



# Uncovering the Hidden Costs of 'Lost Knowledge' in Global Chemical Companies

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Executives in many global chemical companies today recognize that their firms face a major jump in retirements among the ranks of manufacturing, engineering, and R&D professionals in the next decade. This exodus of technical specialists, research scientists, engineers, plant managers, and first-line supervisors represents a major loss of experience and expertise that is likely to impact company performance. As a result, leaders are increasingly looking for ways to capture and transfer this knowledge.

But as executives in the chemicals industry consider undertaking initiatives to retain critical expertise, they must answer the question: What is the real cost of losing manufacturing and R&D knowledge? What is the compelling business case for investing in knowledge retention initiatives?

An ongoing study at the Accenture Institute for Strategic Change has identified at least four ways lost knowledge can affect a firm's performance. Interviews in more than a dozen global chemical companies in the US, Europe, and Japan have confirmed the difficulty of putting an accurate financial figure on the loss of intellectual capital. But our interviews have also shown that building a qualitative business case—with quantitative estimates where possible—for knowledge retention initiatives is going to be essential. For while some senior managers intuitively recognize the threat of losing intellectual capital, others have a harder time seeing the problem. "Obviously there is a cost, but it's not recognized," lamented one research scientist. "The pressure to reduce fixed costs in manpower is overwhelming. And cuts (i.e., early retirements) are often made without serious consideration of how things are going to run with fewer people."

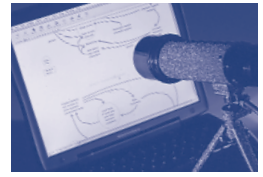
An engineering manager in a diversified chemical company described his situation this way:

*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 are minimizing it because their vision is more short term. And they're close to retirement, too, so for them it doesn't matter.*

Knowledge retention can mean investing in programs that encourage things like phased retirements, culture change, mentoring, knowledge bases, communities of practice, and e-learning. But before making decisions about what to do it is helpful to understand the types of impacts that knowledge lost to retirements or turnover can have on business performance. Here are four impacts to consider when trying to estimate the effects of lost knowledge for your company:

**1. REDUCED CAPACITY TO INNOVATE.** Losing experience and expertise when senior people retire, particularly in R&D, can slow down and reduce the quality of innovation, which is central to many firms' business strategies today. "You just can't be as innovative with young PhDs. The experience really matters," said the HR manager for an R&D unit in a European basic chemicals company. It may be hard to make an explicit connection between a unit's innovative capacity and the knowledge of its staff, but it is still possible to estimate the financial consequences of losing the knowledge most needed to bring new products to market.

For example, one retiring research scientist was an expert in processing data produced by special computer systems that monitored extrusion processes. "If you don't get this data processed properly, you might as well throw the system away," he said. This researcher's specialized knowledge helped the company increase throughputs in certain processes, delaying the need to invest tens of millions of dollars in expanding its plants. But his knowledge of extrusion processes and how to analyze the performance data was also critical in developing new specialized products that created additional revenue streams. It would take his replacement up to a year to come



up to speed before being able to produce outputs valuable to the company.

Thus, the only way to sustain the pace of these innovations was to rehire this retiree as a "consultant" to retain his knowledge. Otherwise, the introduction of new products would have been delayed. Analyzing the real costs of losing access to an individual's or a group's specialized knowledge will often show potential impacts on a firm's innovation capacity.

**2. ABILITY TO PURSUE GROWTH STRATEGIES THREATENED.** 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. One petrochemical company executive explained:

*The bubble of experience that is retiring has been around for at least five years and, frankly, nobody got it. There's an arrogance that says, "We're a great company. We can hire anybody we want. We can fix the problem just by hiring people." But there's little thought about what you lose by just hiring new people. Now our hand has been forced by our growth desires. The experience is going and we can't support the growth.*

The issue of supporting growth is closely linked to problems in recruiting both the young professionals and experienced hires who are needed to support expanded operations. Virtually all the companies we interviewed expect recruiting high quality professionals for global operations to be a major issue in the years ahead. Losing knowledge because of retirements increases the number of new hires needed in an already difficult market. This is no surprise.

But what is not as well understood is that increased retirements also make the task of assimilating new employees more difficult because the availability of potential mentors is greatly reduced. This affects the number of new hires that can be absorbed into a company to support its expansion plans. When pursuing aggressive growth strategies, leaders need to realistically evaluate how they will resource new programs and operations. In the process, they must take into account the extra burden lost knowledge will place on strategy implementation. Trying to grow fast may make it worth investing in retaining some of that experience and expertise.

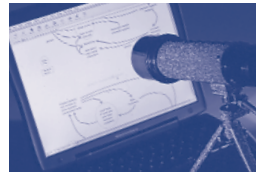
**3. MORE COSTLY ERRORS.** No one likes to talk about it, but having less experienced people working in increasingly sophisti-

cated 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 longer when veteran employees are no longer around to help.

Errors in R&D are also likely to increase as experience declines. "Typically, what happens is people have to make all the same mistakes the retiree did," said one former research scientist. When evaluating the effects lost knowledge could have on their company, executives need to assess where reduced expertise is most likely to leave the firm vulnerable to costly mistakes. Certainly all mistakes can't be avoided. But estimating the potential risk and cost of these errors can help determine where knowledge retention efforts are most likely to pay off.

**4. LESS EFFICIENCY.** Lost knowledge can also have another important impact for 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 a retired research director, who had returned to work for his company as a contractor.

Of course, in many situations that require advanced skills simply adding more human resources is not a viable solution. Manufacturing executives have sometimes learned this lesson when trying to staff highly automated plants in developing countries. "The dilemma is you can't just throw labor at these plants," said one experienced manager. "You need a smarter, experienced skill base." With industry trends towards globalization and consolidation, chemical companies are becoming larger, more complex, and more geographically distributed. Thus, global organizations also increase the chances for reduced efficiency by continually "reinventing the wheel," a costly problem which is only exacerbated by the loss of the individual experience that serves as an important source of organizational memory. Therefore, if leaders expect to sustain the performance improvements their firms have achieved in recent years, they need to ask two questions: What knowledge, if lost, would undermine our productivity gains? And



what knowledge must be retained to support continued performance improvements?

## Conclusion

Pursuing knowledge retention initiatives can be difficult for many reasons. Organizationally, it is hard to find managers who feel ownership for the problem of preventing lost knowledge at an operational level. Human resources, information systems, and line managers are all interested in the problem, but rarely are individual executives charged with retaining knowledge critical to the firm. Meanwhile, line managers are increasingly being challenged by what appear to be conflicting demands from senior executives. Leaders are urging managers to continue cutting costs to improve performance and at the same time asking them to support more costly knowledge retention efforts. Not surprisingly, this produces resistance from line managers who have historically been rewarded primarily for productivity improvements.

In the current economy it will be tempting for leaders to give in to the demands for short-term financial performance. But savvy executives recognize that they also must champion more costly knowledge retention strategies because some of their units could be headed for a point of no return in a few years. 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 one veteran research scientist. "But once that happens it will take years to straighten the situation out because you can't bring people in and get them experience overnight."

The lesson is that if top management doesn't start supporting knowledge retention efforts now, by the time the economic impacts of knowledge loss are really obvious, it may be too late. Identifying where the greatest business impacts are likely to be in your organization is an important step in deciding where to focus resources to address this growing problem.

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