China's Chemical Industry: The Case for Knowledge Management

By Dr. Paul Griffiths (paul.griffiths@vtr.net); Dr. Kai Pflug, Management Consulting – Chemicals (kai.pflug@mc-chemicals.com)

Chemical companies in China are getting increasingly sophisticated, increasing in size, scope and the complexity of their operations. They also fiercely compete with each other, forcing them to utilize any legitimate means that can provide a competitive advantage in their segment. In this paper we intend to show that these conditions call for an increased focus on knowledge management – not because it sounds fancy but because it can make the difference between a profitable and an unprofitable chemical business.

First of all, what is knowledge management? It is a process through which knowledge is captured, stored, shared and utilized to solve business problems within an organization such as a chemical company. Knowledge management thus enables knowledge that exists somewhere and at some point within the company to be utilized elsewhere or at a different point in time.

Here are some examples for knowledge that is worth managing within a chemical company:

• Detailed experimental data and experience gathered in research, e.g., from the development of new chemicals. Such data can speed up future development work and reduce its costs, thus providing a competitive advantage

• Data and experience from established chemical processes, e.g., the correlation between parameters such as temperature, pressure etc. on reaction yields. Obviously such data can be used to optimize similar processes at other locations

• Training materials, e.g., on how to operate machinery, on how to market specific chemicals

• Experience with the application of chemical products and the typical issues arising in these applications

• Experience related to the supply chain, e.g., regional and seasonal demand peaks for certain products

• Knowledge about the competition – their plans, their products, their strengths and weaknesses

• Knowledge of individual customers and their specific requirements

• Background and expertise of own employees – so that if specific knowledge is required, it is possible to quickly check who is the best internal source for such knowledge

• Knowledge of past cooperation partners and suppliers as well as their trustworthiness and capabilities

Obviously, if every employee of a chemical company had all the knowledge of his fellow employees, this would make the company much stronger. In Germany, there is a saying froma leading engineering company that goes: "If Siemens only knew what Siemens knows", emphasizing the loss of efficiency resulting from different parts of the company not sharing their knowledge. The key issue is that much of the knowledge of a company is in the heads, handwritten notes and individual computers of their employees. This knowledge is not accessible to the company as a whole and in fact may be lost completely if the employee leaves the company.

This is important as most activities or tasks within a company are not one time events but will need to be performed again at a different time or location, often under slightly different circumstances. Knowledge management allows replicating knowledge throughout the company so that learnings do not need to be repeated again and again. This is called codification of knowledge, which means we document components of knowledge and we place them in a library for others to find and re-use. This approach to knowledge management is based on technology-driven knowledge networks.

In this approach one of the main objectives of knowledge management is therefore to convert implicit knowledge into explicit knowledge – knowledge that is structured and accessible. This is, as is often said, the knowledge that stays in the organization when everybody goes home in the evening. It takes the form of organizational charts, strategic plans, information systems, process representations, databases, consultant reports, meeting minutes, domesticated social networks, e-mails, purchased consumer reports, sales contracts etc. But this is not the only approach.

Another way of tackling knowledge management is that when somebody in the organization is confronted with a difficult problem, they locate the expert (within or beyond the organization) on the specific subject and reach out to him or her for advice. This requires having an inventory of people and their skills, a kind of 'yellow pages' of its experts. In-house social networks are important tools to facilitate this process of identifying the experts, but there also needs to be a culture of collaboration where assisting a colleague is as important in the organization's priorities as resolving a client problem. This approach is called a

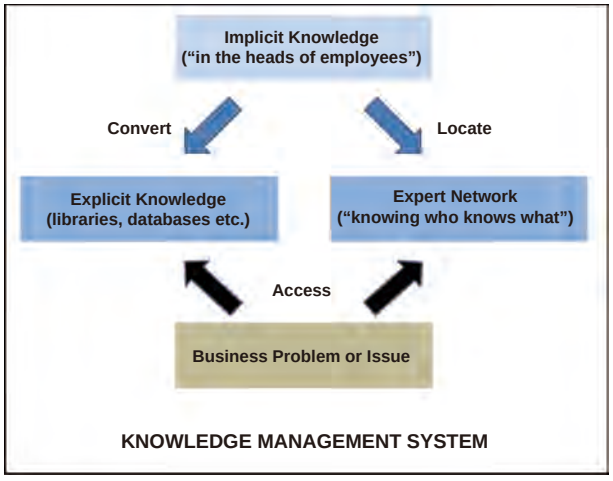

Fig. 1: Key elements of a knowledge management system

people-driven knowledge network.

In the past decades, Western chemical companies have invested heavily in making their knowledge explicit by a multitude of initiatives such as strategic reviews, reengineering projects, ERP implementations, BI initiatives, lean manufacturing schemes, customer relationship management etc. However, domestic chemical companies still often lag behind in this respect. A major reason for this is that only now the complexity of these companies is reaching a level at which knowledge management can bring its full benefits:

• Company size and sales have increased, particularly for private companies. While at a small chemical company informal communication at lunch can effectively disseminate relevant knowledge, this approach does no longer work for larger organizations

• Companies are increasingly integrating up-and downstream and also extend their product portfolio horizontally, creating more specific areas of expertise and reducing the number of generalists who have a good overview of the overall company business

• Domestic companies gradually move away from mere production of basic chemicals into providing specialty chemicals with associated services, which adds several dimensions of knowledge (such as customer requirements, application know-how etc.)

• Similarly, chemicals producers focus more and more on organizing their businesses by their markets rather than by their product – a switch from an internal to an external focus that also requires additional knowledge

• Domestic companies expand their R&D, realizing that innovation is a key differentiator. The increased importance of R&D makes it more important to manage R&D knowledge

• Rather than having a stable number of long-term employees, chemical companies have to cope with substantial fluctuations among the work force. Relying solely on individual employees as knowledge carriers thus becomes too risky – a more stable approach of creating explicit knowledge becomes vital to guarantee maintenance of a company´s core knowledge.

This will become even more important as Chinese chemical companies continue to upgrade their product portfolio and start becoming global players. However, successfully establishing knowledge management is not straightforward and requires careful consideration of all key elements.

Often knowledge management is seen mainly as an IT issue. However, as implied above, this is only one of many aspects to consider. IT has an important role in knowledge management but only as a physical enabler or platform.

An important part of successful knowledge management is to establish dedicated knowledge management positions. For example, companies such as BASF have dedicated knowledge management officers at their main sites. This guarantees that at least for some of the staff, knowledge management is not an afterthought but rather their central task and responsibility. Another example is ORICA, an Australian provider of mining chemicals and services. One of their approaches has been to set up global Centers of Excellence where the company locates its experts on a given subject. For instance ORICA has set up an SAP Competence Center in Melbourne and a Commercialization Shared Center in Singapore.

As in all organizational matters, the crucial factor in a successful knowledge management scheme is the human factor. If the organization does not get its experienced staff to populate the repositories or to respond to requests for assistance from colleagues, the system will not work. The problem is that people often feel less than motivated to do so as they speculate this makes their organization less dependent on their own knowledge. It is therefore vital to incentivize staff to use the knowledge management system – particularly those highly experienced experts who rarely need external knowledge and thus are naturally more contributors than users of the system. Many levers can be used to motivate staff to participate and contribute, but the most important is that the system is not set up as a merely problem-solving device, but as a professional development one, where even the most experienced grow through the interactions with the system.

Knowledge management is an established and worthy function in larger Western chemical companies, fully justifying its resource requirements. As Chinese companies get larger, more complex and more oriented towards markets, applications and services, they will need to establish similar capabilities if they want to compete successfully with Western industry leaders or even with nimble companies from newly emergent economies. Knowledge management is and will remain a core component of any effort to improve efficiency, to be innovative, or to be more responsive to clients. Knowledge management thus cannot be overlooked by any chemical company striving to improve profitability. ■