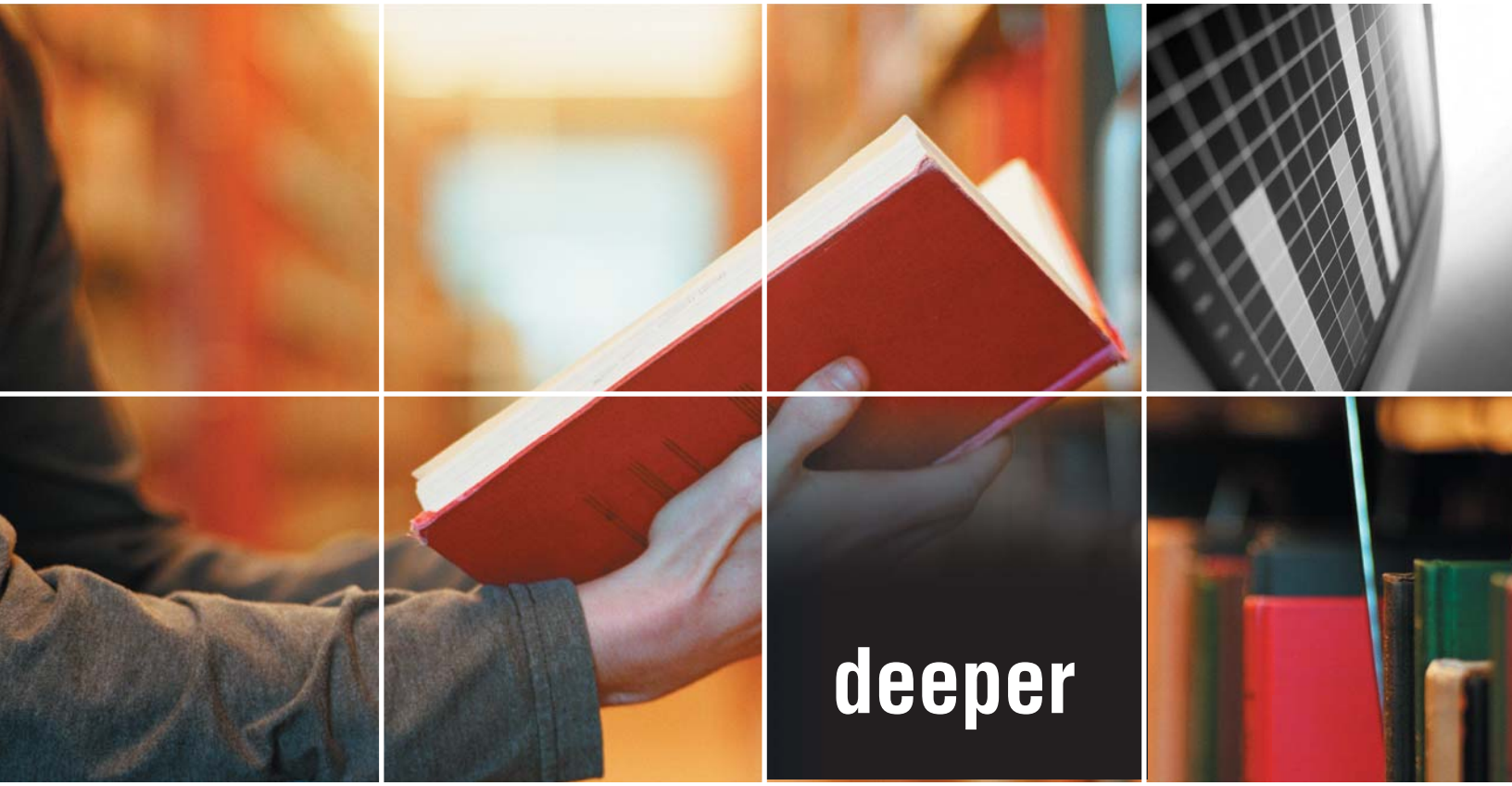
IBM Business Consulting Services

Gray matter matters: Preserving critical knowledge in the 21st century



An IBM Institute for Business Value executive brief

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Gray matter matters: Preserving critical knowledge in the 21st century

After seven years as a strategy consultant, Dave Cooper joined a leading kitchenware company as product director for beverageware. His role was to coordinate across various corporate functions – research, product design and development, manufacturing (done primarily through offshore outsourcing agreements), finance, marketing, sales and alliance partnerships – to meet aggressive growth targets for his product line. The job had significant responsibility (although technically Dave had no supporting team) since the mission was to achieve effective collaboration among the different functions. His position was previously held by a charismatic industry veteran, Carol Dean, who successfully led the beverageware group through five years of double-digit revenue growth and a 12 percent increase in market share. Carol left the company through an early retirement program, giving only a few weeks' notice. Not known for being very organized, her office was left in a bit of disarray.

Dave was not hired until five weeks after Carol's departure. While he received no formal training on his specific duties, the company president did arrange for Dave to meet with other product managers and the leaders of each functional group during his first week. Dave's formal responsibilities were relatively clear from conversations with his peers and prior experience consulting to kitchenware companies. However, he was left in the dark regarding the informal "ins and outs" of Carol's success.

After six months, Dave wondered whether he had made a big mistake in leaving his consulting job for this industry position. Results for the first two quarters of his tenure were very bad. Beverageware revenues dipped two percent, and market share dropped four percent. Furthermore, the company's relationship with one of its most important manufacturing partners, which had always been tenuous even under Carol's charismatic leadership, was severed due to disagreements over a shipment of defective plastic glasses. This had an effect on not only Dave's product line, but three others as well. Dave began questioning his ability to lead the beverageware group out of its downward spiral and back into the growth pattern that his predecessor had achieved.

Introduction

Changes in workforce demographics, labor migration patterns and economic conditions are causing organizations to face the challenge of retaining critical knowledge that is departing the organization. The above vignette, while somewhat stylized, is an example of the troubling and all-too-common effects of organizations' lack of attention to preserving their critical knowledge assets.

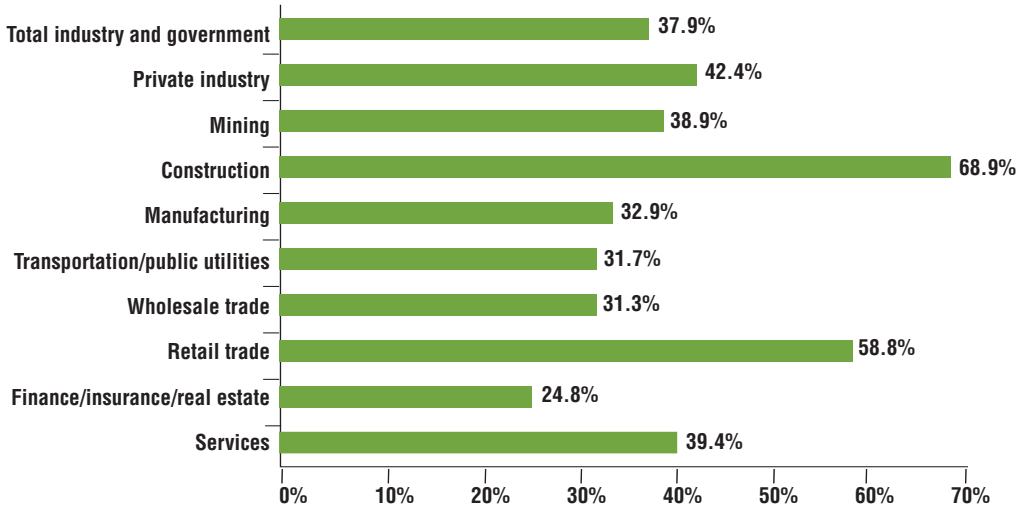
This paper probes the knowledge retention crisis that faces many organizations today, providing insights into driving trends and guidance on the actions organizations can take to tackle this issue. The first three sections discuss why organizations must take a proactive approach to stemming the loss of their critical knowledge assets and provide industry examples and statistics that paint a potentially ominous picture of the problem. The next two sections compare and contrast various knowledge elicitation and exchange techniques that organizations have used to keep their knowledge assets from walking out the door. The final section outlines an approach, tested and refined in partnership with members of the IBM Knowledge and Organizational Performance Forum, to help organizations create a call to action and launch successful knowledge retention initiatives.

Gray matter is walking out the door

Perhaps more than ever, employers in many industries are faced with the issue of losing their critical knowledge assets. Given the aging of the baby boomer generation, retirement eligibility will reach high levels in coming years. One troublesome statistic suggests that 19 percent of the workforce holding executive, administrative and managerial positions in the United States will retire in the next five years.[1] Making matters worse, these maturing baby boomers are followed by a markedly smaller group of generation X'ers. As older employees retire over the next several years, potential replacements will be increasingly difficult to find and hire out of this smaller pool of talent. In some areas, such as the public sector and the oil and gas industry discussed later in this paper, these problems are now garnering serious attention from senior executives.

In addition to looming baby boomer retirements, increased job mobility and layoffs due to economic factors also are placing corporate knowledge "at risk." A 2001 Hay Group survey of 5,000 executives reported that 46 percent planned to leave their positions in two to five years.[2] Annual turnover rates of 30 percent to 40 percent are currently common in many industries, with total industry and government turnover in the United States for February 2002 to January 2003 averaging almost 40 percent[3] (see Figure 1).

Figure 1. Annual rate of turnover (voluntary and involuntary) in the U.S., by industry (Feb 2002 - Jan 2003).



Source: U.S. Department of Labor, Bureau of Labor Statistics.

Gray matter matters, more than ever

The problems associated with the changing workforce trends are exacerbated by the demands of an increasingly knowledge-based economy. Much like other factors of production, knowledge is now held by most organizations to be a critical organizational asset and an important economic resource.

Rapid technological progress, which has given rise to an information explosion, has fueled knowledge's ascendance. First, the Internet and wireless technologies have increased information overload by giving executives and other employees ubiquitous access to business critical information 24 hours a day, 7 days a week. Yet, while executives have access to more information, this information is not necessarily in a format that is readily usable nor in any way prioritized to facilitate its use. While powerful software and systems, such as enterprise resource planning (ERP), customer relationship management (CRM) and supply chain management (SCM), do allow for advanced data processing and analysis to be performed almost instantaneously, the output of any data analysis – be it employee demographics, market forecasting or manufacturing throughput – must be understood and acted upon with urgency in today's competitive and uncertain environment. In short, employees' knowledge has become paramount to organizational performance.

Performance under rapid change and uncertainty requires workers armed with knowledge that goes beyond the explicit information contained in manuals and databases. There is an increasing need to tap into the experience, intuition and social networks of employees. More than ever, critical knowledge is about pattern recognition, social norms and relationships, which can be difficult to learn due to their tacit nature. The social context of knowledge is often overlooked, yet employees spend a tremendous amount of time navigating complex social interactions.

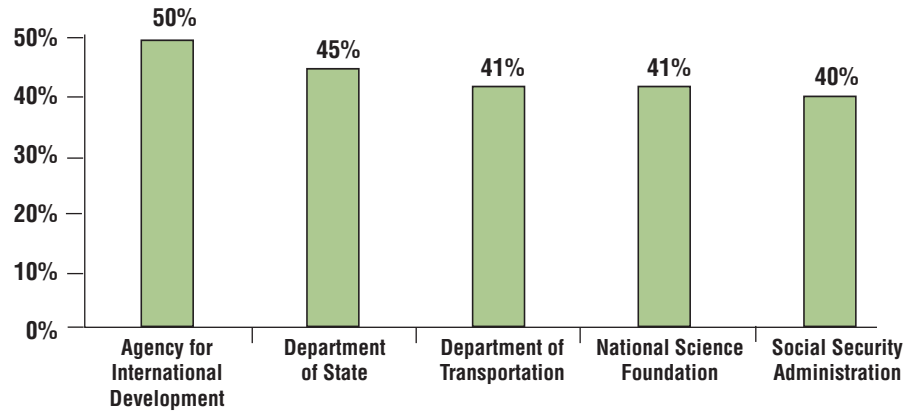
Where this matters most

The knowledge preservation problem strikes at the heart of firms across a wide variety of industries. For example, in the government and the petroleum industries, the average age of key employees continues to rise, forcing organizations to consider ways of retaining critical experiences and insights from potential retirees.

Government

A U.S. General Accounting Office (GAO) report released in April 2001 highlighted the workforce crisis facing many federal departments. The study estimated that rates for retirement eligibility across almost all federal agencies were in the range of 24 percent to 50 percent from 1999 through the end of fiscal year 2006 for those employees working in fiscal year 1998.[4] Figure 2 shows retirement eligibility for those federal agencies expected to be hardest hit as the baby boomers retire.

Figure 2. Percentage of each federal agency's fiscal year 1998 workforce eligible to retire as of the end of fiscal year 2006.



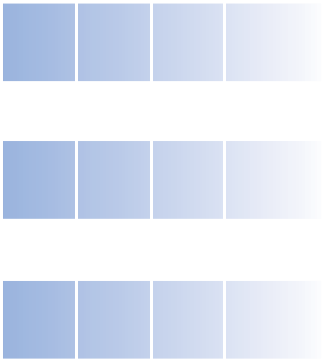
Source: Adapted from "Federal Employee Retirements" (GAO-01-509), April 2001.

An estimated three-fourths of the agencies included in the study are expected to experience a rate of 30 percent or higher retirement eligibility through 2006.[5] Due to a variety of factors, including the stock market downturn and economic recession delivering a blow to employees' retirement funds, the actual retirement rate has been lower than expected over the past two years.[6] However, lower-than-expected retirements are only serving to prolong the inevitable. Compounding these statistics is the recent trend toward privatization, which studies suggest may provoke additional flight from federal jobs.[7] The following quote from the report captures the challenge succinctly:

> The overall annual retirement rate that we estimate – about two percent per year – does not appear overwhelming, but it represents a major workforce planning challenge…Some agencies have experienced personnel-related problems since [the downsizings of the Federal Workforce Restructuring Act from 1994 through 1998], such as the loss of institutional knowledge, increased work backlogs, and skill imbalances, which affected their ability to carry out their missions.[8]

Oil and gas

Similarly, the oil and gas industry has also been wrestling with retirements, compounded by difficulties in recruiting new employees. In December 2001, one oil and gas industry publication reported that by 2010, approximately 60 percent of experienced managers would retire from their positions, even if their employers enacted "golden handcuff" enticements to retain one out of every five.[9] This projection is consistent with the fact that the average age of oil industry employees is on the rise. The average age of the members in the American Association of Petroleum Geologists, for example, was 49 in 2001, up from 41 in 1981.[10] Making matters worse, the long and discouraging period of industry downsizing that occurred in the 1990s has resulted in a shortage of petroleum engineers and geologists, whose skills are critical to successful drilling efforts, in the recent industry upswing. The statistics are startling. At two top schools for oil industry engineers and scientists, the Colorado School of Mines and Texas A&M, students graduating with a bachelor's degree in petroleum engineering dropped 67 percent between 1986 and 2001 and 81 percent between 1982 and 2001, respectively.[11]



Even the largest and most successful companies in the world are not immune to the challenges of preserving knowledge. In his book, *Business @ the Speed of Thought*, Microsoft Chairman Bill Gates recounts a story about an electrician who had previously done work through an outside vendor. At a time when the company was embarking on a major phase of construction, this electrician was "the only person in the world who had all of the plans for all of our buildings…"[12] Gates goes on to comment:

> Here we were, the largest developer of office space in the Seattle area, embarking on a period of construction in which we would put up between 500,000 and 1,000,000 square feet of new office space per year, and our entire "knowledge base" of crucial knowledge was being carried around in the heads of just a few people and in a few stacks of blueprints we didn't even have on file.[13]

Strategies for stemming knowledge loss

While many companies and government agencies have not yet tried to stem the erosion of their knowledge base, several leading organizations have begun to confront their knowledge preservation problems. To stem the loss of knowledge, these organizations have used a variety of knowledge elicitation and exchange techniques, a number of which are described below.

Knowledge elicitation

We refer to one set of methods that organizations have used to preserve organizational memory as knowledge elicitation. Knowledge elicitation techniques focus on working with individuals to take their tacit knowledge (knowledge that is maintained in the memory of an individual or group) and transform it into a more explicit and tangible format. Formats can range from simple written documents to multimedia formats that combine audio and visual recordings searchable via natural language queries. In any case, the primary objective of knowledge elicitation is to increase both the visibility and retention of an individual's knowledge by preserving it in some form of repository. Knowledge elicitation techniques include:

- Expert systems
- Subject matter expert interviews
- After-action reviews
- Knowledge mapping.

While the pros and cons of the various techniques are discussed later in this paper, below are real-world examples of how a few of these techniques are being put into practice.

Expert systems at De Beers diamond mines

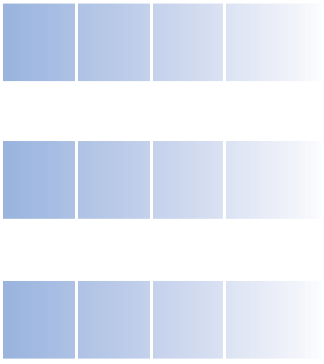
For the past two and a half years, De Beers research division, DebTech, has used expert systems to reduce downtime for its diamond sorting machinery. DebTech chose ClickFix, a Web-based diagnostic and predictive maintenance tool provided by ClickService Software, Inc. The tool relies on a combination of model-based reasoning and case-based reasoning techniques to help reduce downtime due to erroneous and belated machinery fault diagnoses, incomplete fault registers and missing machine part specifications. By entering fault symptoms into ClickFix, mining machinery technicians get assistance in identifying potential fault causes, access to recommended tests and suggested actions, and information regarding replacement parts. [14,15]

Putting ClickFix into practice initially involved identifying and interviewing expert machine technicians, and building their diagnostic expertise into the database. The expert system database is updated continually as it is used in the field.[16,17] According to a lead Control and Instrumentation engineer at DebTech, these efforts are part of De Beer's strategy of "capturing and retaining technology know-how within the company and improving maintenance through diagnostic capabilities."[18]

DebTech did have to overcome a few challenges in the knowledge elicitation and implementation phases of this initiative. In the knowledge elicitation phase, the DebTech team had to resolve contradicting expert opinions on diagnostic processes. During implementation, they also had to modify diagnostic procedures discovered to be unfeasible in practice as well as persuade technicians to make use of the expert system. Thanks to their knowledge preservation intervention, however, executives say that fault resolution times have been cut by as much as 50 percent.[19]

Subject matter expert interviews at Sandia National Laboratories

Sandia National Laboratories' approach to knowledge elicitation was to conduct videotaped interviews to capture the extensive weapons design and testing experience of their aging and retired nuclear weapons designers. At Sandia, executives saw the need to help current and future generations of weapons scientists better understand how to work with weapons and solve problems the



way their predecessors did.[20,21] In the words of Keith Johnstone, co-lead of Sandia's Knowledge Preservation Project:

> What we're doing is trying to capture their ideas, but more than that, their psyches, to try to learn not just what they did, but why they did things the way they did; to find out what worked, what didn't work, what might have worked had the supporting technology been more advanced…[22]

By the end of 2001, Sandia had conducted interviews with approximately 120 retirees, capturing over 2,000 hours of video in two-hour segments. Using Convera's Screening Room software, Sandia is able to digitize and store their video archives, as well as provide online, indexed access to users looking to isolate specific information relevant to their work.[23,24]

Subject matter expert interviews at World Bank

The World Bank also has used extensive interviewing, through storytelling, as a tool for capturing field knowledge. To retain valuable experiences, share lessons learned, expand the Bank's knowledge base, and improve product and service quality, the World Bank captures videos and audiotapes of selected individuals and groups involved in challenging projects, with a focus on uncovering what the Bank does not know. This knowledge retention initiative differs from Sandia National Laboratories' in that the World Bank relies heavily on internal subject matter experts to conduct interviews, as well as screen and edit the videos and audiotapes. Interviewees are encouraged to focus on telling stories rather than providing general observations, so the material will be interesting for the intended audiences. At an average cost of $5,000 per session, more than two dozen videotaped interviews were conducted in 2001.

In concert with its well-conceived elicitation technique, the World Bank's knowledge dissemination process also is key to its success. Both audio and videotaped interviews are posted to a Web site and burned onto CD-ROMs, with any documents referred to during the interview appearing as hot links in the final text. The Bank also pushes these debriefings to targeted distribution lists rather than simply passively posting them on a site. Finally, where possible, they also make interviewees available for follow-up and mentoring.[25]

Knowledge exchange

While the knowledge elicitation techniques described above focus on transforming tacit knowledge into explicit knowledge, knowledge exchange efforts focus on helping individuals make connections with subject matter experts. Knowledge exchange projects are designed to bring together knowledge seekers

and knowledge sources in a way that they can interact with one another and more effectively share tacit knowledge. These types of initiatives stem the loss of organizational knowledge by creating conditions where individuals can discuss experiences, engage in complex problem solving and, in some cases, observe actual work activities. While mechanisms for capturing knowledge may be used as part of a knowledge exchange effort (such as maintaining a repository to support a community of practice), the effort focuses on connecting individuals rather than on collecting materials. Knowledge exchange techniques include:

- Orientation
- Training
- Communities of practice
- Expertise location
- Mentoring/peer assist
- Alternative work arrangements.

A few examples of how leading organizations are implementing knowledge exchange initiatives follow.

Orientation and mentoring at Siemens AG
Siemens AG has recognized that critical knowledge gets exchanged during the first several weeks of a new employee's job. To help ensure that new employees are appropriately mentored during the startup of a new job, Siemens' methodology calls for several key steps. First, Siemens conducts yearly dialogues with staff to identify individuals who would like to move to other positions. Next, they develop job profiles of departing employees and managers to capture key roles and responsibilities, and use these job profiles to select successors. The exchange consists of a "4 x 6" integration process, where new employees have four defined points for being integrated into their new jobs:

- *First six hours* – Initial job orientation
- *First six days* – Thorough discussion between the new employee and the manager to develop a mutual agreement for integration into the new job, based on information outlined in the job profile
- *First six weeks* – Close working relationship between the new and departing employees
- *After six months* – Feedback session between the new employee and the manager to discuss the results of the integration.[26]

Training at Los Alamos Nuclear Laboratory

Los Alamos Nuclear Laboratory uses training to preserve and share the tacit knowledge associated with the development of nuclear weapons that its senior scientists hold. Since much of the early design and development of nuclear weapons was carried out through a combination of scientist intuition and trial and error, and since there has been a ban on the testing of nuclear weapons since 1992, decades of experiential knowledge are at risk of being lost as scientists with hands-on experience in both designing and testing nuclear weaponry transition into retirement.[27,28]

To stem this significant loss, Los Alamos created the Theoretical Institute for Thermonuclear and Nuclear Studies (Titans) program. The Titans program selects a dozen candidates every other year to spend three years training to become nuclear weapons designers. All participants hold a Ph.D. in physics or a related subject as well as a high-level security clearance. Los Alamos hires back retired scientists to create training content and teach classes for its Titans program, which has a strong focus on experiential, often undocumented knowledge of weapons testing. Perhaps the program can be best summed up by a quote from one of the program's students, Charles Nakhleh:

> One of the major benefits, especially the lecture portion, is that it provides an easily accessible forum for digesting large amounts of information efficiently…rather than finding out each of those bits one by one from someone in the hallway.[29]

Expertise location and communities of practice at Northrop Grumman

Northrop Grumman serves as another noteworthy example of using knowledge exchange techniques to preserve knowledge and improve employee productivity. In its Air Combat Systems division, where an aging and rapidly declining workforce has placed critical knowledge assets associated with many of the weapons programs at risk, Northrop Grumman has undertaken a series of knowledge preservation initiatives.

Initially, Northrop Grumman's efforts focused on creating an expertise location management system for employees in its B-2 Stealth bomber program. The expertise location database (Xref – shorthand for cross-reference) was organized into approximately 100 "knowledge cells" (e.g., software engineering, armaments), searchable by name, skill and program affiliation, among other criteria. A knowledge management team identified 200 subject matter experts, many of them engineers with two decades worth of expertise. The Xref database enabled employees to access these subject matter experts and their knowledge more easily.[30]

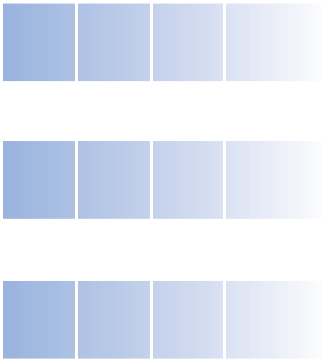
In 1999, when a reorganization threatened to reduce the Air Combat Systems' workforce by 25 percent, the company initiated an organizational knowledge audit to assess the need for, and identify barriers to, a new initiative aimed at improving knowledge sharing among current and future employees. Armed with compelling statistics regarding need and potential benefits, knowledge management executives were able to gain sponsorship from key senior executives for a series of knowledge exchange initiatives, including the launch of several Web-based communities of practice.[31,32] Usage of these communities of practice has been explicitly built into employees' workflow, with a focus on tracking issues and sharing lessons learned. For example, engineers working on the F/A-18 fighter jet program now are able to reuse design expertise and tap into lessons learned by engineers from across Air Combat Systems. According to Northrop Grumman's Review Magazine, through these efforts:

> Significant pieces of design expertise are available to the entire integrated product team, so that when one engineer departs for another assignment, part of that engineer's F/A-18 knowledge remains to assist new people. New engineers can use the Web site to supplement their technical knowledge with lessons that only real-world, front-line experience can teach about the Hornet and Super Hornet.[33]

With different techniques come different trade-offs

The knowledge elicitation and exchange techniques described above have both strengths and challenges associated with them, so organizations need to understand the trade-offs before planning their specific knowledge preservation initiative.

For example, *subject matter expert interviews*, a knowledge elicitation technique, allow organizations to capture actual words and thoughts of the experts. When executed effectively, such as those done at the World Bank and Sandia National Laboratories, interviews can trigger events and tacit knowledge that might not otherwise be brought to the forefront. Furthermore, interview transcripts can easily be linked to documents and other knowledge artifacts to reinforce and expand learning. However, since interviews often are conducted outside the context of performing a job, some of the message can be lost. In addition, bandwidth and search limitations can prevent effective dissemination of interviews.



Another knowledge elicitation technique, the *after-action review*, provides insights that are closely linked to a particular project or event. Since most after-action reviews involve facilitated group sessions, multiple perspectives can help ensure that many relevant points of view are addressed. However, this requires the time of many participants and needs to be conducted soon after the actual event to maximize accuracy. As with subject matter expert interviews, it also can be challenging to ensure that the context remains closely linked to the content of the session, such that individuals using the information in the future do not misconstrue the lessons learned.

A common knowledge exchange technique, *mentoring*, focuses on building close relationships that can lead to sharing valuable tacit knowledge. This technique provides an opportunity for both the mentor and the individual being mentored to receive recognition for their participation. One major trade-off associated with mentoring is that it can be very time and labor intensive, requiring active and ongoing participation of both the subject matter expert and the newcomer. Furthermore, given geographic constraints, time pressures and personality differences, it can sometimes be difficult to force and formalize these types of relationships.

Another proven method, *communities of practice, brings together individuals who are likely to have the common context to effectively* preserve organizational memory. This technique provides group validation of knowledge through the vetting and evaluation of materials. Participation in communities is closely aligned with the actual work of community members, so the knowledge exchanged is likely to be timely and highly relevant to their immediate knowledge needs. Because participation is often voluntary, however, it may take longer to diffuse knowledge to a wide audience. In addition, this technique may require relatively heavy investment in enabling roles and technologies.

Figure 3 summarizes the strengths and limitations of a number of commonly used knowledge preservation techniques.

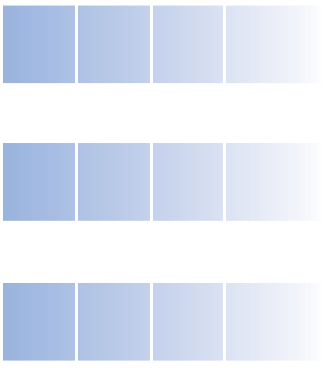


Figure 3. Evaluating the strengths and limitations of select knowledge preservation techniques.

Knowledge elicitation		
Technique	**Strengths**	**Limitations**
Subject matter expert interviews	• Capture actual words and thoughts of the experts • Effective interviews can trigger events and tacit knowledge experiences that might not otherwise become visible • Can be linked to documents and other knowledge artifacts	• Bandwidth and search limitations can prevent effective dissemination • Interviews are taken outside context of performing job
After-action reviews	• Insights are closely linked to a particular project or event • Multiple perspectives can ensure that relevant points of view are addressed	• Requires time of multiple participants • Needs to be conducted soon after the actual event to maximize accuracy • Difficult to ensure that context remains closely linked to the content of the session for individuals using the information in the future
Expert systems	• Knowledge can be built into specific workflow without the need to actually access the original owner • Enables large volumes of transactions to access the knowledge	• Applicable only to limited knowledge domains where the knowledge needed can be broken down into a series of decision rules • Developing systems can be a time- and resource-intensive process
Knowledge mapping	• Increases the visibility of knowledge • Can be used to more easily visualize linkages between knowledge and process	• Maps can become quickly out-of-date as knowledge requirements change • Difficult to determine the exact level of detail that is beneficial to the end user
Knowledge exchange		
Technique	**Strengths**	**Limitations**
Expertise location	• Recognizes the constantly changing nature of and different viewpoints on what is "useful" knowledge • Can catalyze collaboration across functional and geographical boundaries	• Requires participation of subject matter experts who may not want to connect with newcomers • Investment required to support enabling roles and technologies
Mentoring	• Focuses on building close relationships that can lead to strong tacit knowledge exchange • Can provide two-way recognition for participants	• Can be very time- and labor-intensive • Requires active participation of subject matter expert and newcomer • Difficult to formalize relationships
Communities of practice	• Brings together individuals who are most likely to have the common context to effectively preserve organizational memory • Helps ensure group validation of knowledge and the vetting and evaluation of materials • Closely aligned with actual work	• Requires participation of subject matter experts who may not want to connect with newcomers • May take longer to diffuse knowledge because of voluntary participation • Investment required to support enabling roles and technologies
Alternative work arrangements	• Ensures a gradual transition that can enable greater tacit knowledge exchange over a longer period of time • Provides senior employees with opportunities to continue to work and contribute	• Difficult to determine eligibility requirements for different types of work • Requires significant advanced workforce and succession planning
Training	• Allows for a one-to-many exchange of both explicit and tacit knowledge • Maintains a permanent record of institutional knowledge	• Subject matter experts may vary greatly in their ability to communicate to a larger audience • Can be costly to develop materials for small audiences • Training materials can be quickly outdated if not appropriately maintained • Training may be disconnected from actual work practice
Orientation	• Facilitates knowledge transfer at an important transition point • Gives the newcomer an opportunity to discuss challenges and exchange tacit knowledge with existing incumbent	• Requires that an overlap period be built into the job changeover process • Requires that the incumbent have motivation to transfer job knowledge to the newcomer • Newcomer may not have appropriate context to understand "what they don't know"

Source: IBM Knowledge and Organizational Performance Forum 2003.

Four steps to getting started

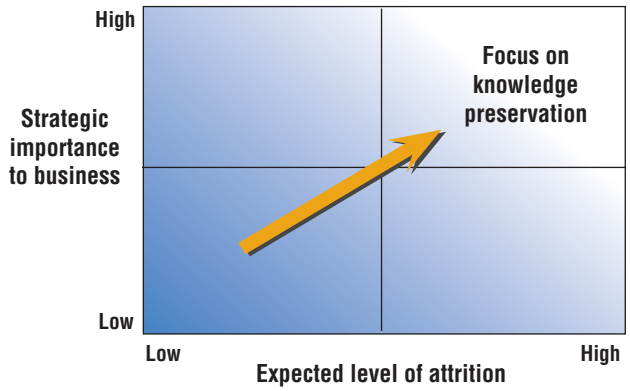
Like other knowledge management projects, knowledge preservation efforts need to be carefully planned and managed. While not meant to provide a comprehensive method for planning knowledge retention initiatives, the following steps are useful for setting organizations on the path to designing and executing a successful knowledge preservation strategy. This approach can help organizations:

- Prioritize positions where knowledge needs to be preserved
- Identify critical "at risk" knowledge for each position
- Prioritize techniques for preserving knowledge
- Build a plan for action for each potential initiative.

Prioritizing positions where knowledge needs to be preserved

Given the time and effort it takes to preserve knowledge, organizations first need to prioritize individual positions and groups where intervention is critical. This discussion should involve a cross-functional team of executives who have a solid understanding of overall business objectives and marketplace needs, as well as some understanding of employee demographics. Intervention will be critical for those positions where the knowledge held is of high strategic importance and where the expected level of attrition is elevated. Figure 4 provides a simple framework for understanding where knowledge preservation efforts should be focused.

Figure 4. Focusing knowledge preservation initiatives.



Source: IBM Knowledge and Organizational Performance Forum 2003.

To prioritize knowledge preservation efforts, first it is important to identify key individuals, groups or positions that hold knowledge of high strategic importance. One common gauge of importance is that this person or group's absence from the workplace is quickly noticed. More specific considerations that make a person, group or position valuable include:

- Understanding mission-critical procedures and methods
- Holding expert knowledge of key tools, equipment and artifacts
- Possessing important relationships with customers, suppliers and alliance partners
- Serving as a "connector" within the organization – actively facilitating the exchange of critical knowledge with supervisors and peers
- Having experience with local conditions in a critical geography.

Next, organizations must examine the extent to which this critical knowledge is at risk. Common reasons why organizations face losing knowledge assets include:

- The labor market is competitive
- There is a limited talent pool for this position/skill
- An employee's stock options or pension benefits have recently vested
- An employee with important or "one-of-a-kind" expertise is reaching retirement age
- An employee is taking part in an internal job rotation program
- There is high turnover for a particular position
- The company is considering outsourcing or divesting a part of the business.

It is useful to gather and analyze employee demographic and market statistics related to the above topics (e.g., years to retirement eligibility, turnover) prior to this discussion.

Identifying critical "at risk" knowledge for each position

Now that the organization has identified the positions, people and groups on which to focus knowledge retention efforts, the next step is to hone in on the specific types of critical knowledge these individuals possess. For this step, a simple brainstorming exercise, ideally involving the practitioner(s) himself, should suffice. Figure 5 provides a sample brainstorming framework, complete with illustrative examples. This framework identifies two types of critical knowledge:

- Explicit knowledge – Knowledge that can be found in official organizational operating manuals, databases and documents
- Tacit knowledge – Knowledge that has a personal quality and is comprised of "rules of thumb," intuition, relationships, values and opinions.

To assist executives in understanding whether or not a particular piece of knowledge is critical, it is useful to think about what would happen to the organization's ability to meet corporate objectives if this knowledge was taken away.

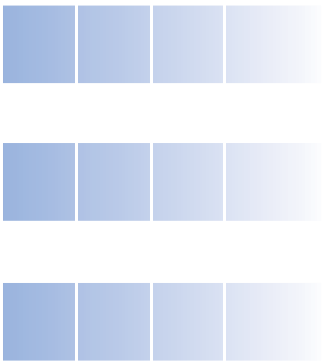
Figure 5. Identifying critical knowledge.

Person/group	Role	Explicit	Tacit
John Smith	Professional development manager	• Ability to perform all tasks related to performance evaluations, career development/management, payroll, expanses etc..	• Relationships with other administrators built up over 30 years • Tricks for navigating and 'getting around the system" related to performance evaluation, payroll and expense reporting processes and technologies
Jane Cook	Managing partner, strategic consulting practice	• Knowledge of strategic frameworks • Knowledge of financial modeling techniques	• 15 years of consumer packaged goods (CPG) industry experience • Relationships with senior executives at several important CPG clients • Extensive professional contacts • Expert ability to apply strategic frameworks and financial modeling techniques • Expert ability to close difficult deals • Knowledge of how to find the right people to staff projects • Ability to quickly access research sources

Source: IBM Knowledge and Organizational Performance Forum 2003.

Selecting techniques for preserving knowledge

As the case examples provided in the previous section suggest, there are many viable techniques for preserving knowledge. Furthermore, many successful efforts will combine a variety of techniques to help ensure both effective capture and reuse of the knowledge to be retained. Since organizations are often forced to reactively (as opposed to proactively) combat their knowledge preservation problems, selecting the best technique for the problem at hand is not always possible. In fact, little research has been done on which techniques are most appropriate and effective under which circumstances. Research at the Knowledge and Organizational Performance Forum provides some insights to help organizations make informed choices.



As with any new initiative, it is important first to understand what existing capabilities and infrastructure can be leveraged to achieve success and save effort and cost. Most organizations are more prepared to launch knowledge preservation initiatives than they might think, and choosing projects which wisely leverage current capabilities and infrastructure will improve the likelihood of buy-in from key stakeholders. Along with an examination of the strengths and weaknesses of various knowledge elicitation and exchange techniques, as described in the trade-offs section above, a simple analysis can help organizations decide which techniques will best leverage existing infrastructure and programs in place to elicit, store and disseminate knowledge. Figure 6 shows sample initiatives and programs many organizations have in place to help prioritize knowledge preservation initiatives.

Figure 6. Leveraging existing resources.

Category	Example initiatives/activities
IT systems/software	• Expertise location management software • Document/content management software • Learning management software
Formal HR programs	• Mentoring • Training • Job shadowing • Succession planning
Formal KM initiatives	• Communities of practice • Social network analysis • Knowledge mapping
Workflow analysis	• Process mapping

Source: IBM Knowledge and Organizational Performance Forum 2003.

While leveraging existing resources and capabilities should be considered, selecting the right approach will depend on several additional factors. These include:

- The reason for which knowledge assets are at risk (e.g., an employee's stock options or pension benefits have recently vested)
- The time horizon in which the organization must plan the knowledge preservation initiative (i.e., how proactive vs. reactive is the planning process)
- The extent to which the knowledge to be preserved is tacit (vs. explicit) and, therefore, difficult to capture
- The geographic dispersion between the expert(s) and the audience(s) of the knowledge preservation initiative.

Building a plan for action

The final step in our "getting started" approach is to build a plan for action. This step draws heavily on analysis done in the previous three steps, but includes some additional work that will help organizations generate a well-orchestrated call to action. While an in-depth business case may be required in some situations to gain full sponsorship and sufficient resources, talking with the right people, crafting a compelling statement of need, and answering some key questions will help your organization start on the right path. Our action plan for each knowledge retention initiative includes the following components:

- Develop a comprehensive stakeholder analysis
- Develop a detailed statement of organizational need
- Examine "the cost of doing nothing"
- Understand success metrics
- Create a plan to resolve potential barriers.

For each knowledge preservation initiative chosen, a comprehensive stakeholder analysis will be critical, and a broad coalition of project champions should be built. Project champions can help by providing funding and other resources, as well as by providing linkages to other sources of support. In addition, a diverse group of champions can provide access to cross-functional input and targeted expertise. Finally, this group can improve visibility of the knowledge preservation effort throughout the organization, thus increasing excitement and the likelihood that success will be replicated elsewhere. By performing a simple stakeholder analysis, an organization can begin to assemble this group of project sponsors. Therefore, for each key stakeholder identified:

- Assess the current level of the stakeholder's support for the proposed initiative
- Understand the stakeholder's related interest areas (i.e., why this person would be interested in the knowledge preservation project)
- List the stakeholder's potential concerns (i.e., what objections this person could have to the proposed initiative)
- Assign an appropriate relationship owner.

A simple spreadsheet, such as that shown in Figure 7, can be used to conduct a stakeholder analysis.

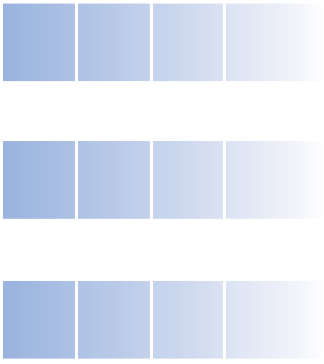


Figure 7. Sample stakeholder analysis.

Stakeholder	Current level of support	Related interest areas	Potential concerns	Relationship owner
Joseph Smith	Low	• Leads technology strategy	• Supporting technology investment may not fit with 2003 technology spending priorities	Jim
Mary Jones	High	• Leads mentoring initiative • Instrumental in succession planning initiative	• May perceive this as duplicating or replacing initiatives already underway	Kristin
Fred Brown	Medium	• Manages large product line • Participated in 2002 process mapping exercise	• Time • Relatively new to the organization	Laura

Source: IBM Knowledge and Organizational Performance Forum 2003.

The next step in building a plan for action involves a more robust assessment of organizational need. While a framework for identifying "at risk" knowledge was provided above, it is important to be able to answer the question: What is the greatest source of pain related to knowledge retention within your organization? Conducting interviews with key stakeholders and compiling demographic statistics to further identify hot issues will bolster your case.

The next component of the knowledge preservation initiative action plan is to perform an analysis of the "cost of doing nothing." Perhaps the most evocative way to call people to action is to tell a "war story" that demonstrates what has happened due to lack of attention to your organization's knowledge retention problem. If you are having trouble gathering "war stories" from within your own organization, try researching similar organizations. Where possible, it is useful to show a negative financial and/or productivity impact. Leveraging the demographic data you have collected, it may also be possible to analyze the financial and productivity impact on targeted areas within your organization.

Fourth, organizations must determine measures of success. Initially, this can be in the form of a success story that demonstrates the value of enacting knowledge preservation initiatives. As with the "war stories," described above, it is important to show a measurable positive financial and/or productivity impact. Here too, you can perform a more robust analysis on how your efforts can have an impact on specific areas within your organization, using meaningful metrics for potential sponsors and other key executives.

Finally, organizations must address any potential barriers. To start, it is helpful to brainstorm the top three potential barriers to success of the knowledge preservation initiative. A constructive way to begin to resolve potential barriers is to establish cross-functional working groups. By involving key stakeholders at this critical stage, you also will further strengthen their commitment to the initiative.

Conclusion

As the opening vignette and examples have shown, most organizations face a serious threat of losing critical knowledge assets by not capturing them and sharing them before their employees leave. This threat is now particularly acute since, to a great extent, productivity and performance in today's organizations are linked to the effective leveraging of organizational knowledge. Making matters more complex, much organizational knowledge lives in a tacit – difficult to capture and convey – format. Organizations will find themselves at a distinct disadvantage if they cannot recognize the importance of their "at risk" knowledge, take stock of the extent of their potential knowledge loss, and respond proactively with initiatives that not only preserve their critical knowledge assets but also improve organizational knowledge sharing.

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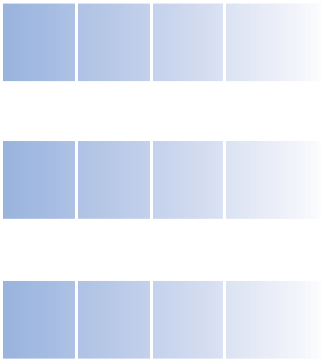

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