented information modeling; electronic publishing technology, hypertext, and the World Wide Web; help-desk technology; full-text search and retrieval; and performance support systems.

Categorization of knowledge management approaches

The term "knowledge management" is now in widespread use, having appeared in the titles of many new books about knowledge management as a business strategy, as well as in articles in many business publications, including *The Wall Street Journal*. There are, of course, many ways to slice up the multi-faceted world of knowledge management. However, it's often useful to categorize them.

In a posting to the Knowledge Management Forum, Karl-Erik Sveiby identified two "tracks" of knowledge management:

- **Management of Information.** To researchers in this track, according to Sveiby, "... knowledge = Objects that can be identified and handled in information systems."
- **Management of People.** For researchers and practitioners in this field, knowledge consists of "... processes, a complex set of dynamic skills, know-how, etc., that is constantly changing."

(From Sveiby, Karl-Erik, "[What is knowledge management](#)")

Sveiby's characterization is on target, but it may not capture the full flavor of the important distinctions in approaches to organizational knowledge management. At *Knowledge Praxis*, we have adopted a three-part categorization: (1) mechanistic approaches, (2) cultural/behavioristic approaches, and (3) systematic approaches to knowledge management.

Mechanistic approaches to knowledge management

Mechanistic approaches to knowledge management are characterized by the application of technology and resources to do **more of the same better**. The main assumptions of the mechanistic approach include:

- Better accessibility to information is a key, including enhanced methods of access and reuse of documents (hypertext linking, databases, full-text search, etc.)
- Networking technology in general (especially intranets), and groupware in particular, will be key solutions.
- In general, technology and sheer volume of information will make it work.

Assessment: Such approaches are relatively easy to implement for corporate "political" reasons, because the technologies and techniques — although sometimes advanced in particular areas — are familiar and easily understood. There is a modicum of good sense here, because enhanced access to corporate intellectual assets is vital. But it's simply not clear whether access itself will have a substantial impact on business performance, especially as mountains of new information are placed on line. Unless the knowledge management approach incorporates methods of leveraging cumulative experience, the net result may not be positive, and the impact of implementation may be no more measurable than in traditional paper models.

Cultural/behavioristic approaches to knowledge management

Cultural/behavioristic approaches, with substantial roots in process re-engineering and change management, tend to view the "knowledge problem" as a management issue. Technology — though ultimately essential for managing explicit knowledge resources — is not the solution. These approaches tend to focus more on innovation and creativity (the "learning organization") than on leveraging existing explicit resources or making working knowledge explicit.

Assumptions of cultural/behavioristic approaches often include:

- Organizational behaviors and culture need to be changed ... dramatically. In our information-intensive environments, organizations become dysfunctional relative to business objectives.
- Organizational behaviors and culture **can** be changed, but traditional technology and methods of attempting to solve the "knowledge problem" have reached their limits of effectiveness. A "holistic" view is required. Theories of behavior of large-scale systems are often invoked.
- It's the processes that matter, not the technology.
- Nothing happens or changes unless a manager makes it happen.

Assessment: The cultural factors affecting organizational change **have** almost certainly been undervalued, and cultural/behavioristic implementations have shown some benefits. But the

cause-effect relationship between cultural strategy and business benefits is not clear, because the "Hawthorne Effect" may come into play, and because we still can't make dependable predictions about systems as complex as knowledge-based business organizations. Positive results achieved by cultural/behavioristic strategies may not be sustainable, measurable, cumulative, or replicable ... and employees thoroughly "Dilbertized" by yet another management strategy may roll their eyes. Time will tell.

Systematic approaches to knowledge management

Systematic approaches to knowledge management retain the traditional faith in rational analysis of the knowledge problem: the problem can be solved, but new thinking of many kinds is required. Some basic assumptions:

- It's sustainable results that matter, not the processes or technology ... or your definition of "knowledge."
- A resource cannot be managed unless it is modeled, and many aspects of the organization's knowledge **can** be modeled as an explicit resource.
- Solutions can be found in a variety of disciplines and technologies, and traditional methods of analysis **can** be used to re-examine the nature of knowledge work and to solve the knowledge problem.
- Cultural issues are important, but they too must be evaluated systematically. Employees may or may not have to be "changed," but policies and work practices must certainly be changed, and technology can be applied successfully to business knowledge problems themselves.
- Knowledge management has an important management component, but it is not an activity or discipline that belongs exclusively to managers.

Assessment: Unrepentant rationalists in the business world are taking a systematic approach to solving the "knowledge problem." You'll also find evidence of such approaches — as well as a less formal use of the term *systematic knowledge management* —Karl Wiig's [Knowledge Research Institute Web site](#) and Gene Bellinger's [Systems Thinking Web pages](#). Systematic approaches show the most promise for positive cumulative impact, measurability, and sustainability.

Conclusion

Where do we stand at the moment, and where do we go from here? We conclude with a thought from Bo Newman, via email:

As attested to in numerous articles in the popular press, knowledge management has already been embraced as a source of solutions to the problems of today's business. Still it has not been easy for this "science" to construct for itself that royal road of self validation. On the contrary, I believe that it is still, at least for the majority of the practitioners and their customers, in the stage of blind groping after its true aims and destination.

Enough said ... for the moment. Let's change the end of this story.

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