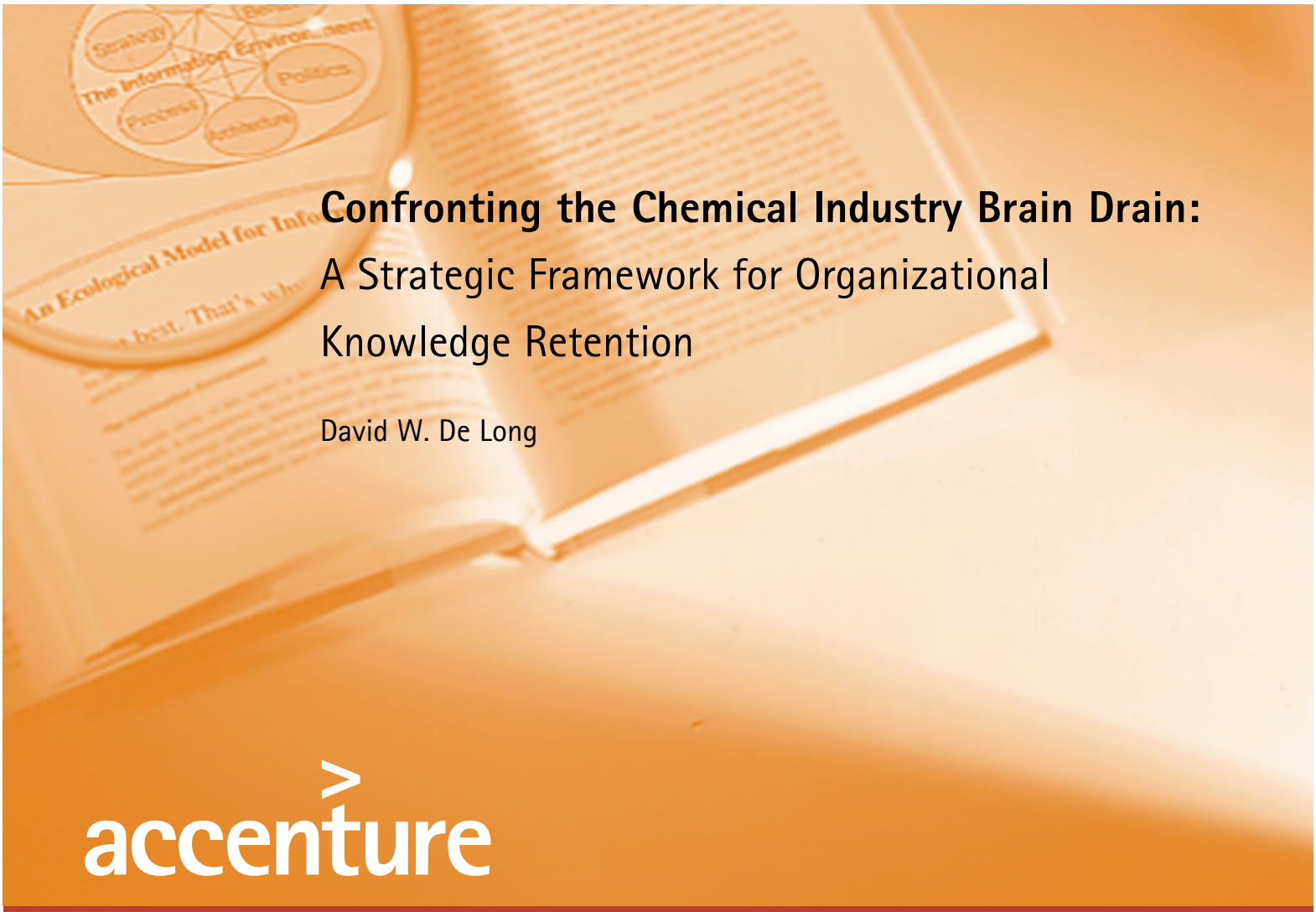

Confronting the Chemical Industry Brain Drain:

A Strategic Framework for Organizational Knowledge Retention

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This report describes how global chemical companies are responding to changes in their workforce demographics caused by downsizing, an aging workforce, and a shrinking talent pool. It also identifies the organizational barriers to effectively capturing knowledge from its aging workforce and presents a framework for creating an effective long-term knowledge retention strategy. This study is based on interviews with 75 chemical company executives, managers, and industry experts in 26 companies in the US, Europe, and Japan.

Executives in many global chemical companies today recognize that their firms face a wave of retirements from the ranks of R&D, engineering, and manufacturing professionals in the next decade. The exodus of technical specialists, research scientists, engineers, plant managers, and first-line supervisors represents a major loss of expertise and experience that is likely to impact company performance. And, according to a study by the Accenture Institute for Strategic Change, retirements are just part of the problem reflected in these changing workforce demographics. At the other end of the talent pipeline, a younger cohort of engineers, research scientists, and plant operators are joining up with a different set of values and expectations, which creates new recruiting and employee retention issues. Indeed, the evolution from an older, traditional, highly-experienced workforce to a younger, more mobile employee base poses major challenges for chemical company leaders, particularly when set in the context of ongoing pressures to cut costs in this increasingly consolidated and technology-driven industry.

Both recruiting and employee retention issues are pretty well understood, however, and although not easily solved, chemical company executives seem to have a good idea of what they need to do. But according to our research, the problem that remains enigmatic for most chemical firms is how to create an environment that supports capturing and sharing the experiential or tacit knowledge of its aging workforce. Interviews with dozens of chemical company executives in the US, Europe, and Japan reveal that few firms have developed a coordinated response to this problem—in part because they lack a framework for addressing it. Leaders also don't necessarily recognize the barriers that are conspiring to undermine action on organizational knowledge retention, which is a demographic time bomb for some companies.

This report has three objectives:

(1) to describe how global chemical companies are responding to changes in their workforce demographics caused by downsizing, an aging workforce, and a shrinking talent pool;

(2) to identify the organizational barriers to effectively capturing knowledge from its aging workforce; and

(3) to present a framework for creating an effective long-term knowledge retention strategy.

Exhibit 1: About Our Research

This exploratory study was designed to identify what business problems global chemical companies are experiencing as a result of changing workforce demographics. Our research team at the Accenture Institute for Strategic Change interviewed more than 75 chemical company executives, managers, and industry experts in 26 companies. The companies where we conducted interviews are listed below. Because this problem has broad implications for many parts of the organization, we sought out people in a variety of roles, including: VP of engineering and manufacturing, R&D general manager, R&D planning manager, research lab director, VP of HR, manager of recruiting & retention, and manager of global HR processes.

- Air Products and Chemicals
- Akzo Nobel
- Asahi Chemical
- BP
- Buckman Laboratories
- ChevronTexaco
- Dainippon Ink and Chemicals
- DuPont
- ExxonMobil Chemical
- Kyowa Hakko Kogyo
- Huntsman
- Lyondell Chemical
- Mitsubishi Chemical
- Mitsui Chemicals
- Monsanto
- Nippon Sanso
- Nippon Paint
- Quaker Chemical Corp.
- Quest International
- Shell Chemicals
- Showa Denko
- Sumitomo Chemical
- Teijin
- Toray Industries
- Tosoh
- Ube Industries

Retirement Trends in the Chemical Industry

The vast majority of US and European chemical companies are concerned about problems posed by their aging workforce. Estimates that 50% of employees will become retirement eligible in a particular function in the next decade are not uncommon in the US and European firms we spoke with. Here are some examples:

"Within the next five years, at least 50% of our engineers across the company will be retirement eligible. This function is made up of predominantly white men in their 50s."

– HR leader, diversified US chemical company

"We've already lost 10-20% of our senior scientists in the last three to four years. And we stand to lose another 10-15% in the next five years. A lot of these people are back now on a consulting basis."

– Petrochemical company executive

"About 35% of our employees are in their fifties and will retire in the next ten years...There's an overwhelming number of people in their fifties (45%) in our production areas."

– Personnel manager, diversified Japanese-based chemical company

"In our process engineering group, more than 50% of the engineers are new to the company in the last three years because our experience has been walking out the door."

– Manager for recruiting & retention, diversified chemical company

"We expect a 16% retirement rate over the next five years."

– Global recruitment and HR planning manager, European-based petrochemical company

Of course, not every firm is looking at such dramatic losses. And executives recognize that a modest level of turnover is good for every organization, presenting promotion opportunities for younger employees and a chance to bring in fresh ideas. Still, for most chemical companies the impacts of an aging workforce is a serious concern, and the problem is complicated by its patchwork quality. "The average age in some plants is rising a lot and in others it's dropping," said one Shell Chemicals manager. "It depends on where you are in the cycle. It also depends on when units came up and when you laid people off. We've got one plant where the average age is quite young and in others it's the opposite." In reality, retirement rates within one company can vary significantly by function, business unit, and geographic location.

Regardless of which units are hurt, however, the average age and level of work experience in many chemical companies—and other industries, as well—is going to drop significantly in the next decade. "We could lose as much as 50% of our total population in the next five to ten years, where the average employee has twenty-five years of experience," said the senior executive of one major oil company. "And, even if we can hire replacements, in ten years our average work experience will drop considerably and that probably has an impact on our NPV."

Implications of Changing Workforce Demographics

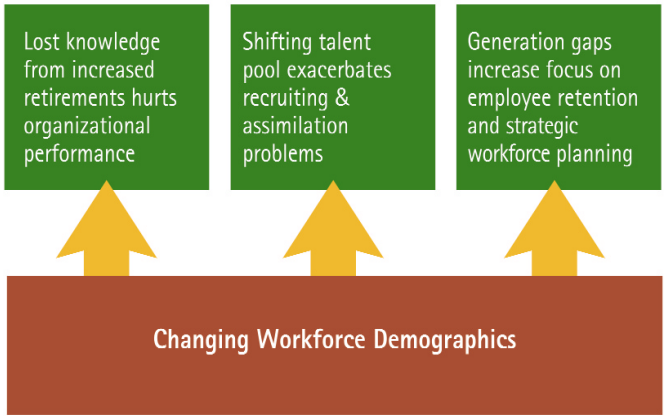
Our study shows that changing workforce demographics are of concern to chemical company leaders for three reasons (see Exhibit 2):

I. Increased Retirements Cause Lost Knowledge, Which Effects Organizational Performance

Losing expertise and experience from key managers and professionals can decrease innovation, increase costly errors, reduce efficiency, and undermine growth strategies.[1]

For example, losing critical knowledge, particularly in R&D, can slow down and reduce the quality of

Exhibit 2: Effects Of Changing Demographics



innovation, which is central to many firm's business strategies today. "You just can't be as innovative with only young Ph.D.s. The experience really matters," said Henk Bonouvrié, HR manager for the Chemicals R&D Institute at Akzo Nobel.

And no one likes to talk about it, but having less experienced people working in increasingly sophisticated computer-controlled manufacturing operations increases the risks of serious and costly mistakes. The investigation into an explosion in one US chemical plant last year found that the engineer in charge had only been out of college a year, and the operators in the control room at the time of the accident all had less than a year of experience in the unit. Not surprisingly, the explosion was attributed to operator error. "We have so many people who are not familiar with our units, you have to wonder if we're not going to see more of this," confessed one executive. And even when errors are not caused by inexperience, diagnosing and fixing them often takes more time when veteran employees are no longer around to help.

Lost knowledge can also have another important impact in an industry focused on cost cutting and productivity improvements. "What you really lose through people leaving is efficiency—knowledge of how to get a job done faster and better. But, of course, that's hard to quantify," said William Litschgi, a retired research director at Monsanto, who had returned to work for his company as a per diem employee. Repeatedly in our interviews it was clear that management's main concern was the loss of experience and tacit knowledge that could affect the quality of decision making and organizational performance. Finally, chemical companies pursuing growth strategies that don't rely solely on acquisitions will find that losing knowledge through retirements and turnover can seriously reduce their ability to support expanded operations.

Savvy executives recognize that, given current retirement rates, if nothing is done to slow the loss of knowledge, some of their units could be headed for a point of no return in a few years. Because once a critical mass of human experience and expertise is gone in certain parts of the business, it will be extremely difficult to recover. "Most managers won't address this problem until there's a crisis," said a veteran research scientist. "But when that happens it will take years to straighten the situation out because you can't bring people in and get them experience overnight."

II. The Shifting Talent Pool Hurts Recruiting

Retirements have also become a major concern for chemical companies because recruiting younger workers is increasingly difficult, especially in Europe. Here are some examples of the recruiting challenges reported:

- "The problem we have is there are fewer people getting into the curriculum and we have greater requirements of the people we want. Our hit rate is 25-40% in the Netherlands, where in the past it was 80-90%."

- "Last year we needed twenty-five chemical engineers in one country. But of the total pool of graduates there who have the leadership capabilities, technical depth and knowledge, and the breadth of thinking to support global work, there are maybe eighty , and we got only three."

- "We've got a recruiting target out there, but we've fallen short by 25-30% for the last three years. If you have a position open and have an opportunity to fill it, usually it's been no problem to fill it. But now it's not a given we can hire."

According to the executives we talked to, chemical companies are having more trouble recruiting for a variety of reasons:

(1) The long-term orientation toward downsizing and cost cutting means many firms have been out of the hiring market and lack the more sophisticated recruiting networks and processes needed today.

(2) The industry has a serious image problem. Young people often see the chemical industry as environmentally unfriendly, and it suffers by comparison to other opportunities presented to young graduates. "We're trying to hire people that want to come work in a dull, boring, steel and mortar company, where they have no opportunity to be a millionaire by age thirty," lamented one executive.

(3) Chemical plants are often located in rural sites less attractive to young people.

(4) The increasingly diverse population of job candidates, primarily in the US, may be reluctant to join what have traditionally been homogeneous white male-dominated cultures.

(5) There is much more competition for top-rated engineering and science graduates who receive offers today from a wider variety of potential employers, such as investment banks, large consulting firms, and high technology companies.

(6) Finally, as chemical companies expand their global operations and develop increasingly complex computerized production processes, they need to hire more sophisticated and skilled employees. "Different than in the past, being a scientist is just not enough," said Akzo Nobel's Henk Bonouvrié. "We need researchers who are able to communicate, which also means being able to listen, to see through things, and get into the plants. They must be able to sell their ideas and relate to others."

Thus, increased retirements only exacerbate the new uncertainties present in this recruiting market. And, even when companies can attract promising new hires, considerable resources are required to assimilate them, and retirements have stretched those resources even thinner by removing potential mentors. "We're going to run into a bottleneck in the future because there is a limit to how many new people we can bring in," said one manager in a major petrochemical company. "We don't want to lower our standards in the quality of the people we hire, and we want to develop them into employees we can use long term. The question is how many people we can bring in and assimilate at once?"

Barry Leskin, GM for learning and development at Chevron Texaco, also recognizes the resource issue around assimilation, saying, "It's a struggle to sustain long term mentoring. We have wide spans of control. So when you bring two new people in where there are fourteen direct reports that's a potential productivity hit for the manager."

The irony is that getting new employees into the organization is a key to transferring knowledge from the older to the younger generation. "Problems of knowledge transfer can't be divorced from supply management. If there's nobody there to tell the story to the knowledge dies," says John Sumser, CEO of Interbiznet.com, a firm that monitors the electronic recruiting industry.

III. "Generation Gaps" Increase Focus on Employee Retention

The challenges posed by the aging workforce contribute to a third problem guaranteed to give any HR strategic planner nightmares. Some US and European managers we spoke with are very concerned about increased attrition among younger workers and experienced hires. The chemical industry has historically been blessed with very low rates of voluntary attrition among professionals and managers. This is still true in Japan, where people rarely leave organizations voluntarily before retirement. But in Western industrialized countries there is widespread recognition that Generation Xers (age 26-37) and Generation Y's (under age 25) have significantly different values than their Baby Boomer bosses (ages 38-56) and are much more impatient and willing to leave their companies for a better opportunity elsewhere.

"Generation Y is different," said one staffing director. "What we've got to understand is people want to come in to learn and grow. And the faster they do that the better. Today we hire students who took college classes in Six Sigma. The culture shift for us is we've got to challenge people more when they come in, and give them more opportunity to grow. They don't want to wait to apply their skill sets. They're ready. But our culture says: 'wait, you're turn will come.' So people leave to apply their skills somewhere else."

Another HR executive was more critical of some new hires, saying, "We have people who come in with a view of entitlement, that we should do everything we can to make sure their existence is as good as it can get. We find many young people have no idea what struggle is all about. Most have been successful in school and feel they should succeed equally well here. Many young people don't seem to understand that this is an environment of competition, not entitlement."

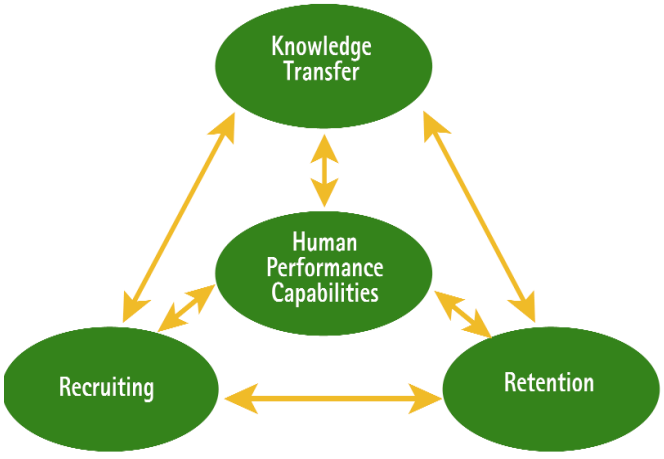
This values clash between older and younger workers has serious implications as global chemical companies try to expand business capabilities for the future. First, unless companies reconcile the differences, this values conflict will result in increased attrition among younger workers. Some chemical companies are already seeing this trend. Losing promising young employees is an even more serious problem when retirement rates are high because this attrition requires additional resources to find already scarce replacements. Thus, increased retirement rates put even greater pressure on companies to address the problem of turnover among Gen-X and Gen-Y employees. To accommodate the changing expectations of younger workers, some chemical companies are reexamining their cultures to see what must be changed to improve retention. "We need to be listening to the people we bring in," said one HR manager. "All of us need to start listening to those new voices."

Increased retirements also contribute to another retention-related issue that must concern functional and business unit leaders. The loss of veteran researchers, technical specialists, and engineers is leading to an increase in experienced hires. One major company has seen that number jump from 10 percent to 35 percent of its total new hires. Experienced professionals and managers, who have been socialized elsewhere, are more likely to challenge their new firm's cultures, to question the way things are done, and to leave if they don't like their new work environment. "The toughest thing for us is the integration of mid-career employees into our culture, which impacts retention," said one manager. "Historically, retention has not been an issue for us. But now we're seeing people we hire come for four or five years, build a tool kit, and then leave." The issue is how welcoming is a firm's culture to employees who join in mid-career. This will become a more serious concern in the future, as companies have to replace more and more retiring professionals with "outsiders."

Implications of Changing Workforce Demographics

The Accenture study found that changes in the characteristics of the workforce contribute significantly to three challenges facing the chemical industry-knowledge transfer, recruiting, and employee retention. These three issues are best addressed through an integrated strategy (Exhibit 3). Trying to tackle only one or two will seriously undermine the skills and knowledge needed to achieve long-term business objectives. Organizations that focus only on recruiting, for example, won't be successful in sustaining effective HR capabilities unless they also deal with the elements in their culture that encourage things like turnover and knowledge hoarding. Interviews also revealed significant barriers that undermine effective action in capturing and sharing knowledge before people retire. The last section will outline a framework that provides an integrated approach to all three problems. But first we'll examine the obstacles that make it particularly difficult to confront the problem of organizational knowledge retention in chemical companies today.

Exhibit 3: Interactive Effects Of Human Performance Processes



Barriers to Organizational Knowledge Retention

1. Lost Knowledge is a Problem Whose Costs are Largely Hidden

This was a consistent theme in our interviews. While some executives intuitively recognize the threat of losing intellectual capital when people retire, others have a harder time seeing the problem. "Obviously, there is a cost, but it's not recognized," lamented one research scientist. "Cuts, like early retirements, are often made without serious consideration of how things are going to run with fewer people."

We found no companies that had tried to develop traditional business cases for knowledge retention initiatives, primarily because it is seen as so difficult. Firms that are better positioned to address the challenges of retaining knowledge from an aging workforce seem to have senior executives who intuitively recognize the problem and are willing to invest resources in addressing it. Those who lack top management support must start collecting stories to illustrate the costs and lost opportunities incurred from the failure to retain the knowledge of veteran employees. For example, what is the cost of delaying the introduction of a new product that was being worked on by a recently retired scientist? And what is the cost of reduced efficiency or increased errors in a plant where two first-line supervisors just retired? Answering questions like these can provide a starting point.

2. Uncertainty About Where the Firm is Most Vulnerable to Lost Knowledge

"First, you must identify where the real risks are of not having the knowledge or expertise the organization needs," says Akzo Nobel's Henk Bonouvrié. "Then you try to analyze the chance those risks will develop." Often managers can't get support for pursuing knowledge retention efforts because no one is clear where the greatest risks are for the company. A more strategic approach to workforce planning can help a firm identify these risks and see where they are most vulnerable to the loss of specialized expertise.

3. No Clear Ownership of the Problem

In our interviews it was apparent that no group has clear responsibility for addressing knowledge retention issues. Knowledge managers were interested but often seemed preoccupied with other initiatives. IT managers believe they own the capability and enabling technology to drive knowledge capture. And HR owns the processes for recruiting and retaining people. But it is functional and line managers who must create the values and culture that supports behaviors needed to share, capture, and apply tacit knowledge derived from experience. In practice, then, improving knowledge retention must be a line management concern because that's where the challenges of transferring knowledge are best understood. But even these stakeholders are often uninterested. One manager from a diversified chemical company noted:

> *The VP of engineering operations gets it. He understands we're losing our knowledge base incrementally, and if we don't do something about it we'll be in trouble. But his directors are saying, "Yeah, it's a problem, but other things are more of a priority." They're minimizing it because their vision is more short term. And they're close to retirement, too, so for them it doesn't matter.*

One battle top management will have to fight in the next few years is gaining middle management support for knowledge transfer initiatives. Most of these managers have been conditioned so long by the demands of cost cutting that they won't respond to messages that appear to conflict with that objective. Another challenge will be the cultural barriers to knowledge sharing that have grown up as a result of extensive downsizing. The idea that knowledge is your power base and that hoarding knowledge will keep you employed is a difficult belief to overcome, but its presence can't be ignored.

4. No Slack Left for Knowledge-Sharing Activities

"We're never going back to the protégé/mentor model and the cast of thousands where less experienced people all have mentors," said Ron Carrick, business information manager in DuPont's engineering organization. "We can't afford that in time or money,

Japanese Culture Affects the Approach to Workforce Demographics Issues

Japan-based chemical companies are currently mired in a severe business recession that makes it difficult to pay attention to longer-term demographic issues, which are just a small part of a larger constellation of economic problems facing the industry. Nevertheless, the cultural forces shaping behavior in Japanese firms suggests that solutions to the challenges created by changing workforce demographics will be strongly affected by country cultures and local economic conditions.

Like firms elsewhere, Japanese companies reported significant variations in anticipated retirement rates. More than half of the firms surveyed reported an M-shaped curve in their age distribution with peaks coming among those in their 50s and 30s. Many Japanese companies have smoothed out their age distributions by offering early retirement packages in recent years. These programs may have reduced concerns about the large wave of retirements expected in some US-based companies, but they don't eliminate the ongoing need to transfer knowledge to younger employees. Where there is concern about high retirement rates in Japanese firms, it centers mostly in the manufacturing area. One company, for example, expects 45 percent of its production workers to retire within ten years.

Only a few Japan-based chemical firms are actively seeking global markets. As one company president noted, "True globalization has not occurred in Japanese chemical companies." The "wall of language" still makes joint work overseas difficult for these firms. Some of the cultural factors that clearly differentiate how Japanese companies can address changing workforce demographics issues are:

- "On the job training" was the most frequently mentioned method of knowledge transfer. Concepts of informal mentoring and face-to-face knowledge sharing still seem to be more deeply embedded in the Japanese culture. The Japanese notion of lifetime employment has meant firms have cut back staff more slowly than in the West, where extensive downsizing has made informal knowledge transfer through practices like mentoring more problematic. At the same time, there is a growing recognition among some in Japan that the traditional unstructured forms of knowledge transfer between generations are too slow and ineffective to bring younger workers up the experience curve in the current environment.

- Retaining workers is not a concern in Japan. Retention rates among younger and middle-aged employees remain high. There is little indication of increased mobility or job switching among younger workers, and no sign of the increased attrition that is evident in some US-based firms.

- Given the low mobility of mid-career workers there has also been little recruiting of "experienced hires." The idea of "head hunting" is still quite alien in Japanese chemical companies. This will make it more difficult to replace expertise lost to retirement and puts increased pressure on firms to develop the capabilities of younger employees more quickly.

- The hiring of foreign-born employees remains very limited in Japan. And a number of executives mentioned that women still face the challenges of gender bias in the industry. Thus, unlike US-based companies, which have actively recruited foreign nationals for some positions, Japanese firms have a more limited labor pool to draw from.

- The legacy of a seniority-based wage system combined with deflated chemical prices has thrown labor costs out of line with foreign competitors. Many firms we interviewed are in the process of moving to a merit-based wage system. This transition, which is currently a dominant concern for management, is likely to impact knowledge sharing between employees in ways that are still unforeseen.

and we can't get that many people." Even when the problem of knowledge transfer is recognized, the resources needed to allow younger employees to learn from older ones are virtually gone. One challenge for cost-driven chemical companies is going to be figuring out how to improve knowledge transfer in an environment where interactions between retiring professionals and managers and their replacements are very limited.

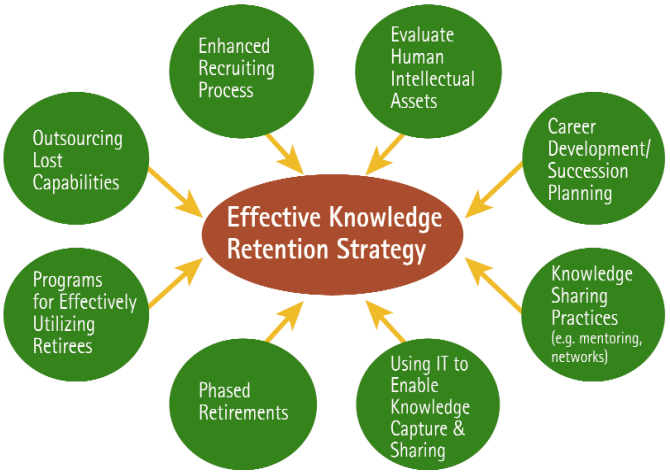
5. Capturing Knowledge Is Not Enough

Finally, as mentioned earlier, transferring knowledge within an organization is useless unless those acquiring it have the ability to learn from others and make improved decisions. More than one company in our study has found that its younger employees lack the problem solving skills—and sense of empowerment—to make decisions based on knowledge passed on by more experienced employees. "There is always more than one cause to a complex event. So what you want is managers who know how the hell to think," said a manager at Shell Chemical. Companies concerned about knowledge retention also need to evaluate the quality of the problem solving skills their younger employees have. Capturing knowledge is of no value unless those who have access to it have the ability to interpret it effectively.

A Framework for Organizational Knowledge Retention

The five barriers described above reflect the context within which most leaders must address the problems created by an aging workforce. To reduce the effects of the three challenges identified earlier—lost knowledge, more competitive recruiting, and higher attrition among younger employees—organizations need both a framework for action and a strategy for implementation. We will outline the framework of critical success factors first. All of the eight elements described here (see Exhibit 4) are essential for creating an effective approach to capturing and sharing knowledge before it is lost to the organization. None of them will do the job alone.

Exhibit 4: Critical Success Factors In Organizational Knowledge Retention



Evaluating Human Intellectual Assets

The first step in diagnosing where an organization is most at risk for lost knowledge is having a detailed process to track current skill inventories and future needs for all essential professional and management roles in the organization. This enables extensive succession planning for professional as well as managerial positions. And, most important, it helps the organization to identify future knowledge gaps that are likely to emerge, given retirement eligibility and historical retirement patterns. This allows more effective resource allocation around knowledge retention initiatives. Two of the companies in our study had elaborate processes for tracking skill inventories and succession plans, and several others were in the process of developing them.

Career Development/ Succession Planning Processes

One of the most important elements for retaining employees—or at least slowing turnover—and building long-term workforce capabilities is the existence of extensive career development and succession planning processes to complement the skills inventory system. If a skill management process monitors the current and future state of resources needed, a career development program helps build the knowledge and competencies professionals and managers need to prepare for future

roles. And succession planning and career paths show employees the opportunities that lie ahead. Experience has shown, of course, that formal career development and succession planning processes are not enough. While the quality of career programs sends an important signal about the organization's real commitment to its employees, it is functional and business unit managers who create the day-to-day working environment that still has the greatest influence over knowledge-sharing behaviors and that ultimately determines the rate of employee retention.

Knowledge-Sharing Practices

To address problems of knowledge retention created by an aging workforce, chemical companies will have to institutionalize an elaborate set of knowledge-sharing practices that become embedded in the culture and accepted as the way work is done. Of course, the first step in developing these practices is to inventory and evaluate those that the organization already has in place. As indicated above, an integral part of the techniques used for knowledge transfer will also be the cultural values and norms needed to support knowledge-sharing behaviors.

The companies in our study varied significantly in their use of the many potential knowledge-sharing practices, such as mentoring programs, knowledge networks or communities of practice, after-action reviews, etc. Japan-based chemical companies were notable for their frequent espousal of "on the job training" as the standard way that knowledge is transferred in their firms. Face-to-face interaction between mentors and protégés appears to still be the norm in Japanese companies, whose leaders also readily acknowledge that their labor costs are too high compared to their competitors in the West. Several US-based firms we interviewed clearly felt they had a long way to go to develop the type of knowledge-sharing culture that would be needed to cope with the retirement of so many experienced professionals and managers.

Using Information Technology to Capture and Share Knowledge

IT resources will be an important part of any knowledge retention strategy, but executives must be careful not to view technology as the solution to their knowledge retention problems. IT applications are only enablers. They cannot meet knowledge transfer objectives alone. To retain knowledge for the organization, line executives must make certain that IT applications are a part of a comprehensive effort that also changes practices, processes, and behaviors. The technology applications mentioned in our interviews were almost all still in the pilot stage. Those that can support knowledge retention objectives include:

- **Databases to track skills and competencies**—Shell Chemical is building a talent management database to help identify current and emerging gaps, as well as future technical skill needs.

- **Lessons-learned repositories**—This is a solution that holds promise in some settings, but such databases also require considerable behavioral change to make sure they are kept up to date and actually used.

- **Communication and knowledge-sharing systems**—These applications support distributed organizations or virtual communities of practice. Buckman Laboratories has been among the most successful at building a global knowledge-sharing infrastructure with its K'Netix system, which combines electronic bulletin boards, virtual conference rooms, libraries, and email. But Buckman's investment has also been supported by major culture change to encourage use of the technology.

- **Systems to support diagnostic and problem solving behaviors**—One Louisiana plant was piloting software that leads users through a highly structured diagnostic process to solve production problems and capture the solutions. Combined with a culture change initiative, this application helps surface the tacit knowledge of veteran operators and transfers it into the system for future use.

- **Automation of more routine information processing tasks**—DuPont has been piloting a Web-based tool that can collect data from plant personnel describing a production problem to consulting engineers. Prompting plant workers through a diagnostic process helps them learn how to think about future problems, and over time provides a broader set of canned solutions to consider, freeing engineers to work on the most difficult problems.

Applications like this one that take over or supplement more routine information processing tasks are one way to leverage limited expertise and also build repositories of consistently applied solutions.

- **E-learning applications**—Several chemical companies in our study were working to capture expert knowledge into computer-based courses before a particular specialist retired. These Web-based applications are still relatively new, and they are proving more difficult to build than originally anticipated.

Phased Retirements

Early retirements have been standard practice in the chemical industry for years, but as knowledge retention and recruiting problems become more acute, companies may begin to look for ways to extend the tenure of their most valuable employees. The most common practice is known as "flexible phased retirement," which means allowing older employees to create more varied and shorter work schedules. Unfortunately, a range of legal barriers restricting pension payments still makes it difficult for private sector companies to implement formal phased retirement programs in the US. Experts, however, expect these laws to be eased over time.

The problem of keeping experienced managers and professionals on the job is especially complicated for global firms, which must contend with a variety of mandatory retirement laws that are continually changing. For example, mandatory retirement in the Netherlands recently dropped from 65 to 62, creating major succession planning headaches for companies operating there. In Japan, meanwhile, the current mandatory retirement age is 60, but executives are expecting it to be raised to 65 to help ease the country's labor shortage. These changes add additional complexity to the challenges of knowledge transfer and succession planning.

Programs for Effectively Utilizing Retirees

The easiest knowledge retention tactic to employ when threatened with losing expertise is hiring recent retirees back as contractors or consultants. Retirees not only have the skills needed, but they also know the culture and organizational history, and have the extensive social networks necessary to get their jobs done, even when they are different from those they left. Given the looming shortage of specialized technical and engineering talent in certain organizations, it seems that bringing retirees back as contractors is going to be a widely used short-term tactic for knowledge retention in the years ahead.

Indeed, one of the most consistent findings in our study was the extent to which global chemical companies have already become dependent on bringing recent retirees back to work on a part-time basis. "We have a very rigorous process to make sure there's a good business reason for bringing them back in," explained one chemical company planning executive. "But if an edict went out tomorrow that said, 'No retirees can be used as contractors,' that would be quite a challenge for us. You never want your business dependent on people who can go play golf."

Using retirees as contractors is a double-edged sword. It helps retain access to irreplaceable expertise, but it can also create a false sense of security that the organization still controls that knowledge. More importantly, when older workers are routinely hired back as contractors they have much less incentive to share their knowledge with others before retiring. "Your knowledge is your security here. If you didn't have the knowledge they wouldn't want you back," said one retired research scientist, who was back working as a consultant.

In practice, chemical companies are bringing retirees back in a variety of ways. In some cases, it remains strictly an informal arrangement with individual managers. In other cases, firms have implemented policies to dictate in what situations retirees may be retained as contractors, in an attempt to limit the practice. Monsanto, on the other hand, was the only company we studied that has created a formal process to actually encourage the re-employment of retirees. Sooner or later, chemical company executives will have to make practical policy decisions about how best to use this essential resource without letting contracting opportunities become a deterrent to knowledge transfer.

What's Your Company's Situation?

Ironically, we found only two chemical companies that showed clear signs of an integrated approach to coping with the changing workforce demographics in the industry. The companies in our study generally fell into four categories:

1. **Loss of knowledge due to retirements not considered a problem by management.**

   Only about 10% of the chemical companies we talked to fell into this category. When management's assessment is accurate, the firm is characterized by a legacy of robust succession planning for all key management and professional roles, as well as an elaborate career development system. In addition, downsizing in the last decade has been carefully orchestrated to minimize the loss of valuable veterans, and mentoring behavior is standard practice in the culture. Finally, the business strategy does not include such aggressive growth goals so that every retiree is a critical lost asset.

2. **Companies in a good position to improve knowledge retention despite retirements.**

   About 30% of the firms in our study had already undertaken a relatively broad set of initiatives to address the problems created by changing workforce demographics. Although they all still face major hurdles, they also share an important asset. These companies seem to have a culture oriented to knowledge sharing and organizational learning. This type of culture will be a critical asset not only in capturing knowledge from retirees, but also in attracting new and experienced hires in a shrinking labor market.

3. **Companies facing serious challenges in coping with an aging workforce.**

   Firms in this category, which represent about 40% of our sample, have several things working against them. First, senior management has not yet recognized knowledge retention or recruiting as major issues worth investing in. Second, they have cultures that have historically not rewarded knowledge sharing. Third, they are highly decentralized, which makes it harder to develop broad-based knowledge retention and recruiting initiatives. Finally, initial solutions are heavily technology-focused, which ignores the fact that fundamental issues in knowledge retention are behavioral.

4. **Companies too distracted by other business events to focus on the problems created by their aging workforce, e.g., downsizing and mergers.**

   In about 20% of the firms studied, top management was too preoccupied with the short-term operations of the company to be thinking about these longer-term strategic issues. While this may be understandable given specific circumstances, the dilemma is that these short-term challenges often contribute to the problem, since they encourage older, experienced workers to take early retirement. And the short-term distractions just divert leaders' attention from issues they must address in order to survive.

Outsourcing Lost Capabilities

In some situations, retaining knowledge adequate to sustain acceptable performance levels is going to prove unrealistic. In those cases, looking at new business models may be the only choice executives have. Outsourcing non-core capabilities has been a trend in the chemical industry for years, and most companies feel they have done what is practical in this area. But some firms are going to face another round of outsourcing decisions when it becomes apparent that the loss of substantial expertise in specialized areas is too difficult and costly to replace or sustain.

One executive thought his firm had already reached that point, saying, "Given our growth strategy, if we're 2,000 people short, we can't just go hire them. We don't have the supervisors. To get where we want to go we'll have to move to much more outsourcing of services and engineering." Outsourcing what have traditionally been core capabilities for a company presents a whole new set of partnering and knowledge management issues that will have to be addressed. But, given demographic trends and the inevitable retirement of so many experienced employees, senior managers may be better off if they begin thinking about outsourcing options now, instead of waiting until they have no choice.

Reinventing Recruiting Processes

The last element in our framework is the recruiting process itself. Many chemical companies are revamping their efforts in this area today, recognizing the major changes in the employment market described earlier. The competition for professional talent in the years ahead is going to be so fierce that companies are now recognizing the need to rethink their presence on college campuses, their image among potential candidates, and what they actually have to offer those they want to hire. Firms that aren't proactively rethinking and investing in their recruiting efforts are likely to find it harder and harder to catch up. We include recruiting as part of an organizational knowledge retention initiative to re-emphasize the interdependence of both ends of the human capital supply chain. The effectiveness of a firm's recruiting efforts in an increasingly tight labor market will have a tremendous impact on the options a firm has for transferring knowledge and its ability to do so.

Implementing a Knowledge Retention Strategy

The first step in designing a knowledge retention strategy for your firm is to understand your options. Organizations can choose from three basic approaches to the problem of capturing and sharing knowledge from their aging workforce. Basically, these approaches are driven by the seriousness with which leadership views the problem. The three options most likely to be considered are:

"Hope is a method, isn't it?"

Top management in at least one large company we studied had not yet come to terms with the threat posed by the loss of critical technical and engineering knowledge. "At this point, we're not doing anything about it," confessed one executive. "But six months from now that will have to change because our hand will be forced. If we're going to grow the company, we'll have to do something different." The demographic changes facing global chemical companies pose real threats to continued success for some firms, and just hoping these problems will go away is a good approach only for executives who are not concerned about the long-term viability of their organization.

Pursuing Programmatic Change—Seeking That Silver Bullet

Given ongoing resource constraints, it is tempting to think the answer to the problems posed by an aging workforce can be addressed by implementing a couple of programs—a little contracting here, a knowledge repository there, and some culture change should do it, right? Wrong. Programmatic change will be the path many companies will be tempted to take. Implementing IT "solutions" is likely to be the most popular approach. But imposing standardized solutions across an entire organization won't be enough. Previous research on implementing the type of complex organizational change required in this situation would predict that starting with programs to build a knowledge-sharing culture or a large technology-based infrastructure will be unsuccessful.[2] These initiatives invariably focus on only one aspect of the problem, such as skill inventories, rewards, culture change, or technology support. That is not enough to sustain the types of broad-based, but also locally adapted, changes that will be needed.

Comprehensive, Integrated, Long-term Initiatives

Unlike the challenges posed by the eBusiness boom, the problems created by changing workforce demographics are not going to subside. The issues of building and sustaining HR capabilities with a very different kind of workforce in a global marketplace will require ongoing attention from functional and business unit managers for years to come. The problems of knowledge transfer and knowledge retention require simultaneously addressing three areas: (1) building a commitment to share and retain knowledge; (2) installing practices to do so; and (3) freeing up the resources (i.e., time) needed to exchange and absorb knowledge.

This means engaging multiple elements of the framework outlined earlier. Skill inventory and career management processes need to be put in place, or enhanced, because management must know what capabilities are most at risk and have a plan to replace them. At almost the same time, knowledge-sharing practices and IT applications need to be customized to meet the special requirements of individual functions or business units because knowledge retention is ultimately a problem that must be solved at the unit level. It is not something that can be delegated to HR or IT departments. To complement other efforts, programs for retaining access to the skills and knowledge of older workers, e.g., phased retirement, should also be implemented where practical, and, if necessary, outsourcing strategies should be considered.

The problems created by changing workforce demographics did not spring up over night. They have been in the making for years, and they will take some time to resolve. What we are advocating is a multi-pronged, coordinated approach to addressing the issues we have identified in this study. Anything less will leave global chemical companies unable to sustain the human performance needed to prosper in years ahead.

Notes:

1. See David W. Delong, "Uncovering the Hidden Costs of 'Lost Knowledge' in Global Chemical Companies," Research Note, the Accenture Institute for Strategic Change, 10 January 2002. www.accenture/isc

2. See, for example, Michael Beer et al., *The Critical Path to Corporate Renewal* (Boston: Harvard Business School Press, 1990).

About the Author

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