

Knowledge Management

Next Step to Competitive Advantage

NEAL POLLOCK

Within the last few years, the corporate sector, government agencies, and organizations are demonstrating an increasing interest in the topic of Knowledge Management (KM). KM caters to the critical issues of organizational adaptation, survival, and competence in the face of continuous environmental change.

This article provides answers to the most frequently asked questions about KM, which combines the data and information processing capabilities of information technology (IT) as well as the innovative capacity of human beings.

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What is Knowledge Management?

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The formal Navy definition of Knowledge Management is found in Department of Navy Chief Information Officer (DON CIO) *Glossary of IM/IT & KM Terms*, dated May 2001, which states, "Knowledge management can be viewed as a process for optimizing the effective application of intellectual capital to achieve organizational objectives." More simply, KM is the application of management to knowledge. Management, in this case, refers to the processes involved in creating, generating, classifying, storing, distributing, communicating, tailoring, and reusing knowledge.

Knowledge can be differentiated from data and information as a higher level of abstraction. Data are the nuts and bolts or piece parts, similar, for example, to the components that constitute a kit for a chair that requires assembly.

Pollock is on a rotational assignment as the Chief Knowledge Engineer at Department of the Navy Chief Information Office, Arlington, Va.

Once the major assemblies are formed and recognizable (e.g., the seat, the back, the legs), they are comparable to information. The completed chair is likened to knowledge. Thus, information is an arrangement of a set of data in a meaningful form.

Knowledge is a set of processed information with appropriate context to be understandable and actionable. The main characteristic distinguishing knowledge from information is the user's ability to easily act upon the knowledge.



If a ship is under attack, giving the captain a pile of sensor data does no good; giving the captain a drawing of numerous intersecting lines, status reports of ship systems, or even the latitude and longitude of the attacker still doesn't (in and of itself) do any good. One must provide a succinct, appropriate level of abstraction — actionable knowledge — that pinpoints the direction and range of the target in terms that the ship's weapons system can interpret, and the "go" status of that system. Only then can the captain decide when or whether to shoot back. That decision depends upon the knowledge provided — but is not constituted by it.

Social Network Analysis maps the interactions between and among the people within an organization. Such interactions are not at all homogeneous. Specific people serve as Connectors, Salesmen, and Mavens for the organization ... the value of such people is often hidden from view. Organizations that eliminate such functions learn of the losses through hard experience.

Knowledge is decision input. The decision, however, requires the captain's understanding and wisdom. Nevertheless, a knowledge base can provide some benchmarks of past actions taken by other captains under similar circumstances and the results from such actions. As David W. Aha explains in a 1992 conference paper on "Generalizing Case Studies: A Case Study," such tools as Case-Based Reasoning (an artificial intelligence application), for instance, can provide insight into the present based upon the past.



What methods does Knowledge Management typically employ?



Two main viewpoints of KM exist: social and technical. Some claim that the former constitutes about two-thirds of KM, while others tend to emphasize the latter due to its familiarity and ease of implementation and measurement. Unfortunately, similar to business process reengineering, implementing technical solutions to KM problems or opportunities provides very limited return on investment (ROI). Similarly, implementing KM while only addressing social aspects can have marginal impact and is usually not measurable in a meaningful way — at least not from a financial perspective.

The large potential gains come from marrying the two aspects by using technology to leverage social interventions or implementations. Thus, IT is well suited to enable the many potential gains of KM. It should be noted, however, that for most people, many KM activities are instinctive. People, by their very nature, share knowledge all the time. KM adds purpose, organization, consciousness, and organizational recognition to the process. Mere institutional acceptance of the organizational value of KM can go a long way in facilitating its effectiveness.



What are the social innovations employed by KM?



Communities of Practice (CoP) can be formed to provide a "place" for people working in particular areas of interest to share methods or concerns and establish a history of cooperation and mutual support. This history can be made available to members. The DON CIO leads the KM CoP; however, this is a special case. (Note that this site is currently open to members only; however, other activities may request membership from the public DON CIO Web site at <http://www.don-imit.navy.mil/quickplace/>.)

The Naval Facilities Engineering Command (NAVFAC) has numerous CoPs. At a high level, the NAVFAC Technical Discipline Leaders (TDL) share their separate areas of expertise in a CoP that cuts across all of NAVFAC's building endeavors. Each TDL, however, has a CoP for his or her own specific Discipline. These CoPs are not collocated, but are spread throughout CONUS and certain foreign countries in which NAVFAC maintains facilities. Numerous CoPs exist throughout the U.S. Government as well as industry.

Social Network Analysis maps the interactions between and among the people within an organization. Such interactions are not at all homogeneous. Specific people serve as Connectors, Salesmen, and Mavens for the organization (as well as in other aspects of life). The value of such people is often hidden from view. Organizations that eliminate such functions learn of the losses through hard experience. With the declining U.S. Government workforce, identifying such people within an organization and creating contingencies for their replacements as the workforce ages are critical to the overall health of the organization.

Similarly, the recognition of generalized reciprocity can lead to a re-orientation of an organization's values or definition of what constitutes work. The leading Ford Motor Company general manager used the quality and quantity of his direct subordinates' helping each other as one of his main criteria for evaluating

their performance. He would even eliminate subordinates who did not actively participate in helping their peers. As a result, when Ford needed new general managers, those reporting directly to him became the candidates of choice. Helping co-workers can be an active part of one's job, not only tacitly, but also explicitly.

Author Stephen Denning, in his 2001 publication, *The Springboard: How Storytelling Ignites Action in Knowledge Era Organizations*, relates how he introduced KM at the World Bank. Indeed, storytelling as a technique of change management has come into its own. Recognized as a fundamental and powerful way in which organizations codify their norms, energize personnel, and achieve corporate cohesion, storytelling is also exemplified in a 1982 book by Tom Peters, *In Search of Excellence*. Peters illustrates how archetypal stories about the exploits of founders establish a company myth, which maintains the company's environment.

The DON CIO holds an annual Knowledge Fair (usually in August), which provides a setting for knowledge workers to share their efforts with their peers throughout the government. It also serves as a one-stop shopping forum for past and ongoing efforts, tools, techniques, and considerations relating to the successful (or unsuccessful) implementation of KM. This then, is the very essence of managing knowledge — “KM of KM” or “meta-KM,” which focuses on reuse and lessons-learned and doesn't limit KM to mere problem solving or best practices. Rather, it provides an opportunity to break new ground.

As stated by the poet Lucan in the first century, “Pygmies placed on the shoulders of giants see more than the giants themselves.”



How can IT Leverage KM?



Web portals are frequently used to connect KM workers such as CoPs. A KM-supportive Web site would include

threaded discussions orchestrated directly by the leader of a CoP. It would also include synchronous and asynchronous sharing software, which would facilitate members at geographically separated locations discussing, sharing, and mutually devising solutions, resolutions, and pilot programs. Many Web tools are available, but some are better optimized or supportive of KM and sharing.

Tacit Knowledge Transfer involves the capture, storage, distribution, and reuse of tacit knowledge. Explicit knowledge has usually been written down in one way or another and, therefore, is readily available for exploitation. Tacit knowledge, however, is far more difficult to tap. Often, people have difficulty accessing their own tacit knowledge until the circumstance or some stimulus triggers the tacit knowledge. Thus, someone who learned Cardio-Pulmonary Resuscitation (CPR) decades ago would probably be unable to answer specific questions about it. Nevertheless, such people can and do react as trained, performing CPR when the need arises.

Not all tacit knowledge is as difficult to recall. Hopefully, one doesn't need to encounter a heart attack victim to recall tacit knowledge. But neither is it easy to recall. An interviewer, for instance, may need the skill of Barbara Walters to elicit tacit knowledge on a given topic during a videotaped interview. Though perhaps lacking a Barbara Walters-type finesse, the Space and Naval Warfare (SPAWAR) Systems Center Charleston is employing the interview technique for their KM initiative.

Knowledge Bases or Banks (KB) parallel their lower-level data and information counterparts. Multimedia adds the necessary versatility to make KBs feasible and utilitarian today. KBs can now include video segments, presentations, Internet hyperlinks, and many more. Today, virtual libraries abound. With appropriate middleware, they can be all but invisible to the user, allowing for one-stop shopping and rendering them far more user-friendly. The Integrated Business Support System (formerly In-

tegrated Contracting System) now in development is attempting to build a virtual library for Navy procurement, including a knowledge base of processes as well as information.

Port Hueneme has used Case-Based Reasoning Tools to reduce the number of service trips required for equipment repair and maintenance. Such tools can emulate BITE, or Built-In-Test-Equipment, which is designed into a piece of equipment or a system. Primarily hardware, software, or a combination of the two, BITE is especially useful on ships. In fact, the author can personally attest to the overall reliability of Case-Based Reasoning tools due to knowledge gained from experience working with BITE on the Surface Ship Torpedo Defense program at the Naval Sea Systems Command, as well as the Advanced Signal Processor (AN/UYS-1) at the Naval Air Systems Command.

High-quality BITE enables “better, faster, cheaper” on-site maintenance and can also assist the user in creating new documents based upon the efforts of predecessors in creating the same type of document for other projects. Using a question-and-answer format, these tools assist the user in selecting the best example for each paragraph or section of the document.

A good example is the Navy International Programs Office, which developed the International Agreements Generator (IAG) to assist authors in creating first drafts of new international agreements. IAG paragraphs have now been pre-approved in OSD so that any paragraphs included in the final draft cannot be challenged — only tailored and negotiated changes can be challenged during the review cycle at OSD.

Content analysis tools are presently in their infancy. They promise, however, to greatly reduce workload by condensing documents into more readable, user-friendly formats that take much less time to read. Presently, some efforts are in place to instruct authors in techniques designed to be more user-friendly, which reduce the latency in both ab-

sorption and in finding embedded knowledge and information of interest.

Both mentoring and shadowing have been used to familiarize personnel with the ways in which more seasoned workers and managers perform higher-level functions. Most long-term training programs such as the Executive Leadership Development Program and the Defense Leadership and Management Program use these techniques, as well as developmental and rotational assignments to provide their participants with a wide assortment of experiences and perspectives. Electronic media such as video teleconferencing, group sharing, Web

ings where participants are required to be physically present. Virtual Reality capabilities (now under development) may add a more complete dimension to such tacit transfer methods.

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What KM implementation methods and processes are used in DON?

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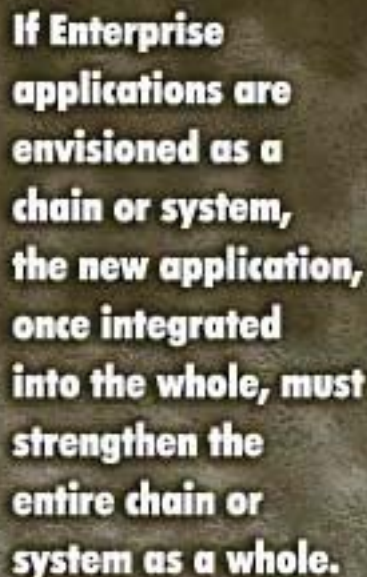
The DON CIO provides KM “Assists” and “Consults” to requesting DON (U.S. Navy and U.S. Marine Corps) activities. Likewise, the DON CIO Enterprise Integration Teams help activities implement various KM initiatives via pilot programs designed to support the vision, mission, objectives, and values of the requesting activity. Each team helps such activities in selecting, designing, and orchestrating these projects. Activities also use their membership in the KM CoP to gain access to the KM CoP Web site. When such activities are co-located with others, a CoP can be initiated at that location so that the co-located activities can share their efforts and facilitate cross-pollination, mutual assistance, and transportable learning and insight. The Washington Navy Yard Community of Practice is one example. Established earlier this year as a subset of the Knowledge Management community, the Navy Yard CoP maintains its controlled Web site by linking to the KM CoP Web site.

The primary implementation tool used by the KM Assist Teams and their supported activities is the Knowledge Centric Organization Toolkit Compact Disk (KCO CD). The KCO CD includes documents, methods, procedures, and processes useful in implementing a KM program within an activity. KCO CDs are available from the DON CIO office, which distributes them to assisted activities and those considering such assistance. The DON *Sharing e-Government Successes or Compendium of KM and eBusiness Initiatives* CD is also available, which documents presentations from the initial Knowledge Fair of August 2000. Certain additional CDs are also available on a select basis, as needed, and within legal restrictions.

KM also works well under the Balanced Scorecard regimen advocated by authors Robert Kaplan and David Norton in a 1996 article appearing in the *Harvard Business Review*: “Using the Balanced Scorecard as a Strategic Management System.” The Balanced Scorecard regimen has now been adopted by a number of DON activities. By its nature, KM improves communications so as to tend to balance the many factors affecting decisions and organizational posture. By empowering individual contributions, KM tends to improve commitment and more optimal use of extant resources.

According to the Activation Theory findings of author Elizabeth Duffy in her 1962 *Activation and Behavior*, and C. Lueba, in a 1955 article published in *Psychological Reports*, entitled “Toward Some Integration of Learning Theories: The Concept of Optimal Stimulation,” individual productivity has an optimal or characteristic point with regard to stimulation — quantity of input. Thus, quality is related to quantity. KM, through lessons learned, best practices, and knowledge sharing, can effect improvements in quality, while decreasing unnecessary quantity of input. Participants can then reallocate their time and efforts more optimally across a spectrum of concerns and possibilities.

While knowledge sharing and distribution are, in truth, a normal part of doing business, KM institutionalizes such sharing and related activities. Since it requires a different emphasis, the principles of Change Management can be employed to facilitate the acceptance of KM within an organization. However, as described in Stephen Denning’s *The Springboard*, stories are most efficacious in gaining acceptance for KM (and other initiatives). Denning describes the optimal construction and structure for his “springboard stories” — success stories illustrating how KM can work effectively to perform the organization’s mission in support of its vision. Such stories tend to inspire buy-in and action in contrast to intellectual agreement. Analysis and fancy slides can only support such stories — not vice versa. The best stories are idiosyncratic of the audience.



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sites, and e-mail can facilitate such efforts through virtual mentoring and similar approaches. Push (vs. pull) techniques can be used to expand involvement by recipients either as observers (for training purposes) or as active participants (for empowerment purposes).

Participation is often a prerequisite for buy-in. Keeping stakeholders “in the loop” can serve to maintain their support over the long run. Virtual techniques, however, are not replacements for face-to-face communication. Rather, they can augment less frequent meet-



How does Knowledge Management affect Navy/Marine Corps Internet (N/MCI) applications?



The many KM approaches previously described provide numerous possibilities for potential applications, which could be hosted on N/MCI, to expand KM and enable Department of the Navy to become a Knowledge Centric Organization. The outcome of such efforts would be synergistic in nature so as to improve not only effectiveness and efficiency within DON, but also to facilitate empowerment and result in a more horizontal organization.

In the present world of fierce competition for human talent and a time-sensitive brain drain within DoD, improvements in human and intellectual capital may become the paramount issues facing the Department in the near future. Nevertheless, it is incumbent upon Department of the Navy to minimize applications fielded across DON and integrate them across DoD to be mutually supportive and to minimize training requirements.

Extensive training of hundreds of thousands of members of the workforce is not generally affordable. Potential applications should, therefore, be usable by multiple DON activities and large numbers of personnel throughout DoD. They should, for the most part, enable autonomous use by employees to accomplish an increasingly wider variety of tasks requiring extensive, widespread knowledge based upon rapidly changing data and information.

Thus, these IT solutions must support knowledge processes that are primarily intellectual capital-oriented and social capital-intensive. In other words, technology should support psychological and sociological processes that create positive organizational outcomes. Outcomes (unlike outputs) are results that affect how the organization interacts with outside individuals and organizations (not just internal ones). The Learning Organization approach (as described

in author Peter Senge's *The Fifth Discipline*, published in 1990), implies an Open Systems perspective. The KCO is an example of such an institution, which maintains its agility and timeliness through knowledge and learning.



How can an Applications Acquirer specify knowledge solutions?



No longer is it sufficient merely to enable an individual to work better, faster, and cheaper because, in systems engineering terms, "optimizing the parts de-optimizes the whole, and optimizing the whole de-optimizes the parts." Therefore, new applications must enable the "Enterprise." (While Enterprise is a somewhat relative term, it usually refers to a large, cohesive, organization that interfaces with external entities. It can vary, for instance, from the entire corporate Space and Naval Warfare Systems Command [headquarters plus all subordinate commands], to the entire Department of the Navy or Department of Defense. As a familiar adage reminds us, "Where you stand depends on where you sit.")

To enable the Enterprise, each application must support the generation, stor-

age, distribution, and re-use of knowledge. Of course, no individual application is expected to do all of these. But if Enterprise applications are envisioned as a chain or system, the new application, once integrated into the whole, must strengthen the entire chain or system as a whole.

For instance, strengthening the strongest link in a chain may be a complete waste of effort. The weakest link may be a better target. Furthermore, a new application may be wonderful in and of itself, but may provide little institutional gain to the Department as a whole. In financial management, for instance, the proposed new project with the best ROI may be rejected if it does not fit into the optimal set of projects, including both existing ones as well as new ones.

The main thrust of N/MCI lies in its Enterprise orientation. Therefore, the acquirer's Business Case Analysis must show convincingly that the new application improves the Enterprise as a whole — and does this better than alternative uses of required resources.

Editor's Note: The author welcomes comments on this article. Contact him at Pollock.Neal@hq.navy.mil.

GENERAL OFFICER ANNOUNCEMENTS

Secretary of Defense Donald H. Rumsfeld announced Jul. 13, 2001, that the President has nominated Army Maj. Gen. John S. Caldwell Jr., for appointment to the grade of Lieutenant General with assignment as Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology, and Director, Army Acquisition Corps, Washington, D.C. Caldwell is currently serving as Commanding General, U.S. Army Tank-Automotive and Armaments Command, Warren, Mich.

On Aug. 2, 2001, Rumsfeld also announced the President's nomination of Army Lt. Gen. Paul J. Kern, for appointment to the grade of General and assignment as Commanding General, United States Army Materiel Command, Alexandria, Va. Kern is currently serving as Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology, and Director, Army Acquisition Corps, Washington, D.C.

Editor's Note: This information is in the public domain at <http://www.defense.link.mil/news>.