Leveraging Knowledge Across the Value Chain
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STATEMENT OF PURPOSE
The purpose of publishing this report is to provide a reference point for and insight into the processes and practices associated with certain issues. It should be used as an educational learning tool and is not a “recipe” or step-by-step procedure to be copied or duplicated in any way. This report may not represent current organizational processes, policies, or practices because changes may have occurred since the completion of the study.
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Sponsor Organizations

BP Natural Gas Liquids

EDS

Halliburton Energy Services Group

Intel Corporation

Lucent Worldwide Services

Petrobras S.A.
Partner Organizations

Buckman Laboratories International Inc.
Caterpillar Inc.
Raytheon Co.
Tata Steel Ltd.
U.S Air Force Materiel Command
Executive Summary

Over the past decade, the explosive growth of globalization, outsourcing, and extended business partnerships has meant critical knowledge is often housed outside the bounds of the traditional organization’s authority. As such, many organizations have begun to realize that they must weave the internal value chain components, plus customers, suppliers, and partners into a “business ecosystem” that provides such high value that few would leave it. During the course of this study of how organizations leverage knowledge across this value chain, the APQC project team discovered that forward-thinking organizations no longer support stand-alone knowledge management programs; instead, they integrate an entire suite of process improvement, learning, and knowledge management approaches to improve performance all across the value chain. This discovery forced APQC to revisit and revise its Road Map to Knowledge Management Results: Stages of Implementation™ to provide a guide that reflects these latest trends.

As the study team ruminated on the outcomes of the research, I was struck by the similarity between these organizations’ programs and my recent visit to an outstanding auto repair mechanic (a gentleman named Mike). Much like our five best-practice organizations, Mike’s sole focus was to provide a satisfactory business outcome for me, his customer. To do so, he had to use his information sources, engage a process, tap into his value chain, and execute work. Mike pulled information from me (the customer), used his diagnostic tools, drew on his knowledge base (previous repair records and tacit knowledge), and accessed information from his suppliers (the car manufacturer and parts suppliers) to determine what to do. Only after he had identified the problem and determined an appropriate solution (either via push from the diagnostic or via previous experience) did he open his extensive tool drawer to select the right tools to complete the job. He did not use one tool to solve all of my car’s problems—he matched the tool to the need to ensure that the process was appropriate for the needed solution. What was the end result? Mike developed new knowledge of how to repair cars and provided me with a working car and an understanding of how to prevent a similar issue in the future.

Our best-practice organizations have accomplished a similar level of success—they created diagnostic tools to assess the value and issues of their value chain partners, developed a variety of integrated approaches to share knowledge and solve process problems, and have focused on continually delivering value to customers by improving the performance of their processes and the individuals engaged in that process.
Executive Summary

As you read on, you will discover that the critical success factors for these organizations involved strong integration. They began their journey toward knowledge management with an eye toward integrating knowledge-sharing approaches with process improvement programs and organizational learning internally and then migrated to their external value chain. They understood that employees want knowledge and tools to be integrated with the business processes they engage in. APQC revised the Road Map to Knowledge Management Results: Stages of Implementation™ to reflect this focus on integration gleaned from this and the 11 other studies we have completed since the stages of implementation were initially created. I hope you will use this report and the revised Road Map to Knowledge Management Results: Stages of Implementation™ as a guide to help you understand and improve your organization’s journey toward improved performance.

Wesley Vestal
APQC KM practice lead and subject matter expert

STUDY SCOPE

The purpose of this study was to determine how leading organizations form collaborative relationships and strategic partnerships across the value chain to successfully share knowledge with suppliers, service providers, business partners, competitors, customers, government/regulatory agencies, and academia. This consortium of leading companies focused on the following four practical areas of implementation to provide actionable information.

1. Gaining support for knowledge-sharing partnerships
2. Building the streamlined extended knowledge space
3. Managing knowledge-sharing partnerships
4. Gauging the results

The organizations selected for deep, detailed study through structured data collection and site visits (aka “partners”) demonstrate innovative performance in one or more of the study focus areas. The goal of the project was to examine organizations that excel in one or more aspects of the scope and build the best practices from all the organizations studied. To achieve this goal, excellence and a history of success in the four scope areas above were used by the APQC study team to select potential best-practice partners for study. Project sponsors then selected from the candidates to determine the final list of partners.

Overview of Findings

The focus of this study was to learn how leading organizations leverage their knowledge-sharing approaches to bolster their value chain and strengthen the flow of knowledge across internal and external members of that value chain including business partners, suppliers, customers, and more. What the APQC project team learned was that in order to truly leverage knowledge across the value chain, these organizations have begun to integrate currently disparate knowledge management approaches, process improvement disciplines, and organizational learning programs into a seamless toolkit to enable their business processes. Figure 1 on the next page illustrates how these organizations leverage KM, process improvement, and organizational learning as a fulcrum to support business process performance.
Executive Summary

The study team discovered 23 findings from the best-practice partners. The approaches taken by the partners provide many insights into how their organizations are successfully leveraging knowledge across the organization to drive business success. Much greater detail is available in the report that follows and in the partners’ case studies.

Chapter 1: Competing on Knowledge
1. Escape the commodity pricing trap through customer segmentation and intimacy developed through knowledge sharing.
2. Build a sustainable, win-win value proposition all along the extended value chain.
3. Build value chain initiatives on a foundation of competency in KM, process improvement, leadership development, and learning.
4. Use relatively straightforward techniques for managing the potential legal and exposure risks in sharing knowledge across the extended value chain.

Chapter 2: Creating an Enabling Environment and Gaining Support for Knowledge-Sharing Partnerships
5. Gain clear, visible, and sponsored executive support by tying knowledge sharing to business strategy and business value.
6. Understand business processes so that knowledge-sharing practices can be built around them.
7. Gain buy-in by involving the appropriate value chain partners in the design of the knowledge-sharing initiative.
8. Use a communication strategy to spread the word about the initiatives and build and sustain buy-in.
Executive Summary

Chapter 3: Creating and Managing Knowledge-Sharing Partnerships
9. Create an approach to determine and prioritize which parts of the value chain to enable with knowledge-sharing tools and techniques.
10. Analyze the performance of critical value chain partnerships to identify where it is appropriate to transfer and implement best practices.
11. Select the appropriate array of knowledge-sharing tools/approaches to match the needs of each partnership.
12. Lower the barrier to entry for knowledge sharing between value chain partners by providing intuitive, easy-to-use tools.
13. Create and operate under a shared funding model divided between the business units and the corporate level.
14. Define clear governance processes for value chain, knowledge-sharing partnerships.
15. Define clear roles and responsibilities for overseeing knowledge-sharing partnerships and managing the change required for success.
16. Create standard operating processes and workflow for managing the security and confidentiality within the partnership.
17. Conduct face-to-face partner forums/workshops with key value chain partners to build understanding of processes and create trust for knowledge sharing.
18. Use multiple communication vehicles as often as possible to strengthen support for current and future knowledge-sharing partnerships.

Chapter 4: The Information Technology Infrastructure
19. Leverage existing knowledge-sharing tools for use with internal and/or external partners, suppliers, or customers where it makes sense to do so.
20. Provide a suite of applications communities of practices can customize for their specific needs.
21. Implement strong authentication and monitoring capabilities for those IT tools.

Chapter 5: Gauging the Results
22. Devise business value measures.
23. Have a methodology in place to measure the results and execute this methodology continuously.

Chapter 6: The Next Stage—Institutionalizing Improvement and Engaging Partners
As the APQC project team progressed through the study, it realized that the findings from it had several implications for APQC’s Road Map to Knowledge Management Results: Stages of Implementation™. Accordingly, the team reviewed the five stages and accompanying enablers to understand how recent findings could enhance the road map. Chapter 6 discusses these enhancements, taking the reader through a brief discussion of each stage and its associated enablers.

These findings emerged as APQC studied, in detail, five organizations that were determined by the screening criteria to be exemplars in leveraging knowledge across the value chain in support of the knowledge ecosystem. Site visits were conducted with these five organizations.
Executive Summary

STUDY METHODOLOGY

Developed in 1993, APQC’s consortium benchmarking study methodology (Figure 2) serves as one of the premier methods for successful benchmarking in the world. It was recognized by the European Center for Total Quality Management in 1995 as first among 10 leading benchmarking organizations’ models. It is an extremely powerful tool for identifying best and innovative practices and for facilitating the actual transfer of these practices.

APQC’s Benchmarking Model: The Four-phased Methodology

Figure 2

Phase 1: Plan

The planning phase of the study began in the summer of 2005. During this phase, secondary research conducted by APQC was used to help identify innovative organizations to participate as best-practice organizations (the partners). In addition to this research, APQC staff members and the subject matter experts identified potential participants based on their own firsthand experiences, research, and sponsor recommendations. Each recognized organization was invited to participate in a screening process. Based on the results of the screening process, as well as organization capacity or willingness to participate in the study, a final list of nine potential partner candidates was developed.

A kickoff meeting was held in September 2005, during which the sponsors refined the study scope, gave input on the data collection tools, and indicated their preferences for site visits to partner organizations. Five organizations were selected for site visits from the original list: Buckman Laboratories International Inc., Caterpillar Inc., Raytheon Co., Tata Steel Ltd., and the U.S. Air Force Materiel Command.

Finalizing the data collection tools and piloting them within the sponsor group concluded the planning phase.

Phase 2: Collect

Three tools were used to collect information for this study:

1. **screening questionnaire**—qualitative and quantitative questions designed to identify best practices within the partner organizations;
2. **detailed questionnaire**—quantitative questions designed to collect objective, quantitative data across all participating organizations; and
3. **site visit guide**—qualitative questions that parallel the areas of inquiry in the detailed questionnaire, which serves as the structured discussion framework for all site visits.

The five partner organizations selected for continued participation in the study responded to the screening questionnaire as well as the detailed questionnaire. Three of the five selected partner organizations hosted day-long site visits attended by sponsors, other partners, and members of the study team. The remaining two partners hosted virtual site visits approximately 2.5 hours in length, with sponsors and members of the study team participating via the Web and teleconference.
The APQC study team prepared a written report (case study) of each site visit and submitted it to the partner organization for approval or clarification. The case studies are located at the end of the report.

**Phase 3: Analyze**

The subject matter experts and APQC analyzed both the quantitative and qualitative information gained from the data collection tools. The analysis concentrated on examining the challenges organizations face in the four study focus areas.

1. Gaining support for knowledge-sharing partnerships
2. Building the streamlined extended knowledge space
3. Managing knowledge-sharing partnerships
4. Gauging the results

The analysis of the data, as well as case examples based on the site visits, is contained in this report.

**Phase 4: Adapt**

Adaptation and improvement, stemming from identified best practices, occur after readers apply key findings to their own operations. APQC staff members are available to help create appropriate action plans based on the study.

### Participants’ Industries

<table>
<thead>
<tr>
<th>Industry</th>
<th>Percentage of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace/Defense</td>
<td>9%</td>
</tr>
<tr>
<td>Chemical/Petroleum</td>
<td>36%</td>
</tr>
<tr>
<td>Government/Military</td>
<td>9%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>18%</td>
</tr>
<tr>
<td>Telecommunications/Utilities</td>
<td>9%</td>
</tr>
<tr>
<td>IT Services</td>
<td>9%</td>
</tr>
<tr>
<td>Semiconductors</td>
<td>9%</td>
</tr>
</tbody>
</table>

*Figure 3*

One hundred percent of the study’s partners answered the detailed questionnaire on behalf of the entire organization. Figure 4 (page 13) depicts the average number of employees and average organization revenue for study partners.
Executive Summary

About APQC

A recognized leader in benchmarking, knowledge management, measurement, and quality programs, APQC helps organizations adapt to rapidly changing environments, build new and better ways to work, and succeed in a competitive marketplace. For more than 25 years, APQC has been identifying best practices, discovering effective methods of improvement, broadly disseminating findings, and connecting individuals with one another and with the knowledge, training, and tools they need to succeed. APQC is a member-based nonprofit serving more than 500 organizations around the world in all sectors of business, education, and government. Learn more about APQC by visiting www.apqc.org or calling 800-776-9676 or 713-681-4020.

Subject Matter Expertise

Kevin Desouza, senior strategic adviser, The Engaged Enterprise and assistant professor, Information School, University of Washington

Kevin C. Desouza is an assistant professor at the Information School of the University of Washington. His immediate past position was the director of the Institute for Engaged Business Research, a think-tank of the Engaged Enterprise, a strategy consulting firm with expertise in the areas of knowledge management, crisis management, strategic deployment of information systems, and government and competitive intelligence assignments. He authored Managing Knowledge with Artificial Intelligence (Quorum Books, 2002), co-authored Managing Information in Complex Organizations (M.E. Sharpe, 2005) and Engaged Knowledge Management (Palgrave Macmillan, 2005), and edited New Frontiers of Knowledge Management (Palgrave Macmillan, 2005). His most recent book is The Outsourcing Handbook: How to Implement a Successful Outsourcing Process (Kogan Page, 2006). In addition, he has published more than 100 articles in prestigious practitioner and academic journals such as Communications of the ACM, Journal of the American Society for Information

Partners’ Number of Employees and Average Gross Revenues

<table>
<thead>
<tr>
<th></th>
<th>Number of Employees</th>
<th>Annual Gross Revenues</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Entire Organization</td>
<td>$14B</td>
</tr>
<tr>
<td></td>
<td>Single Division/Business Unit</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>$50B</td>
</tr>
</tbody>
</table>

Figure 4

ABOUT APQC

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Desouza has advised major international corporations and government organizations on strategic management issues ranging from knowledge management to competitive intelligence and crisis management. Desouza is frequently an invited speaker on a number of cutting-edge business and technology topics for national and international, industry, and academic audiences such as the International Conference on Knowledge Management (as a keynote speaker), Ninth Annual KMWorld & Intranets Conference, APQC’s 10th Knowledge Management Conference, Security & Technology Online Conference–Security in the Era of Regulations, 20th Annual International Conference Meeting of the Society for Competitive Intelligence Professionals, Mid-Atlantic Chapter of Association of Contingency Planners, Business Resumption Planners of Chicago, and Business Continuity Planners Association, among others.

Carla O’Dell, president, APQC

Carla O’Dell is president of APQC. Under Dr. O’Dell’s direction, APQC has become a national leader in conducting and producing knowledge management best practice consortium studies, publications, and training and helping executives develop a powerful and results-oriented KM strategy. Her most recent book on the subject, The Executive’s Role in Knowledge Management, was published by APQC in 2004.

Dr. O’Dell is the co-author of two previous books, American Business: A Two Minute Warning, with C. Jackson Grayson, Jr. in 1988, and If Only We Knew What We Know: The Transfer of Internal Knowledge and Best Practice, with C. Jackson Grayson, Jr. and Nilly Essaides in 1998.

Wesley Vestal, KM practice lead and senior KM adviser, APQC

Wesley Vestal is the KM practice lead at APQC. In his role over the last eight years, Wesley has worked extensively in designing and implementing APQC’s KM service offerings and KM research topics as well as advising organizations such as Pfizer, Mattel, ExxonMobil Chemical, Best Buy, Schlumberger, U.S. Army Medical Division, and the American Red Cross on KM strategies, solutions, training courses, and measurement systems.

Vestal, a Six Sigma Green Belt, speaks at KM conferences around the world and is also an APQC-certified trainer on KM and benchmarking skills. He recently authored the book Knowledge Mapping: The Essentials for Success, is the co-author of the chapter “Best Practices: Developing Communities That Provide Business Value” in the book Knowledge Networks: Innovation Through Communities Of Practice, and has published several articles, including “Ten Traits of Successful Communities of Practice” and “Using Knowledge Management to Replicate the Gains of Process Improvement” in the KM Review. He has also served as a subject matter expert and co-author of APQC’s Using Communities of Practice to Drive Organizational Performance and Innovation, Integrating KM and Organizational Learning, Replicating the Gains from Six Sigma and Lean: Capturing and Transferring Knowledge and Best Practices, Integrating Knowledge Management and Organizational Learning, and Talent Management: From Competencies to Organizational Performance Best-practice Reports.
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Competing on Knowledge

“Competing on knowledge” is a catchy corporate tag line, but it can be an empty slogan if it does not fundamentally change the relationship with customers and drive the bottom line. The phrase usually refers to providing customers with knowledge-based products and services. In the case of this study, APQC found that best practices go beyond this—to actually increasing the success and competitiveness of the organization and its customers and suppliers by collaboratively creating and using knowledge across the value chain.

To stay in front of the seismic shifts in geographical, organizational, functional, and technological advances outside the organization’s walls, many have come to recognize that the value chain must be treated as a knowledge-sharing ecosystem. (For this study, APQC defined “value chain” as a connected series of internal and external organizations [including suppliers and customers], resources, and knowledge streams involved in the creation and delivery of value to end customers.) This study discovered that those who successfully leverage knowledge, skills, and expertise across the entire value chain have more intimate and “sticky” relationships with customers and a clear competitive advantage. Further, they integrate and leverage established competencies—such as communities of practice (CoPs), Six Sigma, and corporate learning and internal consulting initiatives—to ensure a robust and productive process with customers and suppliers.

In the modern, knowledge-based, global organization, there needs to be a channel for knowledge to flow across the boundaries. The defining feature of communities of practice is that they cross boundaries created by workflow, functions, geography, and time. It is not surprising then that communities are a key feature of the best-practice partners’ knowledge-sharing approaches across the ecosystem.

It is a truism that organizations achieve market results by maximizing the throughput of their value chains and not by optimizing any one component at the cost of others. One of the biggest challenges organizations face in sharing across the “white space”—whether that be internal organization silos or with suppliers and partners—is how to overcome the challenges that result from having multiple institutions, cultures, and management structures attempting to work together. A further challenge is that all of the stakeholders want to minimize risks and protect intellectual assets while opening boundaries for knowledge to flow.

This chapter will address how best-practice organizations determine the need for knowledge-sharing partnerships, cross the white spaces, identify opportunities to develop synergies with external entities, develop the value proposition and buy-in, and mitigate the risks that might arise from opening their boundaries to the larger ecosystem.
Best practices emerged as APQC studied in detail five organizations that were determined by the screening criteria to be exemplars in sharing knowledge across the value chain, building the value proposition, creating an infrastructure, and showing results. APQC refers to these exemplars as “partners.” APQC conducted structured site visits with Buckman Laboratories International Inc., Caterpillar Inc., Raytheon Co., Tata Steel Ltd., and the U.S. Air Force Materiel Command Knowledge Now program.

The following brief overview of the five site-visited partners provides context for understanding the strategic positioning and elements of their knowledge-sharing initiatives.

**PARTNER DESCRIPTIONS**

**Buckman Laboratories International Inc.**

Founded in 1945, Buckman Laboratories International Inc. is a privately held, global specialty chemicals manufacturer. It has approximately 1,500 associates with 22 offices in 19 countries; Buckman operates in more than 90 countries worldwide. It has 10 manufacturing facilities in nine countries (two in the United States). The organization’s more than 500 products are key to aqueous industrial processes used in manufacturing and treating pulp and paper, leather, paint, coatings, plastics, and wood. In 2004 Buckman’s revenues exceeded $420 million.

In the mid-1990s when Robert Buckman assumed leadership of the organization, Buckman moved to a customer intimacy model (from a more traditional product-based model). This in turn required the organization to re-think its mission statement, which spells out what it wants to provide to its customers:

*We, the associates of Buckman Laboratories, will excel in providing measurable, cost-effective improvements in output and quality for our customers by delivering customer-specific services and products, and the creative application of knowledge.*

The organization developed a global culture of knowledge sharing, pervasive electronic community spaces (called forums in the K’NetixSM space), and a world-class “learning center,” primarily virtual and digital. Buckman leveraged corporate training as the vehicle to teach, mentor, acknowledge the importance of, and demonstrate executive leadership in the use of knowledge-sharing process tools. Customers frequently turn to them for advice about knowledge sharing.

The creative application of knowledge is an important part of how Buckman implements its business strategy. Buckman’s customer intimacy model focuses on delivering a customized version of the company’s product mix that provides the best total value to the customer. It places a premium on individual and corporate knowledge and the capacity to act on it.

Leveraging knowledge allowed Buckman, who was often a small supplier, to become one of their customers’ preferred and sole-source suppliers.

**Caterpillar Inc.**

Caterpillar Inc. is the world’s leading manufacturer of earthmoving machinery and a leading supplier of agricultural equipment with $30 billion in annual sales and 75,000 employees. The organization makes construction, mining, and logging machinery as well as diesel and natural gas
engines, industrial gas turbines, and electrical power-generation systems. Caterpillar has 250 facilities worldwide and sells its equipment globally via a network of independent dealers. Caterpillar offers rental services; provides financing and insurance for its dealers and customers; and develops, owns, and operates electrical power plants around the world.

Caterpillar is a global organization with 26 autonomous business units that have their own budgets. Its 175 dealers are independent businesses with 1,800 dealer branch locations that are not owned by Caterpillar.

The organization’s vision and mission for knowledge sharing, developed by more than 100 community managers, is to be a global leader whose productivity and competitive advantage are maximized because validated, up-to-date knowledge is freely and easily shared across the value chain, especially with dealers. Because all of the company’s products are sold through independent dealers, it is vital to have collaboration across the value chain on a global basis.

Caterpillar’s core knowledge management (KM) team comprises three people who support the application, set the strategic direction for knowledge management, assess the value to the organization, provide training, and help with requests. Caterpillar’s Knowledge Network, its primary collaboration tool, is owned by Caterpillar University. Communities are a way for Caterpillar employees to connect with the organization’s global partners, customers, or teams in a virtual environment. In 2000 the company opened its Knowledge Network to members of its external value chain.

Within Caterpillar worldwide, the Knowledge Network has about 79 percent penetration into the salaried and management employees in any given 12-month period of time. The majority of the user base comprises people who run projects and implement processes on a day-to-day basis. It also has good engagement at all levels of management.

In late 2005, Caterpillar had approximately 4,300 communities of practice (not all of which are active). The company receives about 75 requests for new communities a month. There are 180,000 community memberships, defined as an individual who becomes a member of a community and then participates in the system’s push/pull of information. The system has also helped identify approximately 10,000 experts across the value chain.

**Raytheon Co.**

Raytheon is a defense and technology aerospace systems industry leader that grew in the late 1990s through a series of acquisitions and mergers, including Hughes Aircraft, TI Defense Systems, and E-systems. Raytheon is headquartered in Waltham, Mass. and has more than 80,000 employees worldwide with customers in 76 countries and $20.2 billion in annual sales. With so many different cultures now under one umbrella, many of whom used to be competitors, Raytheon recognized a need to work as one company focused on customer success. Its vision is to be the most admired defense and technology aerospace systems supplier through world-class people and technology.

Raytheon’s KM approach is designed to leverage knowledge and learning across the entire value chain and integrate with all improvement initiatives. Raytheon Six Sigma (R6σ) and Raytheon Learning were the foundation helping them launch Raytheon’s knowledge strategy. Raytheon’s KM strategy is to leverage systematic processes that create, capture, share, and reuse knowledge to create value for Raytheon and its customers and suppliers. Key to this strategy is the ability to pinpoint knowledge and move it to where it’s needed. This primarily occurs through Raytheon’s networks and
CoPs. Benchmarking is another key to their strategy, supported by their knowledge champions and benchmarking core team. Raytheon has a learning governance board made up of approximately seven members of the leadership team, with liaisons in each of the seven businesses called “business learning representatives” and liaisons to each of the functions called “functional learning representatives.” KM champions have the responsibility to work with their different CoPs, networks, and R6σ projects to help them learn how to leverage and move knowledge to create value.

**Tata Steel Ltd.**

Established in 1907, The Tata Iron and Steel Company (Tata Steel) is India’s largest integrated private steel manufacturing company. It has approximately 42,000 associates and belongs to the Tata Group, an $18 billion company. The organization’s steel making and finishing facilities, located in Jamshedpur in eastern India, produce more than 4 million tons of both flat and long products each year. In 2004 Tata Steel’s revenues equaled approximately $3.5 billion.

Tata Steel’s formal KM program began in 1999 in support of the organization’s vision to become an EVA-positive company and improve the quality of life for its employees. Since that time, the KM program has grown to include Tata Steel’s customers and suppliers. Tata Steel’s value chain includes the organization’s suppliers and customers. In fact, one of the organization’s strategic goals is to develop value-creating partnerships with customers and suppliers. Knowledge is shared across Tata Steel’s value chain via a series of structured processes under the Aspire framework which, as part of the Tata Business Excellence Model, combines total productive maintenance (TPM) philosophy, Six Sigma, total operational performance, suggestion management, and quality circles. The organization’s corporate KM group resides within the Aspire framework and reports directly to the deputy managing director of the organization.

In support of its vision and strategic goals, Tata Steel developed two processes in particular to help it manage knowledge across its value chain: the customer value management (CVM) program and its supplier value management (SVM) program, covered later in this report and in the Tata Steel case study.

**United States Air Force Materiel Command**

The Air Force Materiel Command (AFMC) is one of 10 major commands within the United States Air Force. AFMC is charged with delivering technology, acquisition support, sustainment, and expeditionary capabilities to the Warfighting Commands, such as Air Combat Command and Air Mobility Command, that use the weapons systems fielded and sustained by AFMC to execute the Air Force’s mission.

The AFMC is a blended team of Air Force civilians, military personnel, and contractors, headquartered at Wright-Patterson Air Force base in Dayton, Ohio, and nine other bases nationwide. AFMC employs approximately 80,000 men and women worldwide, the majority of which are Air Force civilians. The AFMC manages a budget of $47 billion.

The Air Force Knowledge Now (AFKN) program resides in the Air Force Center of Excellence (CoE) for KM at Wright-Patterson Air Force Base. The goal of AFKN is to accelerate decision making and improve the quality of the decisions by having the best information and the best knowledge at the time. Communities of practice are the heart of AFKN’s KM approaches.
The AFKN supports more than 2,700 formal and informal CoPs, which have more than 77,000 members. Suppliers represent approximately 5 percent of the system users, primarily because of security constraints. Before AFKN enabled communities of practice and discussion forums, a person might leave a message or e-mail and wait anywhere from two days to two weeks for a response. Now, users can post an inquiry on a community of practice page in a discussion forum and get an answer within an hour from a multitude of people.

AFMC and the AFKN program define the extended value chain (e.g., internal and external) to include AFMC’s end customers (e.g., Air Combat Command and Air Mobility Command) as well as suppliers.

AFMC has determined that KM is one of the key enablers in the transformation of information and breaking the knowledge barrier. The Air Force Information Resources Flight Plan defines KM as a systematic process of capturing and transferring information that can be used to enhance performance or improve related tasks or processes.

In 2004 the successes of the AFKN program resulted in the Air Force CIO naming the AFKN program as the Air Force Center of Excellence for KM. As the CoE for KM, AFKN comprises 19 people responsible for strategy, IT/tech support, community of practice (CoP) support and facilitation, and partnering with other Air Force organizations and programs in support of their KM needs.

**Best Practices**

From these five best-practice partners, the APQC study team extracted a core set of best practices that can guide any organization as it expands its knowledge sharing to the larger value chain. Those to be covered in this chapter follow.

1. Escape the commodity pricing trap through customer segmentation and intimacy developed through knowledge sharing.
2. Build a sustainable, win-win value proposition all along the extended value chain.
3. Build value chain initiatives on a foundation of competency in KM, process improvement, leadership development, and learning.
4. Use relatively straightforward techniques for managing the potential legal and exposure risks in sharing knowledge across the extended value chain.

**CUSTOMER SEGMENTATION AND VALUE-ADDED RELATIONSHIPS**

**Escape the Commodity Pricing Trap Through Customer Segmentation and Intimacy Developed Through Knowledge Sharing.**

One of the most important benefits of strategically sharing knowledge with selected customers is the creation of more intimate and value-added relationships. Intimate knowledge of customer needs builds trust and better results and allows the provider to customize value-added products and services with higher margins.

It is truism in personal and professional relationships that sharing knowledge leads to greater empathy, understanding, and trust, and increases the likelihood of win-win scenarios. In a commercial context, collaborative partnerships—based on jointly derived knowledge—help to build trust and avoid transactional relationships where price is the only factor affecting decisions. Customers see higher returns on their own bottom line from the relationship and are not buying solely on the
basis of line-item costs. For example, chemicals and steel are basic commodity industries and could easily be driven by price alone. **Buckman and Tata Steel** could have languished in this lower-margin region if they had not decided to compete on knowledge in strategic market segments.

However, relationships are expensive to grow and maintain. Knowing they could not support intimate, knowledge-based relationships with every customer in every industry, **Buckman** made the strategic choice to focus on three core segments: pulp and paper, leather, and wastewater treatment. This allowed them to build their technical expertise and provide a full range of services, including assuming the consignment management of key customers’ specialty chemicals. For example, Buckman selected the paper industry as a segment to serve because it was consolidating and outsourcing specialty chemical inventory and expertise.

This decision to segment and focus has allowed Buckman to move from a commodity product-focus, selling one or two chemicals to each customer (“Find customer. Sell drums.”), to completely assuming on-site supply chain responsibilities for all a customer’s specialty chemical and related technology needs and providing the technical expertise to help customers apply the chemicals in their situation.

This move toward true partnering has led to lower costs and higher profits for both Buckman and these selected customers and taken Buckman out of the commodity trap. In addition, this increase in Buckman’s knowledge base has resulted in the innovation of some new chemistries and is one reason Buckman measures corporate success by revenues from new products.

Buckman achieves intimacy and differentiation by the use of two tools, which are primarily used with customers, although they are also applied along the supply chain. These two key approaches are 1) transition workshops and 2) customer satisfaction surveys and workshops, described here.

1. **Transition workshops**—The purpose of a transition workshop is to provide a mechanism for transitioning customers from another supplier to Buckman by spending a week doing one-on-one interviews with people at the customer site. The Buckman team provides the customer with an implementation plan that contains everything the customer has said they wanted (in their words). The plan includes the transition steps, the timeline, and how progress will be measured. The plan is presented to all the employees who were interviewed and leads to a huge level of trust and understanding among all the stakeholders.

2. **Customer satisfaction surveys and workshops**—The customer satisfaction survey contains 25 questions that give Buckman significant feedback on its customers’ needs and expectations. Associates follow up with their customers whenever they receive an unusual response to a survey question to understand what the customer meant. The customer satisfaction workshop is a simple but effective way to establish and re-calibrate the relationship with the customer. According to the Buckman team, the benefits realized from their knowledge-sharing activities and strategies include increased customer loyalty, new business with customers, and penetration of global key customer accounts.

**Tata Steel** is another example of using knowledge sharing across the value chain to escape the “race to the bottom” that can be the result of commoditization and lack of segmentation of customers. To escape the commodity trap, Tata encouraged its customers to find ways to help their customers sell their products more effectively. Tata de-emphasized the importance of having a larger portion of the final product; instead, if their steel improves the final quality of the product, then it is a value creation opportunity.
By 1999 Tata Steel achieved the position of being the lowest-cost steel-producing company in the world. During this time, the company was interacting with customers on a transactional basis only. In 2000 the organization realized they were not focusing on any particular customer segment, so they decided to focus on their automotive and construction customers. The customer value management (CVM) program was launched in 2002 to meet the needs of a selected 20 to 25 customers from the automotive and construction industries. In this program, Tata Steel is exploring methods to work collaboratively and provide comprehensive need fulfillment to its customers and develop a “shared destiny.” This concept of shared destiny refers to the organization’s philosophy that if a customer is growing at a certain rate, then Tata must also grow at the same rate in order to be a strategic partner with that customer.

Even within a prime customer, Tata focuses its knowledge sharing. In other words, Tata chooses what customer issues to focus on and provide value for, while understanding that they will not be able to meet all customer expectations and always move beyond the price agenda. Chapter 2 has detail on how this is done.

Tata’s supplier value management (SVM) requires the supplier participants to have had a relationship with the organization for at least three years. Additionally, Tata Steel must be one of the supplier’s five key customers. Each aspect of the SVM program is run as a separate project following a structured methodology with well-defined timelines.

To date, Tata Steel has conducted its SVM program with nine of its key suppliers and generated a value potential of $6 million. Involving 165 people, the program has generated a total of 62 ideas, 33 coming from the suppliers and 29 from Tata Steel.

Customer segmentation occurs even in government. When the AFKN engages with its customers, they approach each project from a consulting perspective and have a full-spectrum service offering, including change management, business case development, design workshops, collaboration, communities, and supporting information technology. The AFKN group made a conscious decision to devote attention and resources to those that are interested, to not waste energy on detractors, and to not try to be everything to everyone. The AFKN has developed three criteria for selecting among all the requests and potential customers.

1. **Need**—Within the Air Force, as in many organizations, there is more existing data, information, and knowledge available than ever before, and it all must be captured and easily accessible to personnel. Some is more important than others.
2. **Recognition of need**—People have come to recognize that knowledge is a primary strategic mission asset. The AFKN doesn’t have the resources to spend converting disbelievers.
3. **Something can be done about the need**—Powerful processes and tools can meet this need. The AFKN has a growing body of KM case studies and best practices available to learn from and leverage.

**BUILDING A SUSTAINABLE, WIN-WIN VALUE PROPOSITION**

*Build a Sustainable, Win-Win Value Proposition All Along the Extended Value Chain.*

A clear value proposition and a win-win outcome for the organization and its customers is vital to the creation, selling, and execution of value chain knowledge-sharing initiatives. Increasing a customer’s or supplier’s return on investment (ROI) has to be a key objective of a sustainable approach.
Simply increasing the organization’s ROI is not a very compelling objective for its customers or suppliers. Use of customer-focused and supplier-focused value management programs allows organizations to create collaborative partnerships, penetrate farther, build trust, and most importantly, identify win-win knowledge-sharing opportunities that result in better business for both sides.

As Figure 5 illustrates, partners’ objectives are focused on external revenue growth and business opportunities. This may reflect maturity and confidence in the ROI from knowledge sharing on the part of the partners. Based on an ROI study conducted a few years ago, Caterpillar learned that the value of including external partners in the communities was four times the value compared to a community that included Caterpillar people only. Approximately one-third of the entries (initial discussions) in 2004 took place in communities that included individuals who were not Caterpillar employees.

An internal focus for knowledge-sharing activities is insufficient for building a sustainable business case. Today’s focus on growth and revenue absolutely requires the inclusion of the larger or extended value chain and an ROI for customers. Tata Steel and Buckman Laboratories have very rigorous approaches for creating a shared and measurable vision for how all parties make more money.

Buckman Laboratories is an excellent example of an externally focused, knowledge-sharing strategy delivering sustainable value.
A trigger for Buckman to compete on knowledge was an increase in global competition and the move by some customers to sole-source suppliers and/or to reduce the number of suppliers. As a small organization, it had to find a comparative advantage, and knowledge sharing was it. Knowledge sharing allows Buckman to compete with organizations five times its size in terms of speed of response, cut costs for customers, and increase penetration into customer accounts.

Raytheon’s win-win business philosophy is that if it helps its customers succeed, then it will grow, and as it grows, it will increase its shareholders’ value. Raytheon’s customer focus (and growth) is based on three key pillars:

- **performance**—promises made and promises kept;
- **relationships**—listen, anticipate, respond, and follow through with its customers, partners, and each other; and
- **solutions**—develop and provide superior customer solutions working as one company.

Underlying all of these is customer-focused marketing. It has not always been that way. Technical excellence has been a cornerstone of Raytheon’s success for more than 80 years. For much of that time, its people—its engineers—were very product focused rather than customer focused, which can get in the way of providing the best solutions for customers. Change to customer focus represents a fundamental paradigm shift for Raytheon.

It is not always possible to find a compelling win-win for community knowledge sharing. For example, Caterpillar’s 1,500 suppliers have been slower to adopt the Knowledge Network than have its dealers. Supplier relationships are managed on an individual basis. Dealers have adopted faster, in part, because dealers have a lot of products coming from multiple businesses and do not compete with each other, so it is easier for them to use the communities in the Knowledge Network on a more global basis.

**BUILD A ROBUST FOUNDATION**

**Build Value Chain Initiatives on a Foundation of Competency in KM, Process Improvement, Leadership Development, and Learning.**

APQC has found that KM produces the highest value when it is integrated with other strategies, tools, and approaches designed to produce results across the value chain. Figure 6 (page 26) illustrates how KM, process improvement, and learning provide a fulcrum supporting the value chain, not existing independent of it.

In fact, some partner experiences suggest that stand-alone knowledge-sharing approaches tend to have isolated successes, take longer, provide additional change management challenges, and have a limited life span. For example, Raytheon tried to create KM in 1997 without success because it was not linked to other strategies. They found it far more productive to link leadership development strategy and programs with organizational strategy and teach employees to think about sharing across the ecosystem.

As is apparent in Figure 7 (below) the partners have aligned their knowledge-sharing strategy with learning and other important enterprise strategies.

Getting good at integrating and using these approaches internally is a potent precursor to value chain initiatives. Partners did not just leap into initiatives across the value chain as their first foray
into KM. Most of the partners had established a competency and track record in knowledge sharing before they extended it to the ecosystem. It was a natural evolution of their success with KM, process improvement initiatives, and a variety of other learning initiatives that had already imbued the organization with relevant competencies.

This foundation provided the opportunity to hone skills and methodologies, develop a common framework, and build a track record of success before taking it to customers. Sales and marketing executives are loath to test unproven techniques on their most valuable customers.
One of the most important benefits of having a common framework, whether it is built around Six Sigma or KM/communities of practice, is that it provides a common language and culture on which to build. It is also highly efficient. Multiple unrelated approaches limit synergy and create multiple pockets of excellence that are difficult to take to scale.

Most of the best-practice partners had passed their “proof of concept” phase with KM and other internal initiatives before involving customers in knowledge sharing. They had built competency in KM and achieved fluency internally, had rolled out consistent processes and technology, and were speaking the same language and espousing shared values before taking it to customers.

- Both Caterpillar and Raytheon had integrated KM into the learning organization and clearly linked knowledge sharing to Six Sigma methodologies.
- At Tata Steel, knowledge sharing and the value chain initiatives are part of the organizational excellence strategy called Aspire.
- Knowledge sharing is part of the learning and marketing strategy at Buckman.

In 2000 Caterpillar launched Six Sigma on a worldwide basis as a business process enabler to help control variation. Based on the Six Sigma team’s recommendations, in 2001 Caterpillar University was created to be the corporate owner for learning and take over the knowledge-sharing efforts and spread them across the entire company. Knowledge sharing became a key component of Caterpillar’s learning model.

Like Caterpillar, Raytheon is another example of a company that integrated knowledge management into its Six Sigma improvement initiatives, as well as its learning organization. Raytheon Six Sigma (R6σ) is defined as the knowledge-based process for transforming Raytheon’s culture to maximize customer value and grow the business. R6σ and Raytheon Learning were the foundation helping them launch their knowledge strategy. R6σ training and project work have created numerous opportunities for building cross-company networks that form channels of subsequent knowledge transfer and collaboration.

Knowledge is shared across Tata Steel’s value chain via a series of structured processes under the Aspire framework. The company has integrated its knowledge management process with its Aspire framework in order to best leverage the re-use and sharing of information with other departments to avoid duplication of effort. Another benefit of integration is improving the use of knowledge, as opposed to merely inputting information into the repository, and spreading knowledge across the value chain by integrating supplier and customer information into the knowledge management portal.

Buckman Laboratories spent a decade building a foundation of knowledge sharing and learning that made it possible for them to drive a disciplined set of consistent processes globally for capturing and sharing knowledge about and with customers. This foundation has made it possible to create, deploy, and achieve a remarkable level of consistency in customer-centric processes globally. These disciplined processes, including Account Management Programs, many of which are taught to all employees, focus on understanding customer requirements and ensure Buckman is able to deliver against those requirements.

In sum, getting good at integrated approaches to improvement prior to involving customers and suppliers is a good idea. However, if an important opportunity arises and a business case can be made to involve customers or suppliers earlier, it may still be worth it to do so.
Risks Can Be Managed

Use Relatively Straightforward Techniques for Managing the Potential Legal and Exposure Risks in Sharing Knowledge Across the Extended Value Chain.

One of the biggest roadblocks raised before an organization involves customers and suppliers in meaningful collaborative knowledge exchanges is the risk of exposing problems or incurring liability. Partners all expected the legal and risk issues to be difficult to overcome. In fact, by addressing them early and controlling access and terms of use, these did not remain a problem or a barrier to sharing. All have policies to manage risk. In making the case to include external value chain partners in the system, Caterpillar had to address the following business requirements.

- **Security**—how it is controlled, who manages it
- **Legal**—what is shared with whom
- **Metrics**—built-in measurements on activity as well as value are needed
- **Taxonomy**—how it is organized to make sense to value chain partners

The Knowledge Network has not experienced any of the problems Caterpillar was warned to expect when it opened its communities to its value chain partners. However, even with their successes and broad penetration, some executives are still concerned about collaborating directly with clients. Buckman also found there were not a lot of risks to sharing or reusing knowledge across Buckman’s value chain. In order to address concerns regarding intellectual property and privacy issues, Buckman’s customers, suppliers, and contractors must sign confidentiality agreements. Internally, some communities and forums have restricted access or “need to know” access in order to allay any concerns regarding intellectual property or confidentiality issues.

As one would expect, the Air Force has strong information assurance and security processes in place to protect classified information and define appropriate behavior within a virtual environment. The CoE for KM leverages these processes to mitigate and minimize risks around sharing classified information, whether that is in document form or in a discussion forum. Tata Steel realizes that there will always be proprietary or otherwise sensitive information on both sides of the relationship. To mitigate this risk and continue to have a successful relationship, each party must be willing to execute a confidentiality agreement and understand that ideas developed for one customer account cannot necessarily be duplicated for other accounts. Documentation of the entire process with a customer or supplier is key to mitigating potential risks. Tata Steel is also cautious to only share information that is pertinent to creating value with a customer.

As these examples attest, in every partner case these issues were readily addressed and risks mitigated. In no case has a legal or exposure problem arisen over the hundreds of thousands of exchanges that have occurred across all of the best-practice partner organizations. Additional details on security and access approaches are covered in Chapter 2.
CONCLUSION

Engaging in knowledge sharing with customers and suppliers is the next step in the evolution of the modern, knowledge-driven organization. KM nurtures and harnesses the raw material (knowledge) of this millennium in the service of the total ecosystem, not a single function or business.

This chapter highlighted four best practices shared by the partner organizations.
1. Customer segmentation and intimacy developed through knowledge sharing enable organizations to escape the commodity pricing trap.
2. Partners build a sustainable, win-win value proposition all along the extended value chain.
3. Best-practice organizations build their value chain initiatives on a foundation of competency in KM, process improvement, leadership development, and learning.
4. There are relatively straightforward techniques for managing the potential legal and exposure risks in sharing knowledge across the extended value chain.

The following chapters will explore in detail how these organizations were able to create, enable, communicate, deploy, manage, and sustain these practices, and how their experiences have shaped APQC’s model for the stages of knowledge management.
Creating an Enabling Environment and Gaining Support for Knowledge-Sharing Partnerships

Unless an organization has the right environment (culture) in place, fostering knowledge-sharing partnerships will not be possible. Of everything to be discussed in this report, culture is quite possibly the biggest deal breaker. One can think of culture as the ultimate enabler, and if not attended to properly, a suppressor of knowledge-sharing initiatives.

The APQC project team observed four best practices related to creating the enabling environment for knowledge-sharing partnerships.

1. Gain clear, visible, and sponsored executive support by tying knowledge sharing to business strategy and business value.
2. Understand business processes so that knowledge-sharing practices can be built around them.
3. Gain buy-in by leveraging strong change management techniques and involving the appropriate value chain partners in the design of the knowledge-sharing initiative.
4. Use a communication strategy to spread the word about the initiatives and build and sustain buy-in.

This chapter examines these prerequisites for creating an environment that enables the creation and management of knowledge-sharing partnerships. (The tactical framework for creating and managing a knowledge-sharing partnership will be discussed in Chapter 3.)

**EXECUTIVE SUPPORT**

*Gain Clear, Visible, and Sponsored Executive Support by Tying Knowledge Sharing to Business Strategy and Business Value.*

Executive support has been shown to be a critical ingredient for knowledge management initiatives. Without executive sponsorship it is difficult, if not impossible, to get widespread support and participation in knowledge-sharing engagements. At the partner organizations, there was a clear indication that executives were involved and championed the knowledge-sharing partnerships.

For instance, at Buckman Labs, Bob Buckman, who took over the company from his father, wanted to transform the way his organization did business. In particular, Buckman wanted to move more of the decision-making power to the front lines of the organization. In order to achieve this objective, it was

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clear that viable, knowledge-sharing partnerships needed to be in place so as to enable effective and efficient transportation of knowledge.

One way to get executive support for knowledge-sharing initiatives is to frame them in the appropriate language—the language of executives. Executives care about the business strategy and the business value of the organization. Tying knowledge-sharing initiatives to these two concepts will be critical to draw executive attention. Tata Steel has long been an organization where knowledge management efforts have been tied to business strategy and business value. “Value creating partnership with customers and suppliers” is included in the strategic goals of Tata’s 2007 vision.

Tata realized that its most valuable assets are its employees. Moreover, in order for its employees to perform at their best, they have to be given the ability to learn from each other and inform the work done by one another—hence the prominence of knowledge-sharing initiatives. One thing Tata has done is tie knowledge-sharing initiatives to customer value and supplier value through its CVM program and its SVM program (described in the next section).

Tata Steel’s CVM program started approximately three years ago. Using criteria such as volume and strategic long-term relationships, Tata prioritized its customers and short listed 20 of them to participate in this program. Segmenting customers to focus on the most important and prominent ones is very important. Some customers may be better providers of innovative ideas than others and, hence, need to be given more attention. Moreover, customers can also differ in how much they influence the product design and other issues of the organization, especially in the case of large customers who account for a significant portion of one’s market share. One of the goals of Tata’s CVM program is to take Tata’s customer relationships (which have traditionally been transactional in nature) and make them more collaborative. Tata structured the CVM program with an internal, cross-functional team that includes representatives from planning, product development, technology, marketing, and sales. One condition of participation is that the customer must create a similar team for themselves. Under the CVM program, the Tata and customer teams share knowledge developments, goals, and processes with each other in order to improve business.

Tata made it a point to show that knowledge-sharing partnerships were vital to the success of its business strategy and business value. Similarly, Raytheon’s commitment is to build an exclusive culture that recognizes uniqueness, empowers each employee, values all contributions and contributors, and leverages its diverse work force to maximize Raytheon’s competitive advantage. Raytheon has been successful in tying knowledge-sharing and learning activities directly to its competitive advantage and business success. Caterpillar chartered a team that examined what the organization needed to do to remain competitive in the future with rapidly changing markets and global customers. The outcome was that the organization needed to focus on continual learning and change faster to meet its goals.

Probably no other organization is a better exemplar of having executive support for knowledge management efforts than Buckman Labs. A set of three strategic decisions set Buckman apart from its commodity competitors:
1. to compete on knowledge in three selected industries;
2. to be customer-centric and focus on understanding and meeting requirements better than anyone else; and
3. to employ consistent methods globally, which helps establish a global brand.

Over the past 25 years, the Buckman culture has changed to the point where knowledge sharing is now how they do business. Using good change management principles and wrapping knowledge sharing around the business strategy allowed people to understand the value proposition and how they would benefit. Part of the process included accumulating success stories and telling them over and over again. Once again, it is important to note that being clear and concise in how knowledge sharing is connected to business value is critical.

**UNDERSTANDING BUSINESS PROCESSES**

**Understand Business Processes so That Knowledge-Sharing Practices Can Be Built Around Them.**

While knowledge-sharing processes need to be connected to the strategic aspects of the organization, as noted above, they also need to be tied to the operational aspects of the business—the processes. Business processes comprise and represent the movement of work in the organization. They can be thought of as the chain of activities that help mobilize resources, internally and externally, within and across the organization. Embedding knowledge sharing into these processes is critical.

As a part of the Aspire initiative in its procurement division, Tata Steel initiated its SVM program to explore value creating opportunities with suppliers. This program focuses on optimizing resources along Tata’s entire supplier value chain by creating a system for better understanding user requirements and supplier capabilities. For example, one of the problems faced at the steel making shops was to bring about a quantum change in the consumption of aluminum wire used in steel making. Through the SVM program, the bottleneck areas and machine constraints were better understood and solved by leveraging the knowledge and capability of the supplier. This resulted in a 100 percent increase in the consumption of aluminum wire, which was considered to be very difficult before the program. Similar to the CVM program, the SVM program also has a cross-functional team drawn from key stakeholders in Tata’s organization. Each aspect of the SVM program is run as a separate project following a structured methodology with well-defined timelines.

Understanding business processes will help an organization choose the right places for embedding knowledge sharing. Buckman’s management explored using the Malcolm Baldrige National Quality Award (MBNQA) criteria as a systematic management process and discovered how few consistent processes they had across the global organization, making it hard to give customers a consistent experience and to share knowledge. This discovery led them to standardize processes in the sales and customer relationship management space and the development of knowledge sharing tools such as Think T (a meeting planning tool), transition workshops, the requirement alignment tool, and the establishment of the “8 Business Management Standards.”

**GAINING BUY-IN**

**Gain Buy-In by Leveraging Strong Change Management Techniques and Involving the Appropriate Value Chain Partners in the Design of the Knowledge Sharing Initiative.**

Engaging the organization in knowledge-sharing efforts requires change management efforts. It is important to recognize that getting people (or entities) to share knowledge is both natural and unnatural. On the natural side, all entities are connected to other entities and must share knowledge (and information) in order to be even marginally successful in their individual goals and objectives. However, on the unnatural side, organizations have to recognize that knowledge possessed by an entity is a source of power.
This knowledge makes them feel wanted, needed, and recognized in the organization. Fears such as the chances of them being outsourced, downsized (or right-sized), or automated are severe deterrents to knowledge sharing. The change management program of the organization has to recognize these issues and come up with an appropriate strategy to manage them.

The best way to manage change is to take a segmented approach. It is difficult, if not impossible, to change the complete culture of an organization overnight. An organization should choose one place to start out with change management, demonstrate visible results, and then begin to involve other areas. For this study’s partners, these techniques included establishing reward and recognition systems, linking knowledge sharing to performance reviews and evaluations, employing strong communication strategies (discussed in next section), involving value chain partners (internal and external) in the design, and addressing risk management.

Reward and Recognition

The other thing to remember regarding buy-in is that actions speak louder than words. If cultural change is going to take place, the organization must be serious about rewarding the new behavior. Employees should be rewarded for sharing what they know. Entities should be encouraged and rewarded for their effort in setting-up cross-functional programs.

**Raytheon** strongly believes in recognizing people who demonstrate knowledge-sharing and reuse behaviors and leverages a number of forums and celebration activities for this purpose. Many of its CoPs offer achievement awards, some monetary, to members who exhibit effective knowledge-sharing and reuse behaviors. Additionally, its R6σ experts and specialists may receive a reward or recognition through their project achievements (these usually occur within the auspices of a particular CoP), not the least of which is certification.

With the exception of its annual team award, **Buckman** focuses on the intrinsic rewards for knowledge sharing. These include enhancement of individual expertise, networking, and improved customer and supplier relationships. Using the available knowledge-sharing tools increases Buckman associates’ expertise, resulting in them making more money, improving their networking abilities, and deepening and strengthening their relationships with customers and suppliers. The organization’s customer intimacy model strongly reinforces the need to use these tools because long-term relationships are the goal. There is an exception to this intrinsic focus; Buckman’s team-of-the-year award is offered to its TeamToolz teams. This award recognizes several team values such as working effectively as a team, developing individual team members, sharing knowledge among team members and outside the team, and holding itself accountable for achieving results.

**AFKN** leverages team rewards and individual recognition in order to encourage knowledge sharing and instill the desired behaviors into personnel. It has a “CoP of the Quarter” award and a “CoP of the Year” award. These awards are presented to CoPs that have achieved their stated objectives, lead to time/resource savings, and/or created new processes or innovative ideas.

In addition to these formal, group-oriented awards, the AFKN also recognizes individuals on a more informal basis for sharing knowledge with a special AFKN coin that they can display in their work area or carry around with them.

When asked if they have incentives in place to support knowledge sharing across the value chain, 50 percent of partners indicated “yes.” When asked what incentive tools they use to encourage
members of the *internal* value chain to share and reuse knowledge, the most frequent responses included plaques/certificates/tokens, company-sponsored trips or meals, and access to company learning or training. When asked the same question about knowledge sharing and reuse for the *external* value chain, partner responses included preferred or special status within the organization, company merchandise, and plaques or certificates.

**Tying Knowledge Sharing to Performance Evaluations/Assessments**

Many of today’s knowledge-driven organizations have recognized that what gets measured matters to people. Although this usually applies to hard measures, like productivity measures (e.g., sales revenue), it can also apply to softer, more intangible things like knowledge-sharing behaviors. This study’s partners have taken steps to make that connection between behavior and performance. As mentioned in the previous section, Raytheon, for instance, requires its R60 experts and specialists to demonstrate knowledge-sharing behaviors as a criterion for certification. At Buckman, sharing knowledge is everyone’s responsibility. To emphasize the importance of this behavior, Buckman’s results, action, and development (RAD) worksheets include a number of knowledge-sharing elements and how an associate makes use of knowledge-sharing tools. It’s not enough that an individual indicates that he or she has used these tools in their job; they must also provide examples of use or reasons as to why they might not have used a tool for a particular team or project.

**Involving Value Chain Partners**

Understanding business processes will help an organization choose the right places for embedding knowledge sharing. However, it is important to remember that knowledge sharing is about people connecting to people. Any knowledge-sharing initiative or partnership should be “made for the people and made of the people,” to put a twist on a quote by Daniel Webster. Once the business processes are outlined, the organization can go about the business of involving value chain partners. It is important to remember that for building sustainable knowledge-sharing programs, the organization should involve in a collaborative and engaging spirit with its business partners. Working in isolation and then expecting business partners to partake in the activities is not advisable. If it is difficult to control external entities (e.g. value chain partners), it is equally difficult to coordinate knowledge-sharing partnerships with them. Unless the value chain partners are brought into the discussions upfront and are given influence to help design the knowledge-sharing protocols, they are not likely to participate in them.

In order to involve the value-chain partners, the knowledge-sharing partnerships must have something to offer them. This can be in the form of increased productivity and performance, better innovation, or improved work processes. At Buckman, for instance, some members of mid-management and some technical people did not want to give up power and knowledge, but the implementation of knowledge-sharing processes and approaches both helped increase buy-in and also helped people find information they needed in other areas of the organization faster and easier.

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3 Quote from Daniel Webster’s speech before the U.S Senate on Jan. 26, 1830
Also, consider the case of the Air Force. The AFKN program has four primary objectives:
1. create decision-quality information,
2. transform military functions,
3. retain "corporate" skills, and
4. accelerate learning processes.

The first, create decision-quality information, refers not only to data but also to the meaning, context, and timing of that data as well. AFKN wants to accelerate decision making and improve the quality of the decisions by having the best information and the best knowledge at the time.

The second objective is to transform military functions. This objective refers to the amount of time it takes to make a decision or complete a task. Prior to the implementation of discussion forums and CoPs within the Air Force, it could take anywhere from two days to two weeks to get a response to a question. Now, with the discussion forums (housed within the CoPs), people receive responses to their inquiries much more rapidly, sometimes within an hour of posting the initial question. Being able to leverage information and knowledge in this manner improves the overall effectiveness of the organization, helping people transfer information and skills and accelerating the learning process.

**Risk Management**

As mentioned in Chapter 1, one must also think of the risks. Risks are especially important considerations when involving external partners. Tata Steel, for instance, recognizes that there will always be sensitive information disclosed on both sides of the relationship. To address this issue and ensure a successful relationship, each party must be willing to execute a confidentiality agreement and understand that ideas developed for one customer account cannot necessarily be duplicated for other accounts. Documentation of the entire process with a customer or supplier is key to mitigating potential risks. There is always the possibility that a customer may extend an idea that was developed in collaboration with Tata Steel to one of Tata’s competitors. Tata realizes this risk and manages such by continuing to reinforce and strengthen the relationships with current long-standing customers and suppliers. The organization believes that if they continue to generate more ideas for an organization and maintain an active and long relationship, then the risks associated with that organization will decrease, as the level of trust increases. In the words of Tata Steel representatives, “Once you mount a tiger, you can’t get off.” Tata Steel is also cautious to only share information that is pertinent to creating value with a customer.

**COMMUNICATION STRATEGY**

*Use a Communication Strategy to Publicize the Initiatives and Build and Sustain Buy-In.*

The communication strategy is the next vital aspect of building the right environment for knowledge-sharing partnerships. At the strategic level, the communication strategy is concerned with devising the right message so as to engage all of the value chain partners. How the message is framed can have a significant impact on the environment. Ideally, an organization should frame it as a win-win situation for both themselves and the external partners. For example, Tata’s message with its suppliers is a “one firm” concept, or system-cost philosophy, where Tata views itself and the supplier as one entity in order to maximize mutual benefit. Moreover, its message with its customers is one of developing a congenial atmosphere for sharing; Tata Steel does not concentrate on just obtaining
a “win” for itself. Caterpillar uses storytelling to spread the message of the importance of knowledge sharing. One of Caterpillar’s prime success stories has been a recovery effort managed through a community for one of its major suppliers that was hit with a massive tornado in 2004. It was a very compelling testimonial about the value of a community and collaboration. Buckman communicates and markets its knowledge-sharing processes and approaches through brochures, presentations to customers, articles, and papers. Finally, at the Air Force, providing effective communication and training are key components to facilitating the change process. The AFKN team realizes the importance of simple, non-technical communications when conveying the business purpose of the AFKN to the end users. One message they want to get across is that CoPs (or whatever the solution may be) are a long-term investment that will benefit stakeholders across the value chain. Key components of each message include what, why, and how (benefits).

**CONCLUSION**

During the course of this study, the APQC project team discovered the following four best practices as prerequisites for creating and managing knowledge-sharing partnerships.

1. Gain clear, visible, and sponsored executive support by tying knowledge sharing to business strategy and business value.
2. Understand business processes so that knowledge-sharing practices can be built around them.
3. Gain buy-in by leveraging strong change management techniques and involving the appropriate value chain partners in the design of the knowledge-sharing initiative.
4. Use a communication strategy to spread the word about the initiatives and build and sustain buy-in.

Obviously, culture and change management play crucial roles in ensuring an enabling environment for knowledge-sharing partnerships. However, the partners have also taken clear steps to build a strong framework for these partnerships. Chapter 3 will examine in detail the strategic and tactical steps necessary to build this framework to support knowledge-sharing partnerships across the value chain.
Creating and Managing Knowledge-Sharing Partnerships

Good partnerships, like good wine, require planning, effort, and time. Most organizations have business partnerships with a number of outside entities; what seems to distinguish the ordinary from true knowledge-sharing partnerships is the win-win relationship. How did this study’s partners establish relationships built on knowledge that drove newfound business opportunities? They used the full arsenal of proven knowledge-sharing approaches and focused intensely on business results for both parties. An old adage says, “A rising tide floats all boats.” Partner organizations recognize that their success is inextricably tied to that of their value chain partners, so creating and effectively managing knowledge-sharing partnerships has become an important part of their business strategy.

Creating Knowledge-Sharing Partnerships

How do you determine when to create knowledge-sharing partnerships along the value chain? The value chain, as defined in Chapter 1, is a connected series of internal and external organizations, resources, and knowledge streams involved in the creation and delivery of value to end customers. Partner organizations followed a natural evolution in creating partnerships, starting with connecting internal value chain partners (e.g., marketing, development, engineering, and manufacturing) and then bringing customers, suppliers, and other organizations into the mix. However, it is vital to build partnership capability into the organizational KM approach from the beginning if you wish to truly integrate the value chain. Using the retrospective afforded by this study, the APQC project team offers several suggestions for organizations who wish to create effective knowledge-sharing partnerships no matter where they lie in APQC’s KM stages of implementation. The best practices for this chapter follow.

1. Create an approach to determine and prioritize which parts of the value chain to enable with knowledge-sharing tools and techniques.
2. Analyze the performance of critical value chain partnerships to identify where it is appropriate to transfer and implement best practices.
3. Select the appropriate array of knowledge-sharing tools/approaches to match the needs of each partnership.
4. Lower the barrier to entry for knowledge sharing between value chain partners by providing intuitive, easy-to-use tools.
5. Create and operate under a shared funding model divided between the business units and the corporate level.
6. Define clear governance processes for value chain knowledge-sharing partnerships.
7. Define clear roles and responsibilities for overseeing knowledge-sharing partnerships and managing the change required for success.
8. Create standard operating processes and workflow for managing the security and confidentiality within the partnership.
9. Conduct face-to-face partner forums/workshops with key value chain partners to build understanding of processes and create trust for knowledge sharing.
10. Use multiple communication vehicles as often as possible to strengthen support for current and future knowledge-sharing partnerships.

PRIORITIZE VALUE CHAIN PARTNERSHIPS
Create an Approach to Determine and Prioritize Which Parts of the Value Chain to Enable with Knowledge-Sharing Tools and Techniques.

Best-practice organizations partner and share knowledge with all parts of value chain, not just customers and suppliers, including research partners, regulatory entities, associations, and even competitors. In most cases, the study’s partners looked for expanded business opportunities when forming partnerships—what capability or capacity can this new partnership offer? Three-fourths of the partner organizations have created new or expanded business opportunities due to the extended knowledge-sharing program. These opportunities have primarily been in joint ventures with partners in existing markets or expanding market share in existing markets.

When the Air Force Knowledge Now (AFKN) team engages with its customers, they approach each project from a consulting perspective. According to Doug Acker (knowledge architect, AFKN), KM is more than mere document organization, decision-support systems, artificial intelligence, re-engineering processes, and many other practices that have become slogans, including “e-” terms. As mentioned in Chapter 1, the AFKN team concluded that there are three main factors that contribute to the creation of knowledge-centric solutions.

1. **Need**—Within the Air Force, as in many organizations, there is more existing data, information, and knowledge available than ever before, and it all must be captured and easily accessible to personnel.
2. **Recognition of need**—People have come to recognize that knowledge is a primary strategic mission asset.
3. **Something can be done about the need**—Powerful processes and tools can meet this need. The AFKN has a growing body of KM case studies and best practices available to learn from and leverage.

To meet this need, the AFKN developed its engineering process. Part of the purpose of the process is to move people from working in stovepipes to working in communities. This will enable decisions and actions to occur in parallel (rather than sequentially) and enable information items to become information markets.

Over the years, Buckman Laboratories has implemented various knowledge-sharing tools and approaches in support of its value chain in response to critical business needs. They feel it is crucial to tie any large deployment to a critical business need in order to ensure initial management support. With that support, decisions can be made about making resources available, providing training, etc.

Typically, the organization will deploy first to areas where the demand is greatest, the need is
recognized, and people are ready for the changes necessary to improve. Once they have decided where to form partnerships, they leverage three types of communities: customer-specific, industry-specific (e.g., paper or leather), and business function– and role-specific (e.g., TeamToolz facilitators). These communities reflect the organization’s different views of its business.

**Caterpillar** discovered the importance of focusing on key components of its value chain in 2003 when it conducted an ROI study on knowledge sharing. The team learned that the value of communities including external partners was four times the value of a community that included Caterpillar people only. Approximately one-third of the entries (initial discussions) in 2004 took place in communities that included individuals who were not Caterpillar employees. For Caterpillar, that means that approximately $3 million in value comes from Caterpillar people talking to other Cat people and approximately $7 million to $8 million in value comes from the value chain partners. Therefore, the value proposition for communities with non-Caterpillar people is twice that of Cat-only communities.

As referenced in Chapter 1, **Tata Steel** created the CVM and SVM processes to help manage knowledge across the value chain and support its vision and strategic goals. Both serve as outstanding examples of segmenting the value chain and focusing on profitable knowledge-sharing partnerships.

While Tata Steel focuses its efforts using the CVM and SVM processes, **Raytheon** uses its communities of practice to identify beneficial partnerships from suppliers (both of equipment and intellectual capital) to customers, and regulatory groups to competitors. Why competitors? Occasionally it is necessary for an industry to define a standard for things like supplier diversity. Working independently would have caused duplicative and potentially damaging outcomes, so they banded together with other defense companies to set a standard to take to the market. Additionally, it has formed close relationships with organizations that impact their customer’s capacity, including the Defense Acquisition University and the service academies. Finally, they developed partnerships with several universities that have strong programs in critical business processes such as supply chain logistics and quality. The learning organization has specific liaisons with each of those entities to ensure that the curriculums are complementary, programs focus on best thinking, and knowledge is shared where appropriate.

**ANALYZE AND PRIORITIZE FOR BEST PRACTICES TRANSFER**

**Analyze the Performance of Critical Value Chain Partnerships to Identify Where It Is Appropriate to Transfer and Implement Best Practices.**

In APQC’s recently completed benchmarking study *Calculating and Reporting Customer Profitability*, the consortium found that “best-practice organizations use customer profitability and segmentation to appropriately align sales and marketing resources.” Similarly, this study found that partners assess the appropriateness of whether to allow internal and external value chain participants to have access to knowledge-sharing tools and approaches. However, not all partnerships are the same; major customers and suppliers can have significantly different impacts than other value chain partners. This study’s partner organizations not only assess appropriateness of sharing but also analyze the potential business impact of each knowledge-sharing partnership. **Tata Steel** and **Raytheon** rank their top suppliers and customers and focus the majority of their formal knowledge-sharing and process improvement methodologies on these. By measuring the current value of the partnership and

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5 *Calculating and Reporting Customer Profitability*. APQC, 2005
analyzing the potential gains of a new, improved partnership, best-practice organizations can focus their limited resources for the highest potential return.

Tata Steel has developed a strong program to benchmark the current performance of its key customers and suppliers before developing knowledge-sharing interventions. By noting particular areas where sharing and capturing knowledge can make an impact, Tata has tied its success to the success of its key value chain partners, creating the win-win proposition noted in Chapter 1. Similarly, Raytheon’s Integrated Logistics Community invited its top 15 suppliers and diversity suppliers to participate in a partner forum to benchmark, share best practices, and discuss better integration paths. In both cases, the host organization realized significant cost savings and/or revenue growth via cost efficiencies or new program/product offerings.

How do you determine how to assess the appropriateness of each partnership? The partners use the criteria in Figure 8 to prioritize where they put their knowledge-sharing resources. At least two-thirds of the partners used the following criteria to assess the appropriateness of partnering with internal or external value chain partners.

- Does the process involved include proprietary information?
- Is there a clear alignment with business objectives?
- What is the complexity of tasks?
- Does the process focus on local versus global efforts?
- Does the process involve individual or group decision impact?
- Does the organization have access to external resources?

![Criteria to Assess Appropriateness of Knowledge-Sharing Partnerships](image)
**Tata Steel** used criteria such as volume and strategic long-term relationships with its customers and short-listed 20 of them to participate in the CVM program. One of the goals of the CVM program is to take Tata’s customer relationships (which have been traditionally transactional in nature) and make them more collaborative. In this program, Tata Steel is exploring methods to work collaboratively and provide comprehensive need fulfillment to its customers and develop a “shared destiny.” This reflects the organization’s philosophy that if a customer is growing at a certain rate, then Tata must also grow at the same rate in order to be a strategic partner with that customer.

**MATCH TOOLS TO NEEDS OF PARTNERSHIPS**

**Select the Appropriate Array of Knowledge-Sharing Tools/Approaches to Match the Needs of Each Partnership.**

Through the course of this research study, it became very apparent that communities of practice are the “killer application” for knowledge-sharing partnerships. Previous APQC studies focused on retaining valuable knowledge, measuring the impact of KM, and using communities to drive performance and innovation also noted the critical importance of these groups for fostering tacit knowledge exchange, codifying critical tacit knowledge, and building trust among partners. However, the best-practice organizations in this study did not stop there; they put together an extensive array of knowledge-sharing tools to match the needs of each partnership. There is no “one size fits all” and not all of the knowledge-sharing tools “feel” like KM. This is an important point to note, especially in a study on knowledge management—knowledge sharing and reuse can and should be promoted anywhere and everywhere, not just in traditional KM approaches.

Partners use a greater array of approaches and mechanisms to promote sharing within the context of current business programs. Some of the approaches most frequently noted include:

- Six Sigma and Lean projects,
- formal and informal communities of practice,
- internal and external customer/supplier networks,
- benchmarking and consultant projects,
- councils and leadership teams,
- leadership development program projects,
- innovation projects,
- knowledge-sharing portals,
- expertise locator systems,
- community-specific Web tools and discussion threads,
- knowledge repositories, and
- enterprise resource planning (ERP) system modules.

Whichever set of approaches are used, it is critical to put together a combination that allows for tacit knowledge exchange, explicit knowledge retrieval, and tacit knowledge codification. Additionally, partner organizations support each of these approaches with personnel who are well-versed in the organization’s processes, culture, and restrictions to ensure that employees can find what they need, when they need it.

The general architecture of the **Air Force Knowledge Now** knowledge-sharing program articulates this multiple-array philosophy using a hub-and-spoke configuration (please see the AFKN case study).
for more detail). Based on communities of practice, the hub is the entry page for a given CoP, and the
spokes are all of the features and applications available from that entry page. The entry page identifies
the CoP, listing its mission and resources (applications) available to its members.
All applications are modules and are accessible from the entry page but not from other modules.
With a hub-and-spoke configuration, AFKN can add as many modules to the system as necessary
almost instantly. AFKN’s array includes:
• the AFKN methodology (which can be tailored to different organizations),
• e-learning,
• the Air Force Deskbook (a storehouse of current documentation; each document has an owner
  responsible for updating it on a rotating cycle),
• CoPs (see next section for more information),
• a Verity search engine, and
• the wisdom exchange (a method to gain access to experts, or advisers).

In addition to its communities, Buckman associates can also share tacit knowledge through their
participation on various kinds of teams, such as global teams (e.g., supply chain), product rollout
teams, and TeamToolz teams. Buckman’s tools for knowledge sharing and collaboration include
discussion forums, file sharing, calendaring, task management, real-time conferencing, common
systems (e.g., ERP and business intelligence tools), and custom-built tools (e.g., customer satisfaction
surveys). Buckman has found that common business systems such as the ERP have helped them
collaborate. In fact, the ERP was a key factor in development of the global supply chain team because
with it, everyone involved in supply chain now works from a common language, on a common system,
and with common capabilities. It helped them move forward with global approaches to supply
chain issues.

For Caterpillar, most knowledge sharing occurs across the value chain via communities.
However, the Knowledge Network team recognized the need to integrate heavily with the processes
of Six Sigma and subsequently built templates into the Knowledge Network to support and enhance
those business processes. As project teams join the Knowledge Network, there are embedded tools
that support the corporate initiatives and help the teams do their jobs better. To drive continuous
improvement, the Knowledge Network team tries to identify key corporate initiatives (e.g., new
product introduction) and provide communities and tools to support them.

Besides its successful supplier value management and customer value management programs,
Tata Steel has introduced a number of other knowledge-sharing tools and approaches for its partners
and employees to use. Communities of practice, knowledge manthan (a “churning” process that
allows teams to identify good and bad practices), “Ask the Expert” (a portal tool), and linkage to their
Aspire improvement program focus on three components of knowledge management: codification,
personalization, and knowledge diffusion. Each applies to a particular need for various customers,
suppliers, and internal value chain partners.

Raytheon uses not only the traditional knowledge-sharing tools mentioned above (communities
of practice, knowledge portal, discussion boards, ask the expert, and peer assists), but it also includes
knowledge-sharing partnerships in their leadership programs, learning institutes, Raytheon Six Sigma
training, and benchmarking efforts. Where Raytheon does business, they share knowledge with
partners and expect the same in return.
LOW BARRIER TO ENTRY FOR TOOLS

Lower the Barrier to Entry for Knowledge Sharing Between Value Chain Partners by Providing Intuitive, Easy-To-Use Tools.

The partners’ communities of practice knowledge-sharing tools (e.g., discussion boards and repositories) have been designed to allow partners to connect to each other with little or no training or outside support. Why is this critical? Crossing business silos internally or externally is difficult enough without adding technology barriers to the mix. Partners repeatedly focused on building trust as a key component of effective partnerships. In execution, this meant that they built all tools and approaches that fostered knowledge sharing with ease of use in mind. While many people think of Web-based tools when the discussion focuses on ease of use, the partners also designed their community forum meetings, benchmarking projects, and supplier value programs with strong facilitation, common tools, and clear boundaries to make it relatively easy for all parties to share.

Partners are using fairly common, easy-to-use tools such as e-mail, videoconferencing, conference calls, and the company intranet. Additionally, at least half of the partners have implemented the following tools and found them to be at least moderately effective (5.0 or greater on a 6.0 scale).

- Internet-based collaboration Web sites or Web-based applications
- E-mail
- Supplier/Vendor conferences
- Expertise locator system(s)
- Collaborative computer software

The bottom line is that organizations that wish to share knowledge across the value chain should not only provide a wide array of tools to use but should also ensure that the tools are easy to use. For more details on the specific tools, please reference Chapter 4 on IT infrastructure.

**Air Force Knowledge Now** recognized early on that a core component of change management for their knowledge management program was ease of use. They adopted the following checklist of values for their program to ensure that their approaches achieved high impact and were easy to adopt.

- **Simple**—intuitive, conventional interface, minimize extraneous features
- **Airmen-centric**—listening to customer feedback
- **Fast**—having a fast response time to end user questions
- **Flexible**—tailored to group needs and each CoP creates their own requirements
- **Contextual**—applicable to current work; having a common language and taxonomy
- **Boundaryless**—not limited to organizational, cultural, or physical boundaries

**Caterpillar’s** Knowledge Network has to be the easiest way for employees to collaborate with their business partners and colleagues. The team noted that if easier or better tools exist than what they provide, then the culture at Caterpillar would lead users to stop participating in the Knowledge Network and use something else. As technology and business initiatives change, the Knowledge Network team has to keep up with the changes. Caterpillar made the conscious decision to custom build its application so it can more easily control complexity and make it easy for people to use. Because everyone in the value chain uses this tool, the Knowledge Network serves as a “right now” tool to help people readily get the information they need and help them do their day jobs.
Buckman focuses on making sure that the discussion tools its value chain partners and employees use is intuitive and simple. Discussion groups help Buckman associates share new ideas, find answers to questions, and build relationships with one another. Buckman has found that the best way to get people over the curve of participating in such activities is to get them involved. The technology is based on Lotus Notes, which allows people to include attachments or the Knowledge Resource Center staff to archive discussions once they are concluded. The Knowledge Resource Center manages the infrastructure and customer requests.

**SHARED FUNDING MODELS**

Create and Operate Under a Shared Funding Model Divided Between the Business Units and the Corporate Level.

Another key enabler for creating an effective knowledge management infrastructure is operating under a shared funding model. All of the best-practice organizations in this consortium support budgets where the funding is divided between the business units and the corporate level. A similar funding model was also found among the best-practice partners in the 2005 APQC report *Using Communities of Practice to Drive Organizational Performance and Innovation*. The partners in that consortium reported that their budgets were characterized by a shared funding model, with approximately 40 percent of the total budget funded by corporate and 60 percent from the business units.

The following are examples of the funding models and practices at some of the partner organizations in this study.

The **Air Force Knowledge Now** receives centralized funding from the Air Force as an organization and from internal organizations that utilize the AFKN’s consulting services. The AFKN estimates that this division of funding is approximately 40 percent centralized funding versus 60 percent from the various internal departments.

Until 2005, the Knowledge Network at **Caterpillar** was funded by the executive offices of the company. In 2005 the group began charging the business units for its services based on usage with a pay-as-you-go model. Caterpillar developed a business unit value statement that provides an overall view of the Knowledge Network and how the employees of a particular business unit are using the network and its resources. Caterpillar University has dual line reporting to a lead learning manager in each business unit, and this charge would be a part of the training budget within the business units. The lead learning manager in each business unit acts as the contact person to put this charge into the business unit’s budget process.

To determine the price to charge the business units for using the Knowledge Network, the central team analyzed the number of people per business unit who were using the Knowledge Network (only internal employees) then divided that number into the total Knowledge Network budget for the year. The cost came out to be about $85 per year per Caterpillar employee to have access to the Knowledge Network. The central team then took the number of people per business unit (as of October of the prior year), multiplied by that per person charge, and told the business units that the result would be a one-time charge for the next year. The costs will decrease if more employees begin using the system.

**Tata Steel** does not charge for their internal consultancy services, and funding for their knowledge-sharing initiative comes from the enterprise-level budget. If, as an outcome of knowledge sharing, some type of investment is deemed necessary for implementing specific high-priority ideas, then these are funded from a separate corpus, depending upon certain guidelines and board approval.
MANAGING KNOWLEDGE-SHARING PARTNERSHIPS

Management is typically defined as “doing things right,” while leadership is defined as “doing the right things.” Those are fairly simplistic statements, but the concept works for this conversation. Knowledge-sharing partnerships should not be created and managed for the sake of having them; instead, effective organizations create partnerships to drive win-win results as noted in Chapter 1. To that end, effective leadership and management of partnerships is necessary to drive continuous business improvement and sustain successful alliances. How does an organization do this? By developing and implementing standard operating procedures for engaging partners, governing partnerships, and communicating, the best-practice partner organizations have provided leadership and management of new and better business opportunities within their partnerships.

CLEAR GOVERNANCE PROCESSES

Define Clear Governance Processes for Value Chain Knowledge-Sharing Partnerships.

Partner organizations tend to have a standardized methodology to manage knowledge across the value chain. For efficient, effective, and safe sharing that drives business results, best-practice organizations establish clear parameters and assign accountability for knowledge-sharing partnerships. Close monitoring of outsider-enabled communities by leadership and core teams is necessary to prevent anti-trust or collusion issues from arising. For global organizations, it is also critical to develop engagement and governance processes that take the various language and cultural norms into account. For example, Caterpillar has made their tools and content available in Mandarin to help expansion efforts in China. This trend will be even more important as organizations continue to look for cheaper supplies of raw materials, labor, and services (such as call centers) around the globe.

Partners have developed and rolled out their governance processes in the time-honored, best-practice method of piloting the concept with a select number of groups, tweaking the process, and then rolling it out to the greater organization. This piloting process provides two key change management benefits. First, it provides an opportunity to test (and make mistakes) on a manageable scale without risking widespread negative perceptions. Second, it builds advocacy and success stories that can be used for the next phase rollout. As noted in the earlier section on creating effective partnerships that knowledge-sharing approaches are not “one size fits all,” it is important to settle on one governance process to provide consistency and standardization. This certainly does not mean that governance should not have a local component or allow for some customization; rather, it suggests that core standards and operating procedures should be consistent while local groups can tweak approaches to fit their needs.

In the Air Force Knowledge Now program, the Center of Excellence for KM comprises 19 people responsible for strategy, IT/tech support, community of practice (CoP) support and facilitation, and partnering with other Air Force organizations and programs in support of their KM needs. The CoE for KM also has a formal methodology for working with community leaders on KM education, organizational change management, taxonomy development, knowledge process engineering, and KM governance. This methodology/model was developed as part of a cultural and technical assessment of AFMC in 2001 and has been used with great success by both Air Force and non-Air Force organizations.
At Buckman Laboratories, everyone from the CEO to the individual employee has a stake in managing knowledge across the value chain. However, because marketing plays such an important role in the organization, that function could be viewed as the governing body. Marketing collects ideas from associates, customers, suppliers, etc. and uses those to set the direction for knowledge sharing for the organization. It then presents this direction to the planning team, which helps push it out to the organization. Despite marketing’s key role, Buckman allows for some “local flavor” by making sure that every Buckman associate takes responsibility for managing tacit knowledge using the accepted processes to support the value chain.

Caterpillar’s core knowledge management team comprises three people who support the application, set the strategic direction for knowledge management, assess the value to the organization, provide training, and help with requests. Caterpillar’s Knowledge Network, its primary collaboration tool, is owned by Caterpillar University. Caterpillar’s internal governance model for knowledge sharing is integrated into regular business governance entities. The CEO sits on the Caterpillar board of governors for Caterpillar University and at quarterly meetings reviews the top 20 communities, including the number of postings, number of unique members, and number of unique individuals making those contributions. The CEO also participates in strategic business planning communities including the strategic business council that is used at all levels of the organization and is part of the Knowledge Network.

Raytheon’s Six Sigma (R6σ) council of business leaders plan and execute the deployment of R6σ across the enterprise. Business and functional leaders from across the company represent areas to help steer and deploy R6σ efforts across the enterprise. The council’s mission and charter is to drive the development, deployment, integration, and improvement of R6σ for employees and leadership through:
• aligning R6σ to business strategy (having listening posts in each business area to hear what their emerging needs are);
• assuring R6σ is focused toward constraints in providing value to customers;
• sharing knowledge (internally and externally; looking at other companies to learn what they can do);
• establishing the learning and development objectives for leaders, master experts, experts, and specialists; and
• governing the R6σ processes and practices.

CLEAR ROLES AND RESPONSIBILITIES
Define Clear Roles and Responsibilities for Overseeing Knowledge-Sharing Partnerships and Managing the Change Required for Success.

Effective, efficient knowledge sharing does not happen in a vacuum. Just because you have developed and implemented a clear governance process does not mean that you have managed the change involved in knowledge-sharing partnerships. As APQC and scores of others have noted many times, effective change management often determines the success or failure of any new initiative. One key component of change management is the clear definition of roles and responsibilities for overseeing knowledge-sharing partnerships. The best-practice partners have clearly defined roles and responsibilities for overseeing their knowledge-sharing partnerships and providing dedicated change management interventions. This has occurred in several ways: creating a core competency group
that owns and facilitates the knowledge-sharing process (similar to a center of excellence), creating a 
cross-functional oversight group, and designating business liaisons for each partnership. It is critical to 
involve all internal value chain partners that are appropriate in external partnerships. In a logistics 
partnership, for example, it is best to ensure that the logistics function from each business unit is 
represented in the community.

The critical roles for governance are:

- a core competency group that stewards the knowledge-sharing processes, approaches, and tools on 
a day-to-day basis;
- a cross-functional governance group that oversees process improvement, learning, and knowledge-
sharing processes, approaches, and business outcomes on a periodic basis (quarterly); and
- business function liaisons who participate in each process improvement, learning, and knowledge-
sharing partnership on an as-needed basis and report back to the 
governance group.

Not only do the partners define clear roles and responsibilities, they also provide training for each 
of those groups. This training is either done by in-house training staff (80 percent of partners) or 
outsourced to vendors specializing in training (60 percent of partners).

For successful knowledge-sharing partnerships, one should develop a standard set of knowledge-
sharing processes, assign clear roles and responsibilities for implementing those processes across the 
value chain, and train people to support those processes.

Buckman Laboratories has designated certain groups with specific responsibilities related to 
supporting knowledge sharing. Besides marketing, the Knowledge Resource Center plays a significant 
role in moderating and facilitating the discussion groups, housing discussion threads, and responding 
to inquiries and adding information where applicable. Other key roles include the section leaders 
technical experts based on each collaboration area) in the forums and team leaders and facilitators for 
the global key corporate accounts and global and product 
rollout teams.

Each of these team members receive training on a variety of knowledge-sharing and teaming 
tools, including the 8 Business Management Standards, Think T, the Buckman After Action 
Review, and the requirements alignment tool, among several others. Training starts with new hires 
and is continued throughout an employee’s tenure; however, not everyone must be proficient in 
every process. Instead, those groups that have greater responsibility for knowledge sharing within 
partnerships learn the tools they need to drive the best business results.

At Caterpillar, responsibility for managing the knowledge, content, and/or intellectual capital 
that is captured, shared, and reused from the external value chain falls to both the formal knowledge 
management group and community managers. The central group provides the platform for 
collaboration, and the community manager is responsible for the content in his or her community. 
The community manager defines the measures of success, controls the content, and controls the 
security. There are no IT experts or resources required or assigned to the various communities.

To ensure that community managers and users understand how to use the tools to drive better 
knowledge-sharing partnerships, the Knowledge Network has online tutorials about using the 
communities. For new community managers, the Knowledge Network team will e-mail them links 
to all the help documentation they will need to get started. The Knowledge Network team also offers
monthly Web seminars to train new community managers. The central team also conducts Web seminars for general users of the Knowledge Network. Caterpillar has found that the training, not the documentation, makes the system successful.

Raytheon has developed multiple roles for creating, supporting, and maintaining knowledge sharing, process improvement, and organizational learning across the value chain. R6σ master experts (equivalent to Master Black Belts) are fully trained, highly experienced, full-time leaders responsible for planning, training, mentoring, and gaining results. R6σ experts (equivalent to Black Belts) are fully trained, full-time experts who lead improvement teams, work complex projects across the business, and mentor specialists (Green Belt equivalents). Additionally, Raytheon has designated KM champions and KM brokers within each business unit (all are also R6σ experts) to support communities of practice and other knowledge-sharing partnerships. KM champions have the responsibility to work with their different CoPs, networks, and R6σ projects to help them learn how to leverage and move knowledge to create value.

STANDARD OPERATING PROCEDURES FOR SECURITY AND/OR CONFIDENTIALITY
Create Standard Operating Processes and Workflow for Managing the Security and Confidentiality Within the Partnership.

Two of the primary concerns for any organization that seeks to share or reuse knowledge from its value chain partners are security and confidentiality. Patent protection, regulatory compliance, insider trading, and Sarbanes-Oxley continue to raise the stakes for knowledge-sharing partnerships. How does an organization work with its suppliers (many of whom are direct competitors with each other and work with your competitors), its customers (whom you desperately want to know but conversely do not want to allow to see all of your dirty laundry), regulatory agencies (whom you need but may fear), and academic partners (who support your discovery efforts but are outside of your control)? As mentioned previously, establishing clear goals for knowledge sharing across the value chain, prioritizing potential partners, strong governance, and assigned roles and responsibilities should provide the appropriate framework for any partnership. However, to tactically implement a partnership, you need some specific tools such as security audits, disclaimers for system use, and authentication tools.

Before allowing external value chain partners to share knowledge via any IT system, perform a security audit on these systems. Partners used both internal IT resources and outside organizations to test the system from inside and outside the firewalls. Once the audit is complete and appropriate changes are made, work with the legal department and appropriate business functions to create and implement appropriate disclaimers to protect all parties. Caterpillar’s disclaimer has sections on description of service, site access, content, confidentiality of content, code of conduct, disclaimer of warranties, limitation of liability, indemnification, export and/or international laws, miscellaneous, and competition and antitrust. Finally, if outsiders are going to be allowed to access explicit information or search for expertise, strong authentication and encryption tools should be embedded to safeguard the integrity of the system. Take special care to avoid allowing suppliers or other partners to create anti-trust or collusion problems using the organization’s tools by closely managing the discussions and include this language in the disclaimer.
One hundred percent of the study’s partners manage the risk of sharing knowledge inside the internal value chain and outside the value chain. More significantly, partners have built risk management into their standard operating procedures in addition to having external entities sign disclaimers: All partners require all parties to sign non-disclosure agreements and go through standard operating procedures, while 80 percent also address issues on an as-needed basis, depending on the organization’s relationship with the concerned party or parties. Interestingly, the majority of partners also take into account the relationship with the outside entity—trust is critical. As noted previously, organizations should not invest in formal knowledge sharing with every partner because some partners are worth more than others. For those deemed most critical to the business, however, invest the time in developing the relationship and trust level with that partner; then back it up with strong disclaimers, security, and authentication.

The Air Force has strong information assurance and security processes in place to protect classified information and define appropriate behavior within a virtual environment. The CoE for KM leverages these processes to mitigate and minimize risks around sharing classified information, whether that is in document form or in a discussion forum. The CoE provides some initial training and guidance on what is/is not appropriate and copies of Air Force policy documents on what can/cannot be done in virtual environments. Responsibility for the oversight of content and discussions then moves to individual CoP owners. However, the CoE for KM is available to provide assistance if needed. Additionally, the CoE developed a banner to remind users that they are participating in an unclassified CoP. This banner is mostly optional, but there are a few CoPs for which the CoE insists on the banner being on their community site to emphasize the classified nature of the content within the CoP.

Caterpillar created a formal process to assess the risks and implement several changes.

- **Security audit**—Prior to opening the system to the value chain, Caterpillar did an audit on its system security. An outside company was hired to test the system from inside and outside the firewalls. Minor changes resulted from this audit.
- **Disclaimer**—The “mother” of all disclaimers, this prerequisite for using the system is about eight pages in length. There is a one-time step that requires value chain partners to agree to each section before they are allowed to enter the system. The company has had very few issues with its disclaimer, and it may be overridden if Caterpillar has signed a specific agreement with another company.
- **Security profile alert**—This visible flag on a community (an exclamation point in a yellow triangle) lets Caterpillar employees know that the community is open to non-Caterpillar people. The alert is not visible to non-Caterpillar people. The security profile also shows who can see the community by affiliation, organization codes, and name. The community manager controls this security profile, and it can be changed at any point in time.
- **Limited search**—Value chain partners cannot surf and browse communities of content where they do not meet the security profile. Caterpillar employees are given a search option to include content not accessible to them. With this discovery option, if they find content they want to access, they can then request access to it.
- **Encryption**—This feature was added when the value chain was included.
- **Access**—When value chain partners view and expand the list of communities available, they only see those that they can gain access to. Employees, on the other hand, can see the entire list.
As discussed in chapters 1 and 2, Tata Steel realizes that there will always be confidential or proprietary information on both sides of a relationship. To manage that, they leverage confidentiality agreements, documentation of the entire process, and strong communication procedures. Tata believes the real mitigation occurs in the strength of its relationships with these suppliers and customers, however. The organization believes that the level of risk will decrease as the level of trust between the organizations increases.

**FACE-TO-FACE SHARING BUILDS TRUST**

*Conduct Face-To-Face Partner Forums/Workshops with Key Value Chain Partners to Building Understanding of Processes and Create Trust For Knowledge Sharing.*

As noted in the earlier section “Creating Knowledge-Sharing Partnerships,” it is critical to put together a combination of knowledge-sharing approaches for the organization that allows for tacit knowledge exchange, explicit knowledge retrieval, and tacit knowledge codification all along the value chain. During the site visits, several partner organizations noted that tacit knowledge sharing via personal interaction drives the majority of improvement in a knowledge partnership.

Tata Steel, Buckman Laboratories, and Raytheon recognize that extensive knowledge sharing among suppliers (who may be competitors) and customers requires significant levels of trust. All try to create a sense of family within their extended ecosystem of partners by hosting face-to-face forums, benchmarking efforts, and networking forums. How? By bringing together top customers and suppliers for several days to identify critical problems and opportunities, share knowledge around best practices, build relationships, reuse lessons, and benchmark to create better business for everyone.

While it may seem initially difficult to draw suppliers together because of the potential competitive issues, this study’s partners find that it gives the suppliers a chance to be in front of their customer and to understand how to better support that client. This provides the classic win-win scenario referenced so many times throughout this report. To ensure that everyone plays according to the rules, the convening organization must provide clear boundaries and rules for any discussions, advertise the exact participants, and provide a detailed agenda of items to cover. This provides all participants time to prepare and decide what to share based on the audience and goals of the session.

Buckman Laboratories has developed its transition workshop and customer satisfaction surveys (described in Chapter 1) to build trust among its partners. The former provides a mechanism for transitioning applications from another supplier to Buckman. Using interviews, surveys, and discussions, the team crafts an implementation plan (using the requirement alignment tool) to address the critical requirements customers identified. The plan includes the transitions steps, the timeline, and how progress will be measured. The customer satisfaction surveys build on this plan by addressing new requirements and aligning Buckman’s performance with these requirements.

Raytheon’s Integrated Logistics Community created the partner forum to drive better tacit sharing and build value-creating partnerships among key suppliers. The team invites a handpicked group of top suppliers (top 15) and top diversity suppliers to come together for three days to share knowledge, build relationships, identify lessons learned, discover roadblocks, and benchmark together to create better business for everyone. This annual event has become a touchstone for the community and continues to strengthen relationships and drive a significant portion of the $40 plus million savings RILCOM has realized in 2005.
MULTIPLE COMMUNICATION VEHICLES NECESSARY

Use Multiple Communication Vehicles as Often as Possible to Strengthen Support for Current and Future Knowledge-Sharing Partnerships.

According to the partners, clear, constant, and targeted communication about the importance of knowledge-sharing partnerships, the various approaches used to accomplish better sharing, and the potential value of these activities are important for success. In APQC’s knowledge management study *Using CoPs to Drive Innovation and Organizational Performance* (2005), Fluor Corporation provided an excellent overview of the multiple channel strategy they employed to help embed knowledge sharing throughout the organization. Fluor’s KM team uses dedicated communication professionals to support its own communication strategy as well as individual community leaders who need help with their messages. Their communications team developed four simple rules to consider with communication.

1. Create messages that are brief, easily scanned, linked to more detail if needed, and have a call to action.
2. Use as many communication vehicles as needed to reach the audience including leadership messages, corporate brochures, company guiding principles, recruiting brochures, and new hire orientation materials.
3. Brand different types of communication so readers can easily discern its intent.
4. Set a communication schedule but remain flexible to incorporate needed changes.

This study’s partner organizations also tend to include their communications/public relations departments in their efforts to better manage knowledge across the value chain. Partners use roadshows, newsletters, Web-based “push” communications, trivia games, executive presentation “success stories,” and management primers to promote better knowledge sharing and reuse everyday.

For the Air Force Knowledge Now program, providing effective communication is a key component to facilitating the change process. For AFKN, simple, non-technical communications work best when conveying the business purpose of the AFKN to the end users. One message they attempt to convey is that knowledge sharing, CoPs, or whatever solution is leveraged requires a long-term investment that will benefit stakeholders across the value chain. Each message contains key components addressing the what, why, and how (benefits) of knowledge sharing.

During the initial rollout of the Knowledge Network at Caterpillar, the central team made presentations to employees about what knowledge sharing accomplished, why an employee would use the system instead of another tool, and the benefits for doing so. Because of audience changes due to retirement and new hires, there is an ongoing need to repeat these presentations. At start-up, the knowledge-sharing manager spent nearly 50 percent of his time on communication—it is that important in a large organization. As the effort has matured and taken root internally, central team members spend more time talking to external organizations than to internal groups. In the initial startup, the focus was on targeted marketing, identifying early adopters, and providing them with a rollout plan of how this tool could benefit them. From that grass-roots starting level, participation has grown. Caterpillar believes that if the tool is successful, it will grow based on word of mouth. About 85 percent of the Caterpillar employees who use the Knowledge Network say that they would recommend it to others. In the dealer world, that number is believed to be even higher.
Raytheon created and deployed a comprehensive communication strategy to increase awareness, obtain buy-in, and ensure the success of its knowledge-sharing approaches. Because many of their knowledge champions are also Six Sigma experts and influential change agents, they focused on this critical segment first. They created booths, held online demonstrations of tools and approaches, and provided materials at all R6σ forums and celebrations. Other communication activities included a briefing with each business leadership team and the major councils across the organization, a KM video on storytelling with actual stories from CoPs and individuals about the benefits of sharing and reusing knowledge (which they’ve shown at all of their venues and forums), newsletters, brochures, brown bag lunches, and the KM portal. Finally, the team focused on making knowledge sharing an ever-present focus within the various R6σ forums and celebrations, R6σ expert/specialist trainings, R6σ master expert meetings, R6σ council meetings, business leadership meetings, and customer/supplier conferences.

Additionally, the team created a “Knowledge Management Passport” game to force employees to ask specific questions of experts they didn’t know and share dialogue around different issues. At the end of each conversation, members got “stamps” on their passport while building their personal networks and learning new ideas. People handed those passports in at the end of the day to receive special recognition and rewards. The KM champions then compiled the passport information, distilled the best practices and lessons learned, and put them in the best practices database.

CONCLUSION

Chapters 1 and 2 established that knowledge represents the true capital of the new millennium and that it is vital to create an enabling environment for sharing and reusing that knowledge across the value chain. Chapter 3 focused on how organizations both create and subsequently manage the knowledge-sharing partnerships that mean the most to their collective success.

As such, this chapter proposed 10 best practices shared by partners that can significantly impact the scope, depth, and impact of effective knowledge-sharing partnerships.

1. Create an approach to determine and prioritize which parts of the value chain to enable with knowledge-sharing tools and techniques.
2. Analyze the performance of critical value chain partnerships to identify where it is appropriate to transfer and implement best practices.
3. Select the appropriate array of knowledge-sharing tools/approaches to match the needs of each partnership.
4. Lower the barrier to entry for knowledge sharing between value chain partners by providing intuitive, easy-to-use tools.
5. Create and operate under a shared funding model divided between the business units and the corporate level.
6. Define clear governance processes for value chain knowledge-sharing partnerships.
7. Define clear roles and responsibilities for overseeing knowledge-sharing partnerships and managing the change required for success.
8. Create standard operating processes and workflow for managing the security and confidentiality within the partnership.
9. Conduct face-to-face partner forums/workshops with key value chain partners to build understanding of processes and create trust for knowledge sharing.

10. Use multiple communication vehicles as often as possible to strengthen support for current and future knowledge-sharing partnerships.

Chapter 4 will discuss infrastructure requirements in greater detail, while Chapter 5 outlines methods for gauging the success of the partnerships and infrastructure that have been created. Whether you are starting value chain knowledge-sharing partnerships for the first time or have been doing them for years, the practices in this chapter and subsequent ones should help you improve your results.
The Information Technology Infrastructure

Technology permeates people’s daily lives. With the exception of face-to-face conversations, there is very little collaboration or sharing that does not involve some form of technology, from the most basic technologies (e.g., the telephone) to more complex ones (e.g., portals). Even a face-to-face conversation may be supported by the use of a laptop or other device if actual tasks need to be accomplished during that conversation.

As discussed in Chapter 3, this study’s best-practice partners do their best to provide the right mix of enabling technologies to their knowledge workers to support knowledge sharing across the extended value chain. To determine what that mix may be, the KM group works with the IT group to look at various criteria when making decisions as to what kind of technologies to employ in support of knowledge sharing, such as the:

- complexity of tasks,
- IT infrastructure available to the work force,
- geographic location of the work force, and
- varying skills of the end users.

Task complexity often dictates which tools may be made available within a community. If basic communication is the only requirement, a community may only need e-mail and/or discussion forums. For more complex tasks with high interdependencies, tools that allow greater flexibility with synchronous or asynchronous work may be required. IT infrastructure like available bandwidth or disparate system platforms may mean that technology must be standardized to the lowest common denominator in order for the greatest number of people to be able to use the technology. At Buckman Laboratories, for instance, bandwidth and connectivity varies widely among associates, some of whom are located in areas where high-speed access is simply not available. Online tools and access to explicit repositories, discussion boards, and experts tend to have greatest value in parts of the organization that are more isolated than others. Varying technological skills across end users means that all tools must be easy and intuitive to use. The first generation of Caterpillar’s Knowledge Net system was not easy to use, so it underwent a redesign in 2002 to address that issue among others and has continued to evolve since then.

During this study, the APQC project team observed three IT-related best practices.
1. Leverage existing knowledge-sharing tools for use with internal and/or external partners, suppliers, or customers where it makes sense to do so.
2. Provide a suite of applications CoPs can customize for their specific needs.
3. Implement strong authentication and monitoring capabilities for those IT tools.
This chapter examines the use of IT tools in support of sharing knowledge across the value chain, including portals and CoP applications, as well as what some of the partners have done to ensure that access to the tools and content within them is as safe and secure as possible.

**IT Tools Used for Sharing Knowledge Across the Value Chain**

Chapter 3 discussed the need to select the appropriate array of knowledge-sharing tools/approaches to match the needs of each partnership. While a number of those knowledge-sharing tools/approaches promote the face-to-face transfer of knowledge, many also have some type of technology or IT component to support or enable them. This is important given today’s globally dispersed workforce and the need for asynchronous as well as synchronous collaboration.

Study participants were asked to indicate which tools are used at their organizations in support of knowledge sharing across the value chain. As Figure 9 shows, e-mail is still the most frequently used tool in support of knowledge sharing among study participants. Other popular IT tools include teleconferences/conference calls, collaborative computer software, intranets, and videoconferencing.

When asked to rate the effectiveness of the listed tools on a scale of one (least effective) to six (most effective), study participants rated e-mail as the most effective knowledge-sharing tool, perhaps because of its almost universal access and level of familiarity. Other highly effective tools included conference calls and collaborative computer software.

![Average Overall Frequency and Effectiveness of Knowledge-Sharing Tools](image_url)
One surprise for the APQC project team was the relatively average rating (3.33) of enterprise resource planning (ERP) software. The team had supposed that with the many modules that would seem to lend themselves to sharing information along the value chain (e.g., logistics, supply chain, sales, and marketing), it would be an effective tool for knowledge sharing. However, the rating may be due to the fact that a number of the participants do not use ERP software or only use certain modules, such as human resources, which does not lend itself to knowledge sharing due to privacy issues.

**USE OF IT TOOLS (INTERNAL OR EXTERNAL)**

*Organizations Leverage Existing Knowledge-Sharing Tools for Use with Internal and External Partners, Suppliers, or Customers Where It Makes Sense to Do So.*

Of course, it is one thing to use these tools in support of knowledge sharing and another to determine which tools work best in sharing knowledge with external groups (e.g., business partners, suppliers, or customers). The color of the bars in Figure 9 shows whether partners use the tools to share knowledge internally, externally, or both.

The tools most likely to be used to support knowledge sharing both internally and externally tend to share certain similar characteristics such as:

- easy, almost universal access—e-mail and conference calls—and
- asynchronous/synchronous collaborative capabilities—e-mail, conference calls, Web conferences, videoconferencing, Internet-based or Web-based sites or applications.

These tools allow for easy access by external parties and usually only require a user identification and password once they have been approved for access.

In a previous APQC Best-practice Report (*Retaining Valuable Knowledge*, APQC, 2002), e-mail was not rated as a very effective tool for knowledge sharing. However, at that time, it was being looked at from an internal perspective only, and study participants felt that because of the difficulties underlying mining e-mail for valuable content, it was not a very effective knowledge-sharing tool. But when it comes to sharing knowledge across organizational boundaries, e-mail is perhaps the most universally available tool for that purpose. Unlike tools with a more internal focus, such as expertise locator systems or intranets, almost everyone has access to e-mail. With the new mining technologies now available on the market, that issue is not the challenge it once was.

Many of the tools described above are leveraged by study participants within the scope of community activities. All of this study’s best-practice partners have CoPs and leverage them as a primary means of sharing knowledge. (See Chapter 3 for more details.) These communities are usually set up within a portal. Descriptions of some of these portals, their features, and partner CoPs follow.

**Portals**

In this study, 100 percent of the best-practice partners leverage portals and CoPs. Typically, they use the portal to “house” the CoPs, providing access to community sites and resources for community members. Portals not only provide a common place for people to access community sites, they also

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6 A Web portal, or portal, is defined as a Web Site or service that offers a broad array of resources and services, such as e-mail, news, calendars, chat rooms/discussion forums, and search engines. It is typically the starting point for a user’s Web experience. [https://en.wikipedia.org](https://en.wikipedia.org) (retrieved December 2005)
leverage templates that allow for standardization of the look and feel of community spaces, for example. According to APQC’s 2005 Best-practice Report *Using Communities of Practice to Drive Organizational Performance and Innovation*, standardization reduces the need for support and maintenance and helps keep central support costs minimal.

**Buckman’s** portal (Figure 10, below) focuses on collaboration and integrates all of the tools available to its associates. The idea behind the portal was to make knowledge sharing and collaboration as easy as possible for its associates by integrating all of the tools they might need into one place. In essence, it’s a one-stop shop for collaboration, analysis, learning, and research.

The belief at **Raytheon** is that a portal can make KM easier and more personal. Raytheon leverages its portal as a means of recognizing and registering its formal CoPs. The portal allows Raytheon to provide self-service capability to the CoPs including online training materials. Other portal features include:

- Raytheon KM training;
- e-mail support;
- a Web crawler;
- content management;
- personalization of individual portal;
- a single, self-administering sign on:
- collaborative tools support;
- standard and ad hoc reporting capability;
- integration with existing applications (e.g., SAP, Web apps, and mainframe);
• full-featured search (of the portal, intranet, Internet, file servers);
• remote access support;
• wireless support; and
• improved security infrastructure (Netegrity);
• ability for non-IT users to deploy small scale apps via the portal.

It also has a list of all formal CoPs, a place for community administration, popular links, a people and information search, and links to key KM resources.

Caterpillar’s Knowledge Network serves as the portal to its 4,000 plus CoPs. Developed internally, the Knowledge Network functions primarily as a Web-based discussion and content interface that is heavily integrated into e-mail. Active members (e.g., manager, experts, or members) of any community receive e-mail from anything posted into the community. Many of the processing activities are enabled through e-mail as well, so a community manager does not need to login to the system to approve a new person’s membership, for example. Additionally, the Knowledge Network has tools embedded in it that support corporate initiatives and business processes, such as templates to support and enhance Six Sigma. The Knowledge Network also has a feedback system allowing any user in the system to share feedback with the core KM team.

**COP APPLICATIONS**

**Provide a Suite of Applications That Communities Can Customize for Their Specific Needs.**

As discussed in Chapter 3, CoPs appear to be the “killer app” for organizations desiring to enable their knowledge ecosystem and share knowledge across the extended value chain. CoPs commonly provide space for collaboration and discussion, resources for expertise location, and links to additional resources (e.g., databases, best practices repositories, and work-related tools.). APQC’s 2004 Best-practice Report *Virtual Collaboration: Enabling Project Teams and Communities* states that best-practice organizations assess the nature of the work and worker when considering what type of IT infrastructure to provide to their teams and/or CoPs. The more complex and non-routine the tasks are, the more support they require, including sophisticated IT infrastructure. Figure 11, page 62 depicts different degrees of collaboration and some examples of the types of tools that are most commonly used by community members working at these different degrees of collaboration. As the figure shows, as the complexity of certain tasks increases, so does the need for tools that support interdependent interaction.

From another of APQC’s Best-practice Report *Using Communities of Practice to Drive Organizational Performance and Innovation* (2005), comes the finding that best-practice organizations provide just the right amount of technology to make the community effective. This study’s partners, while leveraging templates to provide the same look and feel across their CoPs, go to some effort to allow for customization within the community spaces themselves, thereby allowing community leaders and/or coordinators to mix and match the applications and features to meet the knowledge-sharing and collaboration needs of their community members.

CoPs are a major part of AFKN’s knowledge-sharing efforts. In order to meet the wide variety of needs of the more than 77,000 community members, the AFKN allows for a certain amount of customization within each community. Typical AFKN community features include links to related sites, document management capabilities, a mission statement on the CoP entry page, search feature,
community calendar, links to collaboration tools, links to training, and a feedback mechanism. The basic look and feel is the same for each community. For example, each has the community mission statement on the community entry (home) page, but community leaders have the freedom to select which community features will meet the needs of the majority of their community members.

Similar to AFKN, communities are the primary avenue for knowledge sharing at Caterpillar. Located within the Knowledge Network, Caterpillar’s CoPs leverage a number of features in support of their members. These features include access to Caterpillar’s legal agreement (a document that outlines the terms of use for external entities using Caterpillar’s Knowledge Network and CoPs), a contacts and feedback mechanism, a glossary of terms, search, a list of CoPs, a variety of community functions, and a “preferences” option. The preferences option allows a community member to do some customization to his or her view of the community including the ability to change languages. (Caterpillar’s communities can appear in English or Mandarin Chinese.)

SECURITY

Implement Strong Authentication and Monitoring Capabilities for IT Tools Used in Support of Knowledge-Sharing Partnerships.

Chapter 3 discussed IT security and confidentiality as part of the framework for creating and managing knowledge-sharing partnerships. Certainly this study’s partners have greatly benefited from sharing and reusing knowledge in collaboration with their suppliers, customers, and partners. However, they made sure to take appropriate steps to protect any intellectual property, confidential information, etc. when doing so by allowing only a limited peek behind the curtain to these individuals or groups.
Their IT tools have strong authentication and monitoring capabilities (e.g., tracking who has visited a particular community site, where they came from, and what they searched for).

Although the partners allow external individuals access to their portals and CoPs, it is done so in a calculated fashion and with an eye toward security. In other words, their access may be limited to content and features available only on an extranet, or if they are allowed full access to a community, for instance, certain content within that community may be protected so that they either do not see it at all or if they can see it, they cannot open it. For example, AFKN has strong information assurance and security processes in place to protect classified information. Additionally, the CoE for KM provides some initial training and guidance on what is or is not appropriate to share within a community space as well as copies of Air Force policy documents on what can/cannot be done in virtual environments.

Caterpillar actually underwent a security audit prior to opening the Knowledge Network system and its CoPs to value chain partners, and it leverages a variety of security options. To start with, a value chain partner must sign what the knowledge-sharing manager claims is the “mother of all disclaimers.” Eight pages long, this is a signed legal document that is a prerequisite for any value chain partner using the Knowledge Network system. Each section of the disclaimer must be agreed to before a partner is allowed access. In addition to the disclaimer, every community member has a security profile controlled by the community manager that includes affiliation, organization, and name. With these profiles, community managers know exactly who has access to their CoPs, and security profile alerts (a yellow, triangular flag with an exclamation point on it) placed on the community homepage are used to notify Caterpillar employees when a community is open to non-Caterpillar people. Finally, knowledge entries (validated pieces of information) have their own unique security profile, so access can be limited to only those members of the CoP that meet the profile criteria.

CONCLUSION

Whether the knowledge-sharing partnerships are internally or externally focused, certain considerations need to be made from an IT perspective with regard to IT tools and capabilities to support the partnership and yet protect that which needs to be protected. To that end, this study uncovered three best practices.

1. Leverage existing knowledge-sharing tools for use with internal and/or external partners, suppliers, or customers where it makes sense to do so.

2. Provide a suite of applications CoP managers/coordiators can customize for their specific needs.

3. Implement strong authentication and monitoring capabilities for those IT tools.

Having guidelines and processes to create and manage knowledge-sharing partnerships and the technologies to enable them is only part of the equation. These things require time and money to implement, maintain, and sustain over time; therefore, there must be some way to gauge the value or return for these partnerships. Chapter 5 outlines methods for gauging the success of the partnerships and infrastructure created in support of knowledge-sharing partnerships.
In the decade since knowledge management began its rise, organizations have learned how systematic KM processes impact the flow of knowledge between people and units in organizations. They now have better methods and models to recognize knowledge gaps in their business processes and envision how KM can impact them. In addition, software applications have better tools to track participation and utilization than in the early days of KM. The combined progress now allows sophisticated KM practitioners to understand and measure knowledge sharing and use. Although KM has become a widely adopted business practice and imperative over the past decade, organizations still struggle to measure the gains it promises to offer.

Metrics alone are not enough to tell the entire story of an organization’s KM efforts. There are success stories, best practices, and lessons learned that can convey necessary information, sometimes in a much richer format. However, without metrics, management attention waivers, funds tend to dry up, and pleas for more money fall on deaf ears. KM programs get relegated to an afterthought, and KM core groups find themselves reassigned. This is unnecessary when a few simple, targeted measures collected and reported regularly can result in increased support, resources, and funding.

This chapter will look at ways to evaluate the impact and viability of knowledge-sharing partnerships. Having a knowledge-sharing partnership is one thing; having one that is sustainable, delivering value, and helping the business of the partners is quite another. In order to get to the latter, organizations must be able to continuously measure how the knowledge-sharing partnership is performing, find ways to improve it, and repeat the procedure for continuous process improvement. Best practices for this chapter follow.

1. Have a robust measurement methodology in place to gauge the results of the knowledge-sharing activities and partnerships.
2. Devise business value and KM measures to understand the impact knowledge-sharing activities and tools have on the value chain and the organization.

**Implement a Measurement Methodology**

Have a Robust Measurement Methodology in Place to Gauge the Results of the Knowledge-Sharing Activities and Partnerships.

Having measures is not enough; an organization must have a robust and transparent methodology to measure its knowledge-sharing partnerships. The methodology should be executed continuously, and the results should then be used to improve the knowledge-sharing practices on a regular basis.
At Tata Steel, for example, senior management reviews the trend of the key performance indicators before and after the completion of the CVM and SVM programs. This creates sufficient visibility for senior management on the improvements gained through the programs.

Metrics to evaluate a phenomenon normally fall into two categories: process metrics and output metrics.7 Process metrics evaluate the steps required to move from inputs to outputs. Output metrics are those that evaluate the finished product. Output evaluations are normally made by the customers of the product or service, whereas process evaluations are conducted by the producing organization. Output metrics are more subjective and may vary highly depending on the nature of the customer answering the questions. Output metrics provide a sense of how those who are outside the production process view the product and whether the product meets the demands of the customer.

During its 2003 benchmarking study Measuring the Impact of Knowledge Management, APQC analyzed that study’s best-practice partners’ measures in terms of the APQC KM Measurement Framework for developing KM metrics and tying them to organization outcomes (Figure 12). The framework provides a map for how to trace KM investments (inputs) and activities (process and behaviors) to impacts (outputs) and related bottom-line measures (outcomes).

Looks simple, right? The challenge many organizations face when measuring their KM efforts is how to link KM activities and tools (e.g., participation in communities, After-Action Reviews, and best practices repositories) with the appropriate business processes. APQC developed a five-step methodology to help organizations make those linkages.

1. Define customer requirements or business goals/objectives. Each enterprise or organization must have a strategic starting point, and it is usually embodied in the business goals/objectives or strategic-level customer requirements.

2. Determine critical success factors, which are those key activities or items that must be performed to ensure success. These factors act as necessary, but not sufficient, conditions for success. Individually they will not guarantee success, but without them, KM practitioners will not be successful.

3. Determine major business processes and agree on the one to two major business processes that have a profound impact on meeting the critical success factor requirements. List and define the measures that clearly track process performance in support of achieving the critical success factors.

4. Determine the supporting KM activities that support the major business processes. Define the KM activity measures that have an impact on the identified business processes.

5. Develop measures. To do this, the KM team should use existing organizational and business process measures if possible. The measurement data must be collectable and meaningful. The KM team needs to think about what business managers care about when developing these measures. Finally, the measures should be limited to the critical few.

Measures can and should evolve over time with the growth and maturity of the knowledge-sharing partnerships, the KM program, and as the organization itself matures. The key point to remember is to begin with the end in mind. By starting with organizational and/or customer objectives and requirements, the KM team will be able to ensure that they measure what matters and can show a clear, strong correlation between KM activities and tools and business results.

Measuring the Process

The first step toward measuring a process is the ability to define the process. Without an adequate definition of what is being measured, people might be inclined to measure different things at different points in time, or different people will measure different things because there will be a lack of consensus about the component being measured.

Once the process is defined, the second step involves articulating what attribute is being measured. Multiple indicators can be measured for any component. For example, in weight training, a person can measure the amount of body fat, the stamina, the muscle strength, and a whole slew of other indicators of the human body. Moreover, there can be composite indicators that integrate individual indicators. Common, measurable attributes include the time taken to complete the process and the number of critical issues that arise during the conduct of a process.

The third step involves analyzing the measures and answering the question: What do the indicators tell us? For scores to be meaningful, they need to be understood within a given context. Context normally involves two items: history of the process and outsider information. History of the process provides indicators about how a process is performing currently compared to how it performed in the past. Obviously, the KM team or whomever examines the indicators hopes to
fare better on positive indicators while lowering the numbers on negative indicators. Developing a historical context for evaluating metrics requires time and experience. A person cannot expect to compare how a process performed today to yesterday to tell him or her something brilliant; however, comparing how that process performed today against the average performance over a month will provide him or her with some insights.

While history takes time to develop, outsider information (benchmarking) can provide more immediate context. With benchmarking, an individual or team can always compare their indicators against those of other organizations. Two types of benchmarking are common. The first is where an organization compares itself to the average performance of other organizations in the industry. The second is where it compares itself to industry leaders. The first kind of benchmarking is ideal in the early stages of the process as it gives those responsible an indicator of where they need to be relative to rest of the industry. The latter is more suitable once they have gained more experience with the process and are looking to move up the charts and reach higher goals.

The fourth step involves devising appropriate interventions to improve the performance of certain areas. Interventions can serve as positive or negative reinforcements. Positive reinforcements involve understanding what worked well and continuing to do it in order to make the process stronger. Negative reinforcements entail uncovering what went wrong, correcting it, and then ensuring that the correction is applied to improve the process. The fourth step feeds back into the second or third step, depending on whether those responsible need to calibrate new measures. If new measures are required, they go back to the second step; otherwise, they go back to the third step.

Measuring Outputs

Output measures are derived from an understanding of what the customer of the process wants. This could include external as well as internal customers. Not surprisingly, the first step in developing good output measures is the identification of customers and their needs. An organization normally has multiple categories of customers to a process. While all customers may share certain characteristics, there may be differences in the experiences and needs that can be used to segment them. Experienced customers will have different needs from new ones; similarly, the needs of frequent or repeat customers will vary from those of occasional customers. It is always a good idea to get inputs on what is important from all segments of customers, as doing so will impart a better perspective of the complete picture.

The second step involves devising surveys or other instruments to get customer perceptions on the phenomena. Here the overriding rule is the KISS principle—“Keep It Simple, Stupid!” Nothing will detract customers from providing input faster than a long and cumbersome survey to fill in. Customers must be polled routinely and frequently for their opinions, yet they must not feel imposed upon. Customers will get frustrated—and very quickly, one might add!—if they see their opinions being ignored and failing to make a difference in how the product or service is being delivered.

The third and fourth steps of measuring outputs are the same as for process metrics and do not need to be repeated here.
DEVISE BUSINESS VALUE AND KM MEASURES

Devising Business Value and KM Measures to Understand the Impact Knowledge-Sharing Activities and Tools Have on the Value Chain and the Organization.

The value of knowledge-sharing partnerships can be measured on multiple levels, which vary in degrees of sophistication:

- participation,
- process improvement, and
- business value.

At the most basic level, knowledge-sharing partnerships can be measured for depth of participation. Some organizations consider participation measures to be a proxy for degree of penetration into the organization. The AFKN team, for example, measures the number of participants who have created accounts, the number of documents uploaded into the communities, the number of pages displayed per month, as well as the number of submissions received for CoP awards. Using their reporting tools, they can also see how many people visit a community each day, what base they are from, and the searches they performed. Anybody within the Air Force can view the metrics for a given community, even if the community is closed. Metrics can be automatically generated on a monthly or daily basis.

Measurement occurs at this level at Caterpillar as well. As of November 2005, Caterpillar had approximately 4,300 communities of practice with 180,000 community memberships. As of that time, Caterpillar had seen 40,000 unique users of its Knowledge Network in the previous 12 months. Using the system, which looks at user profiles, the KM team determined the users comprised the following affiliations:

- 29,000 Caterpillar employees;
- 6,000 dealer employees;
- 2,900 agency employees;
- 1,400 suppliers;
- 500 joint venture individuals; and
- 200 retirees.

At the next level, measures of knowledge-sharing are tied to process improvements. Buckman gauges the effectiveness of its knowledge-sharing tools and activities in a variety of ways, including the number of Buckman After Action Reviews, the number of trained associates, customer loyalty scores, supplier relationship enhancement, customer satisfaction survey results, rate of new product development, new product sales, and continuous improvement for Buckman and its customers. With its focus on customer intimacy, it should be no surprise that a number of their results indicators focus on their customers. Everything they do is driven by the desire to enable their customers to work more efficiently and create products as soon as possible. Buckman uses customer satisfaction surveys and workshops as a measure of their role in helping the customer do those things.

At the third level, organizations begin to tie knowledge-sharing metrics to those of business value or processes. Tata Steel is a great example of this. A steering committee reviews the performance of the knowledge-sharing approaches at a regular frequency. For example, at the senior management level, the SVM program is reviewed on four broad dimensions: value created in the chain, value accrued
to the Tata Steel chain, the number of ideas implemented, and the number of people covered under the program. Within each of those dimensions, the review committee looks at a specific set of key performance indicators for shop performance for each of the user departments covered under that dimension. For example, cost and productivity of the steel making shop is governed by parameters such as the life cycle of cost of refractory in the steel ladle and the consumption of aluminum wire. For the CVM program, typical key performance indicators reviewed by senior management include increase in the share of business, improvement in delivery compliance, system inventory, and volume of new products or grades. In addition, senior management also reviews a few idea-specific key performance indicators.

Raytheon uses a variety of measures at all three levels to evaluate the effectiveness of KM and its communities. For example, it has community and R6σ project outcome measures such as the value created by the KM community, after action reviews (conducted annually), and a community health assessment tool. Since knowledge sharing is interwoven into its R6σ methodology, it also examines R6σ measures such as ROI, growth, and training and certification as a way to understand the impact knowledge sharing has on the organization.

Raytheon’s RILCOM community uses a comprehensive set of inward- and outward-looking performance and cost metrics. These metrics have evolved over time. In Phase I of its life cycle, the community focused on inward-looking performance metrics such as cycle time, pack to ship time, and dock to stock (reported as number of days). In Phase II, the community focused more on cost metrics such as headcount, material handling, transportation, and initiative savings.

Again, these were still inward focused. As of the end of 2004, RILCOM had documented $36 million in tangible benefits for Raytheon. As Raytheon’s RILCOM community moves into Phase III, it plans to focus on more outward-looking metrics such as supplier performance and cost metrics like volume, on-time delivery, transactions, accuracy, quality, claims, and service. RILCOM and Raytheon want to take this approach and deploy it to their top suppliers to enable them to get metrics and data from their partners in real time.

Figure 13 details the metrics that senior managers at the partner organizations care about. As it shows, most measures link directly to corporate performance indicators.

Knowledge Management Measures

While business value measures are important at the executive level, organizations serious about knowledge management also need measures to help improve the knowledge-sharing processes—the knowledge management measures. Knowledge management measures should account for the frequency, efficiency, and effectiveness of an organization’s knowledge-sharing protocols.

Examples include the metrics collected by the AFKN to gauge the effectiveness of their communities of practice: number of registered users, number of documents uploaded per month, total number of users, and most accessed CoPs by month. The AFKN currently has more than 75,000 registered users in the system and more than 27,000 documents uploaded into the system (as of the end of September 2005).

To gauge the effectiveness of its knowledge-sharing approaches and tools, Raytheon looks at a series of KM deployment measures such as the number of KM champions certified, the number of leadership teams and master experts briefed, communication metrics, and the number of deployed communities.
In addition to the KM and community measures described above and in the previous section, Raytheon’s communities also leverage an annual CoP health assessment process and an annual After-Action Review process. Licensed from APQC, the CoP health assessment focuses on structure, leadership, knowledge-sharing processes, communication, recognition, measurement, and outcomes (Figure 14, page 72). It provides consolidated survey responses and highlights gaps (Figure 15, page 73). Using this assessment, RILCOM and its sub-community, MTrak, scored in the top percentile compared to other Raytheon CoPs across the globe. Also conducted by a third party, the annual CoP After-Action Review helps to identify gaps and lessons learned for continuous improvement on RILCOM projects.

As stated in the previous section, as of late 2005, Caterpillar had approximately 4,300 communities of practice. The KM team receives, on average, 75 new community requests a month. The KM team uses the Knowledge Network system’s built-in reporting tools to track the number of communities, the number of postings within communities, the number of attachments in the discussion forums, the volume of attachments, and the content viewed by users. The system has also helped identify about 10,000 experts across the value chain.

Caterpillar’s value chain partners are very good community participants. In fact, according to Caterpillar’s knowledge-sharing manager, external discussions account for more value than internal activity in Caterpillar today. External partners are forcing internal people to engage in knowledge sharing as they answer questions. The organization has found that communities are an excellent tool to gather the voice of the customer.

**Metrics That Matter the Most to Management**

- Safety improvement: 40%
- Failure reduction: 20%
- Cost savings: 80%
- ROI: 80%
- Total number of users: 100%
- Percent of sales from new products: 40%
- Other: 40%

*Partners (n=5)*

![Figure 13](image-url)

Other= success stories, customer attrition, demonstrating global thought leadership, improved utilization, and employee satisfaction.

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Gauging the Results

Sample Section of APQC’s CoP Health Assessment

<table>
<thead>
<tr>
<th>Strategy and Leadership</th>
<th>CoP “A” % Score of Possible</th>
<th>Average Score for All CoPs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the CoP have a clear, compelling business value proposition for you to participate in it?</td>
<td>83%</td>
<td>79%</td>
</tr>
<tr>
<td>Does management support the time you spend in the CoP?</td>
<td>89%</td>
<td>83%</td>
</tr>
<tr>
<td>Does your management recognize the value of output of your CoP?</td>
<td>74%</td>
<td>72%</td>
</tr>
<tr>
<td>Does the CoP have a dedicated, skilled leader?</td>
<td>86%</td>
<td>73%</td>
</tr>
<tr>
<td>Does the CoP have someone who coordinates the knowledge capture and documentation?</td>
<td>80%</td>
<td>72%</td>
</tr>
<tr>
<td>Does the CoP leader have a clearly communicated vision for moving the CoP forward?</td>
<td>57%</td>
<td>48%</td>
</tr>
<tr>
<td>Do you know who the senior sponsor of the CoP is (i.e., do they have a visible presence)?</td>
<td>51%</td>
<td>44%</td>
</tr>
<tr>
<td>Does participation in the CoP help you perform your job better? (0= No, 1= In a limited fashion, 2= Occasionally, 3= Frequently, 4= Very frequently)</td>
<td>49%</td>
<td>49%</td>
</tr>
<tr>
<td>How much dedicated time does the CoP leader typically spend managing the CoP? (0= 0, 1= 1-5%, 2= 6-10%, 3= 11-20%, 4= 21-30%, 5= 31-50%, 6= 51-75%, 7= 76-100%)</td>
<td>44%</td>
<td>24%</td>
</tr>
</tbody>
</table>

Section Score                                               | 66%                         | 59%                       |

Figure 14

Participation is not the only gauge of success with knowledge sharing. Buckman has other bottom-line measures for its customer-focused, knowledge-driven value chain success, including:

- rate of new product development,
- penetration into existing accounts (as evidence that customers are profiting from the partnership), and
- sales growth.

Buckman is now in its third year of double-digit sales growth. It is growing faster than the market and is taking business away from competition.

APQC’s 2005 study *Using Communities of Practice to Drive Organizational Performance and Innovation* found a tremendous emphasis on communities as the target of, and the vehicle for, sophisticated communication methods and messages. Not only do the communities at those best-practice organizations use up-to-date electronic methods, the messages are often crafted with the help
of marketing and communication professionals to cut through the information overload inherent in the new world of work.

All of the partners in both studies report that integration of communities across the value chain leads to faster communications, better reaction time and reduced errors, faster technology transfer and adoption, an increase in the spread of improvement ideas across the chain, and reduced cycle time in general. Speed is a strategic benefit in itself, leading to customer value.

CONCLUSION

The processes and impacts of knowledge-sharing partnerships are measurable. Tracking the results and outcomes of the knowledge-sharing activities will ensure continued support in terms of resources and funding from business units and senior management. Sometimes, the act of measuring in and of itself can contribute to better results and continued support.

This study’s best-practice partners did not develop their measures overnight. They put considerable time and effort into developing measures that would reflect the impact their knowledge-sharing partnerships have had on the organizations. They also realize that the measures are not a one-time occurrence. They need to be tracked, collected, and reported to key stakeholders on a regular basis. And, their measures have evolved over time. Although activity-based measures continue to be important to them, it is with the outcome measures that many times they, and other key stakeholders, see the true impact KM is having on their organizations.
The Next Stage—Institutionalizing Improvement and Engaging Partners

As discussed during this report, to truly leverage knowledge across the value chain, organizations have begun to integrate currently disparate knowledge management approaches, process improvement disciplines, and organizational learning programs into a seamless toolkit to enable their business processes. The model in Figure 16 illustrates the importance of this concept. KM, process improvement, and organizational learning form the triangle-shaped fulcrum that supports business process performance. Process improvement programs (including Lean, Six Sigma, Statistical Process Control, etc.), knowledge management (self-service tools, process-based knowledge sharing, CoPs, and best practices transfer, etc.), and organizational learning (training and development, leadership development, talent management, etc.) form the triumvirate of tools for process and people improvement.

An Integrated Approach to Enhancing the Value Chain

Figure 16
Enterprise processes supported by these tools (represented here with APQC’s Process Classification Framework’s core business processes) deliver value to the customer and must remain squarely in the target crosshairs of the enabling processes. In addition to the growing importance of business process management (BPM), these combined process and people improvement tools required APQC to challenge traditional notions of the knowledge management evolution inside of organizations. This study of how organizations leverage knowledge across the value chain drove APQC to reconsider its Road Map to Knowledge Management Results: Stages of Implementation™ to reflect the next evolution of improvement in business.

KM Stages of Implementation

During the course of APQC’s 2000 benchmarking study, Successfully Implementing Knowledge Management, APQC created the Road Map to Knowledge Management Results: Stages of Implementation™ noted in Figure 17. Over the course of the last five years, APQC explored many of the varying aspects of knowledge management that have made this model such an important and viable management tool. Communities of practice, Web-based self-service tools, expertise location systems, virtual collaboration tools, and the transfer of best practices all make up critical components of the arsenal of knowledge management.

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8 The Process Classification Framework represents a series of interrelated processes that are sociotechnical in nature, are business critical, and represent six major dimensions of the organization. It serves as a high-level, industry-neutral enterprise model that allows organizations to see their activities from a cross-industry process viewpoint. It is available at www.apqc.org

9 BPM is a management approach that governs workflow in an organization; instead of focusing on work within a given function (e.g., finance and accounting department), process management directs an organization’s cross-functional focus to a particular process (e.g., paying an invoice). Source: Business Process Management. APQC, 2005.
However, over the same period of time, APQC also explored how knowledge management, as a discipline, is being used by leading organizations to bolster the “business of their business.” Studies that have looked at retaining valuable knowledge in times of shifting work forces, replicating the gains of process improvement programs, integrating KM and organizational learning, and measuring the impact of KM have illuminated the future of this powerful process improvement approach.

Accordingly, APQC has taken a fresh look at each of the stages to see what needed updating in the light of findings from 12 KM benchmarking studies and scores of client interactions in the last five years. As a result, APQC has updated the Road Map to Knowledge Management Results: Stages of Implementation™ and revised the nomenclature of stages 2 through 5 (Figure 18). Stage 1, “Get Started,” does not substantively change based on APQC’s learnings.

However, Stage 2, which relates to developing strategy, should now focus on building a KM strategy that is integrated with process improvement and organizational learning. APQC modified Stage 3 to anticipate launching KM pilots across the value chain, which will help organizations begin building cross-business improvement from the beginning of their journey. As this report demonstrates, most organizations start by linking internal components of their value chain before venturing outside their core—the key is to launch pilots that impact the value chain and deliver business impact. Stage 4 again includes the word “integrate” because this is typically where organizations begin to formally move KM, process improvement, and organizational learning tools and approaches into a common area. In Stage 5, formerly called “Institutionalize KM,” it is apparent that effective knowledge sharing has to go beyond institutionalizing internally to include the entire value chain ecosystem of an organization.
Revised Stages of KM Implementation

APQC’s Road Map to Knowledge Management Results: Stages of Implementation™ model serves two purposes: as an assessment of your organization’s maturity and as a toolkit for driving better and faster maturation. In the former case, an organization should compare itself to the categories described below to discover where along the stages it lies and identify areas where it has strengths and opportunities. In the latter case, it should serve as a blueprint for integrating knowledge-sharing tools and processes into the very fabric of the “business of the business,” with ideas for strategy development, implementation plans, business development, partnerships (internal and external), governance, tools and approaches, classification schemes, and much more. APQC developed another road map during its 2005 Integrating Knowledge Management and Organizational Learning benchmarking study that can also help guide an organization’s efforts. APQC integrated much of what was learned there into this revised edition as well, so the two should be complementary.

Is the model 100 percent correct? Of course not. The discipline of knowledge management is always changing and adapting to fit current and future business models. Just as any overarching model or index attempts to take disparate pieces and converge them neatly into a homogenous tool, APQC recognizes that this will not be “one size fits all.” Accordingly, the revised Road Map to Knowledge Management Results: Stages of Implementation™ should operate as a guide and discussion tool where an organization takes what fits and applies it with gusto, modifying or discarding the parts that do not. APQC hopes that the new revisions will engender dialogue and passion and that this tool will help organizations around the world quickly discover the benefits of tapping into their most valuable resource—the knowledge of their people and processes.

OVERVIEW OF CHANGES TO STAGES MODEL

This section is meant to highlight the revisions that may have relevance instead of covering the complete revised Road Map to Knowledge Management Results: Stages of Implementation™. For the revised stages, the following subsections will discuss each stage and then list the updated elements inside each of the following key categories:

- objectives (the major focus areas inside each stage),
- business case (the value proposition and elements for a business case in each stage),
- budget (where the resources and funding typically come from in each stage),
- governance structure (the guidance and oversight structure in each stage),
- role of information technology (how IT should interact at each stage),
- change management (tools and ideas for how to drive successful change at each stage),
- assessment (formerly part of Assessment and Measurement, this describes different types of assessments conducted at each stage),
- measurement (formerly part of Assessment and Measurement, this highlights what types of metrics and measures are appropriate at each stage),
- communication (a new stand-alone category to describe different communication ideas and practices), and
- tools and processes (a new stand-alone category to highlight different tools and processes one might use to drive success inside each stage).
Stage 1: Get Started

Stage 1 is where organizations discover the need for better knowledge sharing and reuse to prevent duplication of effort, avoid past mistakes, and to consistently replicate best practices. The end goals of the visionary inside an organization in Stage 1 are to create a compelling rationale for KM, engage other influencers in the cause, and develop a task force to begin developing a strategy. Organizations in Stage 1 do not typically have a formal business case or structured goals for the effort; instead, they are focusing on the potential of KM while gathering anecdotes of success or failure to bolster their case. There have been no substantive changes to Stage 1 because getting started has not really changed in more than five years!

Stage 2: Develop Integrated Strategy

For KM to make a long-term, and sustainable, measurable impact on an organization, develop a KM strategy that is integrated with the business strategy, process improvement strategy, and the organizational learning strategy. Stage 2 represents a crucial turning point for most organizations because this is where interest in knowledge sharing moves from individual interest to an organizational initiative. Beware, however, that Stage 2 is where many process improvement efforts, including KM, go to die. Stewards often fail to connect the effort to critical business goals and do not adequately address senior management concerns about driving revenue, innovation, quality, or cycle time improvements. Several changes to Stage 2 are highlighted that should help an organization build for the future from the beginning. Consider the elements in Figure 19 (page 80) to develop a KM strategy.

Stage 3: Launch Value Chain KM Pilots

If Stage 2 represents a danger zone for stalling a KM program, Stage 3 offers the opportunity to test the strategy, solve pressing business problems, and learn how to help improve processes and people efficiently. Launch KM pilot projects to test the strategy and deliver “quick win” value to the organization. Best practices research and implementation experience shows that successful knowledge-sharing organizations start with at least three pilot projects with different focus areas, approaches, and goals. This helps an organization test its capabilities and build competencies quickly, while building engagement through success. Focus on internal value chain components first, but also consider launching a pilot that impacts an external value chain partner as well. Pull in a key supplier, a key customer, or a vendor who will benefit from the interaction and provide improvement for the organization as well. It may be too early to involve members of the extended value chain if competencies are not developed. Do not pick more pilots than can be feasibly supported. It is worse to stretch resources too thin and fail several times rather than focus efforts on the critical few and ensure success. Consider the elements in Figure 20 (page 81) to launch initial KM pilots.
## Categories and Tasks for Stage 2

<table>
<thead>
<tr>
<th>Categories</th>
<th>Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>• Create a strategy that integrates KM, process improvement and organizational learning foci</td>
</tr>
<tr>
<td></td>
<td>• Identify at-risk areas for knowledge loss</td>
</tr>
<tr>
<td>Business Case</td>
<td>• Identify the major payoffs for KM given the organization’s strategy</td>
</tr>
<tr>
<td></td>
<td>• Focus on building people and process capability and how KM approaches will work</td>
</tr>
<tr>
<td></td>
<td>• Reflect potential value of pilot initiatives</td>
</tr>
<tr>
<td></td>
<td>• Identify value of better relationships across the value chain both internally and externally</td>
</tr>
<tr>
<td>Budget</td>
<td>• If possible, identify areas to share resources with process improvement and/or organizational learning</td>
</tr>
<tr>
<td>Governance/Structure</td>
<td>• Include value chain partner input and opportunities in strategy discussions</td>
</tr>
<tr>
<td></td>
<td>• Develop Center of Excellence to implement and manage KM and other process improvement initiatives</td>
</tr>
<tr>
<td>Information Technology</td>
<td>• Identify how to integrate with current learning IT tools (LMS, LCMS, etc.)</td>
</tr>
<tr>
<td></td>
<td>• Identify how to integrate with process improvement IT tools</td>
</tr>
<tr>
<td></td>
<td>• Develop and administer vendor assessment tools</td>
</tr>
<tr>
<td>Change Management</td>
<td>• Develop a clear vision linked to corporate strategies</td>
</tr>
<tr>
<td></td>
<td>• On-board business unit liaisons</td>
</tr>
<tr>
<td></td>
<td>• Develop executive sponsorship messaging</td>
</tr>
<tr>
<td></td>
<td>• Create communication strategy</td>
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<tr>
<td></td>
<td>• Develop recognition strategy</td>
</tr>
<tr>
<td>Assessment</td>
<td>• Review feasibility interviews</td>
</tr>
<tr>
<td></td>
<td>• Conduct IT needs assessment with relevant employee groups (ID needs for expertise location, virtual collaboration, asynchronous communication, repositories, search etc.)</td>
</tr>
<tr>
<td></td>
<td>• Conduct cultural readiness assessment with relevant employee groups</td>
</tr>
<tr>
<td></td>
<td>• Conduct vendor assessment (for IT applications and implementation)</td>
</tr>
<tr>
<td>Measurement</td>
<td>• Identify key performance indicators of potential pilot areas</td>
</tr>
<tr>
<td></td>
<td>• Identify and gain buy-in on critical measures from senior management</td>
</tr>
<tr>
<td>Communication</td>
<td>• Execute communication strategy for organization</td>
</tr>
<tr>
<td></td>
<td>• Communicate vision for improved sharing across value chain</td>
</tr>
<tr>
<td></td>
<td>• Create short “elevator speech” on why, how, and what KM will do for employees</td>
</tr>
<tr>
<td></td>
<td>• Develop road show content to deliver consistent messages</td>
</tr>
<tr>
<td>Tools and Processes</td>
<td>• Conduct appropriate level of knowledge mapping to address content and knowledge needs/gaps</td>
</tr>
<tr>
<td></td>
<td>• Conduct value-scope interviews with stakeholders and potential pilot areas</td>
</tr>
<tr>
<td></td>
<td>• Compile summary cases for each potential pilot</td>
</tr>
<tr>
<td></td>
<td>• Use criteria testing matrix to select from potential pilot</td>
</tr>
</tbody>
</table>
## Categories and Tasks for Stage 3

<table>
<thead>
<tr>
<th>Categories</th>
<th>Tasks</th>
</tr>
</thead>
</table>
| Objectives                  | • Develop viable processes for linking internal and external value chain components together, even if starting with internal value chain participants  
                              • Link to organizational learning and development  
                              • Link to process improvement initiatives |
| Business Case               | • Identify potential value of replica methodologies and approaches  
                              • Emphasize value of learning opportunities  
                              • Identify potential gains in value chain partnership improvement |
| Budget                      | • Mix corporate funding for CoE and methodologies with business unit funding for pilots and/or initiatives |
| Governance/Structure        | • Develop central CoE with facilitators, moderators, and content managers to manage processes and infrastructure  
                              • Recruit and support CoP leaders/facilitators |
| Information Technology      | • Develop applications to support pilot or initiative needs  
                              • Link applications to learning and process tools  
                              • Conduct security audit on current and new systems  
                              • Create appropriate security tools and processes |
| Change Management           | • Conduct stakeholder analysis to determine support and business requirements  
                              • Create approach-specific communication and training and recognition plans  
                              • Identify and address barriers to sharing information |
| Assessment                  | • Security and risk assessments for IT tools  
                              • Assess employee/member satisfaction after launch of pilots |
| Measurement                 | • Develop measurement and tracking systems for each pilot/initiative  
                              • Develop roll-up scorecard for overall health of initiative including activity, process, and business outcome measures  
                              • Establish baseline performance for each initiative and post-pilot performance using current process and outcome measures |
| Communication               | • Identify communication specialist to help support efforts  
                              • Create communication plan and schedules  
                              • Brand communication vehicles so users can identify types of messages quickly |
| Tools and Processes         | • Process and knowledge mapping  
                              • KM design framework for approaches to address planning and design and launch steps  
                              • Taxonomy development for consistent classification of content  
                              • Facilitator guides for “self-service”  
                              • CoP implementation tools for consistency  
                              • After-Action Reviews to gather lessons learned from pilots  
                              • Discussion boards |

*Figure 20*
Stage 4: Integrate, Expand, and Support

For most organizations, Stage 4 requires the most effort and is the stage at which it is most appropriate to target the extended value chain in earnest. After launching a few pilots, tracking results, and developing lessons learned and best practices, many organizations expect success to continue unabated. Wrong! They will find that Stage 4 requires as much or more diligence than any of the previous stages if they wish to truly become a knowledge-enabled organization. If the organization planned and strategized appropriately with other key partners from process improvement and organizational learning, integrating, expanding, and supporting should go more smoothly. If it has not, now is the time to put on the partnering hat so it can embed knowledge management tools in every process improvement effort and link employees to all of the learning tools, content, and expertise they need to do their jobs.

Additionally, measurement and value creation need to remain major focal points for the core group and business management. At this stage, an organization should be assessing the significance of its value chain partners and sharing knowledge with them to ensure that it captures the best information from anywhere in the business family. Finally, Stage 4 organizations will see business units begin to pull KM, process improvement, and organizational learning because they see such strong value. Consider the elements in Figure 21 to integrate, expand, and support organizational efforts.

Stage 5: Institutionalize KM Across the Value Chain—The “Performance Program”

APQC has always envisioned Stage 5 as a part of a journey and not a destination in and of itself. Despite all APQC has learned during the course of the last 17 best-practice studies, this still remains true. Now, however, APQC can offer more insight into what institutionalization begins to look and feel like.

- Knowledge sharing and reuse appearing seamless to the employee and value chain components is the goal.
- Effective organizations use business process management tools along with process improvement, organizational learning, and KM to embed knowledge, content, and expertise in the actual work streams employees engage in.
- Knowledge is pushed or pulled at the point of need.
- When problems or defects occur, employees from anywhere in the value chain can reach into their easy-to-use bucket of tools to solve problems by engaging an expert, finding a proven practice, “leaning” a problem out, taking a training course, or chatting with a supplier.

The goal is for employees to improve their work processes every day and improve themselves (i.e., learn) at the same time. As such, the organization might want to shift its language at this stage from talking about KM as a separate effort and instead brand its efforts as a performance program that drives process and people improvement regardless of the toolset. Consider the elements in Figure 22 (page 84) to institutionalize KM across the value chain.

Appendix A includes a detailed matrix of each stage and the corresponding components that best-practice organizations consider as they develop sophisticated approaches to process and people improvement. Please use this as a complete reference for the new Road Map to Knowledge Management Results: Stages of Implementation™.
## Categories and Tasks for Stage 4

<table>
<thead>
<tr>
<th>Categories</th>
<th>Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td>• Enhance CoP competencies</td>
</tr>
<tr>
<td></td>
<td>• Develop integrated KM, process improvement, and organizational</td>
</tr>
<tr>
<td></td>
<td>learning links</td>
</tr>
<tr>
<td></td>
<td>• Engage key value chain business partners</td>
</tr>
<tr>
<td></td>
<td>• Develop replication processes for process improvement programs</td>
</tr>
<tr>
<td><strong>Business Case</strong></td>
<td>• Create formal business case for expansion and integration,</td>
</tr>
<tr>
<td></td>
<td>especially to include suppliers, customers, and other business</td>
</tr>
<tr>
<td></td>
<td>partners</td>
</tr>
<tr>
<td></td>
<td>• Create common KM and organizational learning approaches and focus</td>
</tr>
<tr>
<td></td>
<td>on subsequent cost savings</td>
</tr>
<tr>
<td></td>
<td>• Build value of investment for replication inside of process</td>
</tr>
<tr>
<td></td>
<td>improvement function</td>
</tr>
<tr>
<td></td>
<td>• Require value of investment and ROI if possible</td>
</tr>
<tr>
<td><strong>Budget</strong></td>
<td>• Blend business unit and corporate funding for CoE and approaches</td>
</tr>
<tr>
<td></td>
<td>• Integrate KM, process improvement, and organizational learning</td>
</tr>
<tr>
<td></td>
<td>into normal budgetary cycle</td>
</tr>
<tr>
<td></td>
<td>• Increase reliance on people and budget from business units</td>
</tr>
<tr>
<td>**Governance/</td>
<td>• Common reporting structure for KM, organizational learning, and</td>
</tr>
<tr>
<td>Structure**</td>
<td>process improvement;</td>
</tr>
<tr>
<td></td>
<td>central CoE maintains management of processes and tools</td>
</tr>
<tr>
<td></td>
<td>• Develop network of knowledge/process/learning champions</td>
</tr>
<tr>
<td></td>
<td>• IT manages infrastructure</td>
</tr>
<tr>
<td>**Information/</td>
<td>• Implement IT to support external partners where needed</td>
</tr>
<tr>
<td>Technology**</td>
<td>• Ensure that compliance and security remain strong</td>
</tr>
<tr>
<td><strong>Change Management</strong></td>
<td>• Revise and sustain communication plans</td>
</tr>
<tr>
<td></td>
<td>• Provide training and e-learning opportunities for new KM, process</td>
</tr>
<tr>
<td></td>
<td>improvement, and learning tools</td>
</tr>
<tr>
<td></td>
<td>• Create supply chain and external customer partner teams</td>
</tr>
<tr>
<td></td>
<td>• Build knowledge sharing into corporate competencies</td>
</tr>
<tr>
<td><strong>Assessment</strong></td>
<td>• Employee/Member satisfaction assessments for each approach/</td>
</tr>
<tr>
<td></td>
<td>initiative or community</td>
</tr>
<tr>
<td></td>
<td>• Encourage each pilot/community to assess alignment to initial and</td>
</tr>
<tr>
<td></td>
<td>corporate goals</td>
</tr>
<tr>
<td></td>
<td>• Assess overall alignment to initial goals and corporate goals</td>
</tr>
<tr>
<td><strong>Measurement</strong></td>
<td>• Create and report on overall measures using balanced scorecard or</td>
</tr>
<tr>
<td></td>
<td>family of measures</td>
</tr>
<tr>
<td></td>
<td>• Develop formal ROI/value of investment where possible</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>• Continue communication strategy</td>
</tr>
<tr>
<td></td>
<td>• Communicate with value chain partners</td>
</tr>
<tr>
<td></td>
<td>• Set up face-to-face value chain partner forums where possible</td>
</tr>
<tr>
<td></td>
<td>• Develop external communication strategy to publicize results/</td>
</tr>
<tr>
<td></td>
<td>programs</td>
</tr>
<tr>
<td><strong>Tools and Processes</strong></td>
<td>• Competency mapping for individual roles and/or job classifications</td>
</tr>
<tr>
<td></td>
<td>• Benchmark financial performance of value chain partnerships</td>
</tr>
<tr>
<td></td>
<td>• Facilitator- and self-directed implementation guides for CoPs,</td>
</tr>
<tr>
<td></td>
<td>expertise locator system, virtual collaboration, AARs, etc.</td>
</tr>
</tbody>
</table>
## Categories and Tasks for Stage 5

<table>
<thead>
<tr>
<th>Categories</th>
<th>Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>• Provide information, activities, and tools to knowledge workers at the point of need that furthers their effectiveness</td>
</tr>
<tr>
<td></td>
<td>• Seamless integration with their work practice</td>
</tr>
<tr>
<td></td>
<td>• Fully integrate KM, organizational learning, and process improvement into “performance program”</td>
</tr>
<tr>
<td></td>
<td>• Develop value chain partner performance scorecards</td>
</tr>
<tr>
<td></td>
<td>• Close alignment of “performance program” with business model</td>
</tr>
<tr>
<td></td>
<td>• Capture and retain valuable individual knowledge</td>
</tr>
<tr>
<td>Business Case</td>
<td>• “Performance program” becomes part of the organization's differentiator in marketplace</td>
</tr>
<tr>
<td></td>
<td>• Recognize “performance program” as value-add across business ecosystem</td>
</tr>
<tr>
<td>Budget</td>
<td>• Central resource and budget seen as investment; may or may not come from distributed model (e.g., business units pay into a central fund)</td>
</tr>
<tr>
<td></td>
<td>• Create standard budgeting process for central CoE</td>
</tr>
<tr>
<td></td>
<td>• Embed budgeting process inside business units</td>
</tr>
<tr>
<td>Governance/Structure</td>
<td>• May move toward reporting to strategic executive vice president of HR (if HR and human capital are seen as a strategic asset in the company); movement out of IT</td>
</tr>
<tr>
<td></td>
<td>• May report to president or executive or particular business division served</td>
</tr>
<tr>
<td></td>
<td>• Business units partner with consultative HR, learning, KM, process improvement professionals to keep environment fresh with information that relates directly to business and human performance</td>
</tr>
<tr>
<td></td>
<td>• Increased responsibility for execution in business units and operations</td>
</tr>
<tr>
<td>Information Technology</td>
<td>• Tools built into work flows and integrate with common applications</td>
</tr>
<tr>
<td></td>
<td>• Consolidation and providing one face to the user with push and search features with some room for customization</td>
</tr>
<tr>
<td></td>
<td>• People, process, and content available via one portal</td>
</tr>
<tr>
<td></td>
<td>• Make technology accessible to value chain partners</td>
</tr>
<tr>
<td>Change Management</td>
<td>• “Performance program” seamlessly aligned with performance management systems</td>
</tr>
<tr>
<td></td>
<td>• “Performance program” linked to talent management and leadership development</td>
</tr>
<tr>
<td></td>
<td>• Embed “performance program” change agenda and knowledge experts in processes and business units</td>
</tr>
<tr>
<td></td>
<td>• Build “performance program” into new-hire training</td>
</tr>
<tr>
<td></td>
<td>• Provide ongoing recognition</td>
</tr>
<tr>
<td>Assessment</td>
<td>• Identify links to productivity and revenue improvements, cost and cycle time reductions, etc.</td>
</tr>
<tr>
<td></td>
<td>• Assess health and alignment to business needs</td>
</tr>
<tr>
<td></td>
<td>• Correlate business and human performance and responsiveness to need of workers to increase capacity for quality and delivery</td>
</tr>
<tr>
<td></td>
<td>• Should be seen as pervasive rather than initiative driven, so it does not make sense to measure separate initiatives</td>
</tr>
<tr>
<td>Measurement</td>
<td>• Separate measurement not needed—business metrics should reflect strong knowledge sharing, process improvement, and learning</td>
</tr>
<tr>
<td>Communication</td>
<td>• Communicate value chain partnership successes externally</td>
</tr>
<tr>
<td></td>
<td>• Make part of employment “brand” for prospective employees by communicating as differentiator for employment</td>
</tr>
<tr>
<td>Tools and Processes</td>
<td>• Competency mapping</td>
</tr>
<tr>
<td></td>
<td>• New hire training in tools and philosophy and behavioral expectations</td>
</tr>
<tr>
<td></td>
<td>• External partner forums</td>
</tr>
</tbody>
</table>

*Figure 22*
CONCLUSION

The theme of this study and the message for KM practitioners is “bottom-line and strategic results come from integration across the value chain.” No matter the type of organization, the sum of the value of its combined parts is vastly greater than the individual components. Many have argued that the difference between the balance sheet and market capitalization resides in the knowledge and know-how of the people in that organization. Whether one agrees or disagrees with the semantics of the argument does not matter; what does matter is that effective organizations make the best use of the resources they have at their disposal to produce the goods or services they deliver. Accordingly, it is time for process improvement professionals, no matter what organizational label they wear, to work together to improve processes and people as efficiently and effectively as possible. By integrating KM approaches like expertise location, After-Action Reviews, communities of practice, and best practices transfer with process improvement programs like Six Sigma and Lean as well as traditional learning and development tools, organizations can reduce the internal competition for mind share and resources while reaping evolutionary and revolutionary gains in productivity and performance.

As organizations embark on the journey to performance or continue a sojourn already begun, consider the revised APQC’s Road Map to Knowledge Management Results: Stages of Implementation™ and the best practices from this study as a helpful tour guide. An organization can certainly walk through the landscape on its own, but just as a good docent enriches a tour experience by pointing out insider information, so can this report provide tips, tricks, and juicy “tidbits” that will make the journey less tedious and hopefully more fun and successful.
Partner Organization Case Studies

Buckman Laboratories International Inc. 89

Caterpillar Inc. 103

Raytheon Co. 115

Tata Steel Ltd. 137

United States Air Force Materiel Command 149
Celebrating its 60th anniversary in 2005, Buckman Laboratories International Inc. is a privately held, global specialty chemicals manufacturer. It has approximately 1,500 associates with 22 offices in 19 countries; however, Buckman operates in more than 90 countries worldwide. It has 10 manufacturing facilities in nine countries (two in the United States). The company’s more than 500 products are key to aqueous industrial processes used in manufacturing and treating pulp and paper, leather, paint, coatings, plastics, and wood. In 2004, Buckman revenues exceeded $420 million.

In the mid-1990s, Buckman moved to a customer intimacy model (from a more traditional product-based model). This required the organization to re-think its mission statement, which spells out what it wants to provide to its customers. Buckman’s mission is focused on providing cost-effective improvements in output and quality to their customers by delivering three things:

1. customer-specific services,
2. customer-specific products, and
3. the creative application of knowledge.

As a part of this refocusing, Buckman made a set of strategic decisions that set the organization apart from its competitors:

• to complete on knowledge in three industries,
• to be customer-centric—focus on understanding and meeting requirements better than anyone else (hence the standardized methods), and
• to use consistent methods globally to establish a global brand.

The creative application of knowledge is an important part of how Buckman implements its strategy. It is an integral part of who they are and who they strive to be as an organization and led Buckman to pursue knowledgeable business processes designed to help a customer in the application of Buckman products. Buckman’s customer intimacy model focuses on delivering a customized version of the organization’s product mix that provides the best total value to the customer. It places a premium on individual and corporate knowledge and the capacity to act on it.

Buckman considers its key knowledge assets to be the tacit knowledge its associates have about their customers, industries, and products. Sales people on site with customers are the focal point for bringing technical expertise and knowledge to customers.
Buckman spent a decade building a foundation of knowledge sharing, pervasive electronic community spaces (called forums), a knowledge resource center, and a world-class learning center. This has made it possible for them to drive a disciplined set of consistent processes globally for capturing and sharing knowledge about and with customers and, to some extent, suppliers in order to ensure the organization can deliver against requirements. These disciplined processes, many of which are taught to all employees, focus on understanding customer requirements and ensuring Buckman is able to deliver against those requirements.

**GAINING SUPPORT FOR KNOWLEDGE-SHARING PARTNERSHIPS**

*Knowledge sharing is what we do.*

—Kathy Buckman Gibson, chairman of the board, Bulab Holdings Inc.

Over the past 25 years, the Buckman culture has changed to the point where knowledge sharing is a way of life. There were two triggers to this change. The first occurred when Bob Buckman took over the company from his father; he wanted to bring decision making closer to the point of work and began introducing processes that allowed that to happen. Using good change management principles and wrapping knowledge sharing around the business strategy allowed people to understand the value proposition of knowledge sharing. Part of the process included accumulating success stories and telling them over and over again. Processes were implemented that eliminated power bases and increased the flow of information across the organization. Now, everyone from top management to associates in the field is expected to talk and learn from each other. It creates their foundation for knowledge sharing. People understand that knowledge sharing gives them a competitive edge and keeps them in the lead with their customers.

The second trigger was the increase in global competition. Over the years, Buckman has seen a trend among its customers to move to sole-source suppliers and/or to reduce the number of suppliers. Steve Buckman (CEO and president, Bulab Holdings Inc.) realized that only a few companies would survive this change and wanted to position Buckman to be on top. As a small organization, they had to find a comparative advantage and knowledge sharing was it. Knowledge sharing allows Buckman to compete with organizations five times its size in terms of speed of response. Knowledge sharing is imperative for Buckman’s survival and growth.

Buckman’s value chain includes its global associates, customers, customers’ customers, suppliers, regulatory agencies, industry associations, and business partners. The organization needed to understand how to share knowledge effectively and efficiently to meet customer needs and act cohesively as an organization, whether that’s through customer intimacy, rate of innovation, or continuous improvement.

**Knowledge-Sharing Approaches and Processes**

In 1997 Buckman’s management explored using the Malcolm Baldrige National Quality Award criteria as a systematic management process and discovered how few consistent processes they had across the global company, making it hard to give customers a consistent experience and to share knowledge. This discovery led them to standardize processes in the sales and customer relationship management space and the development of knowledge sharing tools such as Think T, Transition Workshops, the Requirement Alignment Tool, and the establishment of the “8 Business Management Standards.”
Presently, knowledge sharing at Buckman occurs through a continuation of Bob Buckman’s vision, K’NetixSM, portals, extranets, TeamToolz, AMPs, papers, articles, association involvement, continuous learning, and continuous improvement and innovation with their customers. Knowledge sharing is a part of associates’ performance evaluations and is in their RAD (results, actions, and development worksheet) reviews. It is the acknowledged responsibility of every individual in the organization to share knowledge.

Knowledge-Sharing Tools for the Supply Chain

According to Mark Hamilton (director of materials planning and procurement, Buckman Laboratories Inc.), being a customer-focused company presents some unique challenges to the supply chain side of the organization because of the number of custom-made products. Some of the tools used in support of knowledge sharing across Buckman’s supplier value chain include TeamToolz, BAAR (developed at Buckman), demand forecasting, a common enterprise resource planning (ERP) system, and Navigate®. These tools have helped the organization in its efforts to be customer-focused. A brief description of each follows.

• **TeamToolz**: Used primarily with their global key corporate accounts, this is a process where teams are created with an owner, a leader, a facilitator, and a charter. It is a disciplined teaming process supported by training, materials, and performance support products and is incorporated as a knowledge strategy within the organization. It is a complete toolkit for creating and sustaining successful teams, including processes for sharing information and coordinating activities to ensure alignment with the customer’s goals. According to Hamilton, many of the improvements that have been implemented over the past three years in supply chain management started with one of these teams and the LINCS project (Leadership, Innovation, Navigation, and Collaboration for Supply).

• **BAAR (Buckman After-Action Review)**: This is another technique or tool used throughout the organization. It is Buckman’s version of the After-Action Review (originally developed by the U.S. Army). Buckman not only uses it internally with teams and processes but also with its suppliers as part of an annual evaluation process to review Buckman’s interface and relationship with its suppliers. During this process, Buckman team members bring the major suppliers in (or go visit them) to answer some basic questions (see below) and review what has happened in the past year of doing business together.
  – What was supposed to happen?
  – What did happen?
  – What went well that needs to be sustained?
  – What didn’t go well that needs to be improved?
  – What is the path forward?

• **Demand forecasting**: One outcome of the LINCS project was the formalization of demand forecasting at Buckman. The demand forecasting tool is a focal point for Buckman’s planning team. Using the tool, they can make their production and inventory plans and share that information with their suppliers. For instance, one thing the tool has allowed them to do is to extract forecast information all the way down to the raw materials they buy in quantity and share that information with their suppliers. The tool also incorporates input from Buckman’s sales and marketing associates to produce a formal product by package by customer monthly forecast that...
can be leveraged in the planning process. Buckman measures the accuracy of the forecast to know whether it is dependable or if there are dynamics in the marketplace making it difficult to produce an accurate forecast. This tool enables Buckman to take information from their customers and flow it upstream to their suppliers. Without it, Buckman could “get in trouble really fast,” said Hamilton.

- **ERP**—Buckman also has a worldwide ERP system that they are trying to get all their operating companies to use. Much like the demand forecasting tool, the ERP system has allowed them to streamline activities and processes to improve supplier relations. One of the outcomes of having this information has been the formation of a global supply chain team to address global issues and situations.

- **Navigate®**—Navigate is a system for new products being introduced within the organization. It is a stage-gate process whereby an idea that emerges for a particular industry can be formalized into a project (usually within R&D) if it shows some merit. Eventually, it gets to a point where there’s a “go/no go” decision (usually around stage 3 or 4) about spending more resource time and money on the product to take it to market. A “go” decision means that it has merit and promise and fits within the philosophy of the organization. The process includes many impact reviews to make sure the organization can support the product with affordable, available materials, warehousing, etc. Both the reviews and assessment of these elements help ensure a greater success for the product when it is launched.

In addition to the tools described above, Buckman has also implemented a Web portal and several Web-based tools in support of its supply chain. The portal is especially helpful in communicating changes, including pressures on price and supply, and is updated daily by members of Hamilton’s team. Sales, marketing, and operational people are also linked into the portal so that they can see the same information for their decision-making needs.

Buckman also has a number of inventory management tools incorporated into its portal as part of its effort to support its customers. Because they are so customer-focused, product-specific, and service-oriented, Buckman has some sales people that handle inventory management for their customers on-site at the customer location. These on-site sales people need access to inventory management tools, as well as the usual sales and technical tools. One such online tool helps them maximize orders at the lowest possible freight cost to the customer. The incorporation of these tools into the portal was the result of a TeamToolz team created to impart inventory management skills to sales associates assigned to consignment inventory accounts.

According to Hamilton, it was these knowledge-sharing tools that helped them do a good job of keeping products and services flowing to their customers during the recent 2005 hurricane season, despite the fact that two major U.S. petrochemical regions were heavily impacted by the hurricanes.

**Knowledge Sharing in Sales**

In addition to the tools described in the previous section, Buckman also leverages a number of knowledge-sharing tools in support of its sales associates. These tools, including the account management programs, Think T, the BAAR, Requirement Alignment Tool, 8 Business Management Standards, transition workshops, and customer satisfaction surveys and workshops, are described here.
• **Account management programs (AMP):** In the late 1990s, Buckman associates developed some sales tools to help them better share knowledge with their customers. These tools helped the associates improve their meeting planning and evaluation skills and became the genesis of what are now known as AMP. Buckman provides training by certified trainers on all of its AMP programs to all of its associates.

• **Think T:** The Think T is a simple planning tool used by Buckman associates everywhere. It has become natural for Buckman associates to use this tool before any discussions, whether internal or external. To visualize this tool, think of the letter “T.” On the left side, associates brainstorm what they want to accomplish in the meeting they are about to attend. On the right side, they prioritize those things they want to accomplish. They also list their primary and secondary goals on the same sheet. This tool helps keep the discussion focused and moving forward and provides a quick checklist to ensure everything is accomplished.

• **BAAR:** described previously

• **Requirement alignment tool (RAT):** The RAT is a simple flowchart used to work with customers to align human processes and activities so they will operate automatically. This six-step process begins with the identification of the process manager and operator. In Step 2, the manager defines the requirements the process must meet to achieve success and makes sure the operator understands each of the requirements. Step 3 establishes a measurement for each requirement. Step 4 requires a response check for each requirement and measurement. Step 5 is the result of the RAT—an automated process. Requirements and measurements are known, and the process should be tested periodically to make sure the result is within the required measurements. Finally, Step Six occurs when a system fails because it can no longer be kept within the requirements by operator adjustments. At this point, both the operator and the manager must collaborate to solve the problem, often revisiting steps 2 through 5. Buckman has several problem-solving methodologies it will employ here.

Using the tool helps customers understand what their Buckman associate is doing and the Buckman associate to understand what the customer wants them to do. They can also measure progress with the customer against the chart. The tool has built-in steps to revisit a customer’s needs (if necessary), realign themselves with the customer, and help them get back on track.

• **8 Business Management Standards:** The purpose of the 8 Business Management Standards is customer satisfaction. Buckman learned through surveys with its customers that the main reasons for their continued loyalty usually fell into eight categories or standards. They learned that when these standards were in place, they had satisfied customers and achieved account retention. These eight standards are:
  1. communications,
  2. system knowledge,
  3. planning,
  4. safety and product stewardship,
  5. program manual,
  6. service and activity reports,
  7. business reviews, and
  8. continuous improvement/ROI.
To ensure the process is working, Buckman asks its customers 25 questions on a simple survey form (the customer satisfaction survey) administered annually. The output of the survey sets goals for filling any gaps in the process. According to Buckman representatives, the key to success is that the measurement for success is not set by Buckman but rather by their customers’ point of view.

Buckman has also used these standards (based on customers’ needs) to establish criteria for their suppliers.

- **Transition workshops**: The purpose of a transition workshop is to provide a mechanism for transitioning applications from another supplier to Buckman. Whenever Buckman acquires a new customer, they hold a workshop with that customer. During the workshop, the Buckman team interviews the customer on what they would like to see accomplished during the transition. Involving the customer in the process in this manner addresses the need for buy-in and supports the change management. The Buckman team holds one-on-one interviews with people at the customer site. The people interviewed represent all levels of the organization, from the docks all the way up to executive management. At the end of the workshop process, the team provides the customer with an implementation plan (using the RAT tool) that contains everything the customer has said they wanted (in their words). The plan includes the transitions steps, the timeline, and how progress will be measured.

- **Customer satisfaction surveys and workshops**: The customer satisfaction survey contains 25 questions that give Buckman significant feedback on its customers’ needs and expectations. The results of the survey are shared with the customer. The purpose of the survey is to keep Buckman informed of changes in its customers’ facilities. In today’s economic climate, customers’ processes change quite rapidly, and the survey is Buckman’s way of ensuring they are in tune with those changes. Buckman believes it is important to understand the context around a customer’s responses to the survey. Associates follow up with their customers whenever they receive an unusual response to a survey question to understand what the customer meant. Sometimes, it means that a customer’s needs have changed.

The purpose of the customer satisfaction workshop is to discover customers’ new (changed) requirements and align performance with the new expectations. During the customer satisfaction workshop, a kickoff meeting is held with the customer’s management and key personnel to discuss the results of the survey and define the gaps between performance and customer expectations. Personal interviews are conducted with key personnel to understand their requirements for their area of responsibility. The final product is a documented service plan based on the requirements, measurements, and responsibilities presented by the interviewees.

- **TeamToolz**: described previously

The key to these and the knowledge-sharing processes in the previous section is that they are all consistent, repeatable processes.

**Communicating/Marketing Knowledge-Sharing Processes and Approaches**
Buckman communicates and markets its knowledge-sharing processes and approaches through brochures, ads, presentations to customers, articles and papers, association presentations, speeches (at conferences), and awards. Buckman recently won the 2005 Most Admired Knowledge Enterprise
Barriers to Knowledge Sharing

The following are some of the barriers to sharing knowledge across the value chain encountered by Buckman associates and some of the ways these barriers have been addressed.

• **Bandwidth and connectivity:** Some Buckman associates do not have access to high-speed connections because of the infrastructure limitations in the field and at customer sites. Both are becoming less of a problem due to standardization of technologies in the organization and improved infrastructure.

• **Resistance to knowledge sharing:** Some members of midmanagement and some technical people didn’t want to give up power and knowledge, but the implementation of knowledge-sharing processes and approaches helped increase buy-in and also helped people find information they needed in other areas of the organization, with management support.

• **Participation in newsgroups and discussion forums:** Buckman established breakrooms (casual forums) to make people comfortable communicating online. Discussion areas are not heavily moderated because they do not want to curtail discussions.

Assessing the Risks

According to Buckman team members, there are not a lot of risks to sharing or reusing knowledge across the organization’s value chain because Buckman does not include customers and suppliers directly in the discussions. The organization faces a greater risk if it does not share knowledge with its customers and suppliers.

BUILDING A STREAMLINED, EXTENDED KNOWLEDGE SPACE

As Buckman developed its knowledge-sharing architecture over the past few years, it carefully considered the fact that the organization’s primary focus is on sharing tacit knowledge. To that end, Buckman’s approaches to knowledge-sharing include communities of practice, teams, disciplines, and a variety of tools to support that key fact. Buckman leverages three types of communities: customer-specific, industry-specific (e.g., paper or leather), and business function- and role-specific (e.g., TeamToolz facilitators). These communities reflect the organization’s different views of its business. In addition to its communities, Buckman associates can also share tacit knowledge through their participation on various kinds of teams, such as global customer teams, product rollout teams, and global project teams. Finally, Buckman also leverages disciplines, or standards, in support of its teams and communities. These disciplines include the account management programs, TeamToolz, and Navigate®.

Buckman’s tools for knowledge sharing and collaboration include discussion forums, file sharing, calendaring, task management, real-time conferencing, common systems (e.g., ERP and business intelligence tools), and custom built tools (e.g., customer satisfaction surveys). Buckman has found that even common business systems such as its ERP can help them collaborate. In fact, the ERP was a key factor in development of the global supply chain team because everyone involved in supply chain
now works from a common language on a common system and with common capabilities. It helped the organization move forward with global approaches to supply chain issues.

In one form or another, Buckman has had discussion groups since late 1992 when they began using CompuServe. Today, for collaboration purposes, Buckman uses network news transfer protocol (NNTP) discussion groups and MS Outlook Newsreader. There are two types of NNTP groups: those with global access (anyone in the organization can access it) and those with exclusive (restricted) access. Exclusive discussion groups may be set up for teams that need a place to collaborate but also need to protect the content of those discussions. Whichever type of access is set for a discussion group, Buckman focuses on making sure that the tool is easy to use. Discussion groups help Buckman associates share new ideas, find answers to questions, and build relationships with one another. Buckman has found that the best way to get people over the curve of participating in such activities is to get them involved. Discussion groups are a great way to involve people in knowledge sharing without them even realizing that that is what they are doing. The technology is based on Lotus Notes, which allows people to include attachments or the knowledge resource center staff to archive discussions once they are concluded. The Knowledge Resource Center manages the infrastructure and customer requests.

Associates can decide which forums they wish to participate in. In fact, Buckman is in the process of implementing a subscription service to help people manage their information. Although most of Buckman’s discussion forums focus on business-related issues, some have been established to foster more informal sharing. Breakroom forums are informal discussion forums that focus primarily on introducing people to the organization. They are also the place for associates to go to for informal, nonbusiness-related discussions. These forums were originally created for just that purpose so that people would use the regular forums for business discussions. Breakrooms became the places for those types of discussions so that the other forums could remain focused on business issues. Breakrooms get people involved in an easy way, teach people to use the technology, and are organized by geographical areas.

In keeping with the organization’s philosophy that each associate is responsible for managing his or her own knowledge, Buckman’s discussion forums are primarily self-moderating. However, if a question is submitted that is not answered within 24 hours, the knowledge resource center has staff to find someone to respond. The only other time a group may require moderation is if a comment is made that is contrary to Buckman’s code of ethics. In those cases, the message is usually pulled by a member of the knowledge resource center staff.

One challenge for Buckman is that many of these tools must work over low-speed connections due to the fact that many of their employees are located in areas where the infrastructure will not support a high-speed connection at this time. Therefore, whatever tool they use, it must work for everyone. That is how they make a decision about what to standardize. Most associates do not mind the lower-speed connections and in fact appear to appreciate the offline capability this gives them because it gives them time to reflect on their response.

Buckman’s portal integrates all of the tools (Figure 23) discussed above and focuses on collaboration (not the more traditional publishing). The idea behind the portal was to make knowledge sharing and reuse easier for Buckman’s associates and teams by providing a place that integrates all of the systems people use to collaborate with each other and search for information,
regardless of whether they want to collaborate, perform data analysis, access learning modules, or view and create documents.

**Integration**

According to Tim Meek (vice president, knowledge transfer), integration relies on two key elements: people and common methods. For instance, within the TeamToolz discipline, there are team owners, leaders, and facilitators, each with a specific role to play in support of that team. For example, team owners make the critical decisions and set direction for the team. Buckman also leverages facilitators for its teams, communities, forums, and discussion areas. These supporting roles are crucial to enable tools and approaches to work smoothly. Facilitators augment information for a discussion, help people find resources, locate technical help, and generally fill in the gaps and make things happen.

Another key to integration is to use common methods, such as Buckman’s various disciplines. In its early days of knowledge sharing, Buckman did not explain the value proposition (the “why”) very well. Today, it has the discipline to require teams to document their purpose, process, and payoff. During the team chartering process, a team will address questions like the following.

- What is the value?
- What is the scope of the effort?
- What will it cost?
- Who should be part of the team?
- How will we know when we’ve accomplished our goals?
Buckman now has more disciplines in place, which helps people integrate with each other because they have a common process for accomplishing goals, regardless of geographic location or language. It is not hard to sell because when it works well, people will use it.

Deploying Knowledge Sharing Across the Value Chain

Over the years, as Buckman implemented various knowledge-sharing tools and approaches in support of its value chain, it typically did so in response to some critical business need. According to Meek, it is important to tie any large deployment to a critical business need in order to ensure initial management support. With that support, decisions can be made about making resources available, providing training, etc. Typically, the organization will deploy first to areas where the demand is greatest, the need is recognized, and people are ready for the changes necessary to improve. Once the resource decisions have been made and the deployment plan mapped out, then teams can be assigned to the areas of the organization with the greatest need, and they can begin fixing the problem. Once the initial deployment is rolled out, it is important to leverage successes (success stories) and user champions to help spread the word about the new tool or approach and ensure buy-in and participation. According to Meek, management may support the initial deployment, but it is the people that will carry it forward with management buy-in and commitment.

Deployment examples at Buckman include the account management programs, the portal, and the need for increased collaboration capabilities. Buckman’s top management agreed that those tools would be the standard that everyone in the organization would use. From a strategic standpoint, that meant that everyone needed to be trained on those tools. From a deployment standpoint, this meant that resources were needed to ensure everyone was trained. One way to ensure that the training took place was to require every associate to have that training. Regarding the portal and collaboration, Buckman is rolling the portal out in a phased manner across the organization, beginning with those areas of the organization with the greatest need and demand for it.

Privacy Issues

When asked about issues of privacy regarding knowledge sharing, the Buckman team said that they look at it externally and internally. Externally, in order to address concerns regarding intellectual property and privacy issues, Buckman’s customers, suppliers, and contractors must sign confidentiality agreements. Internally, some communities and forums have restricted access or “need to know” access in order to allay any concerns regarding intellectual property or confidentiality issues.

MANAGING THE EXTENDED KNOWLEDGE ENTERPRISE

Knowledge sharing is baked into the culture of Buckman. Ask just about anyone there about it, and they will most likely reply, “It’s just the way we do things here.” Buckman does not have a group or program office accountable for managing knowledge across the value chain. Everyone from the CEO to the individual employee has a stake in managing knowledge across the value chain. However, because marketing plays such an important role in the organization, that function could be viewed as the governing body. According to Alison Tucker (director, marketing and media communications), marketing collects ideas from associates, customers, suppliers, etc. and uses those to set the direction for knowledge sharing for the organization. It then presents this direction to the planning team, which helps push it out to the organization.
According to key members of the Buckman team, every Buckman associate is responsible for managing tacit knowledge in support of the value chain. However, certain groups have specific responsibilities related to supporting knowledge sharing. For instance, the knowledge resource center plays a huge role helping moderate and facilitate the discussion groups, housing discussion threads, responding to inquiries, and adding information where applicable. Other key roles include the section leaders (technical experts based on each collaboration area) in the forums and team leaders and facilitators for the global key corporate accounts, global, and product rollout teams.

## Training

Training on Buckman’s knowledge-sharing tools and activities begins with the new hire orientation. The belief is that people need to be trained up front on how to use the discussion tools (for example) and how to find useful tools and resources on the intranet. Buckman uses a passport system that basically spells out what training an individual needs to take and when (timeframe for completion) and where it is available. Each employee is coached and mentored through his or her manager, plus associates informally coach each other.

## Reward and Recognition

When Buckman first began to formalize its knowledge-sharing tools and activities, there was discussion about how to motivate people to use the tools and participate in the community and forum discussions. They even gave some consideration as to whether there should be some sort of financial reward. Instead, Buckman decided to move forward with a team-of-the-year award and an emphasis on the intrinsic rewards for knowledge sharing, such as the enhancement of associate expertise, networking, customer relationships, and supplier relationships. The team-of-the-year award, which started in 2001, is offered to their TeamToolz structured teams. There are a number of criteria for this award, which is presented to the winning team by the board of directors. The team values recognized by this award include working effectively as a team, accepting responsibility, developing individual team members, sharing knowledge among team members and outside the team, demonstrating effective leadership within the team, holding itself accountable for achieving results, and exemplifying Buckman’s Code of Ethics through the interactions of team members and with the rest of the organization.

Buckman’s associates realize that using the knowledge-sharing tools will make them smarter in their jobs, which will result in them making more money. The customer intimacy strategy enforces the need for networking and sharing with customers because Buckman wants customers for the long term. Knowledge sharing allows associates to build long-lasting relationships with their customers.

As additional motivation, there are the RAD reviews. These reviews are very structured and based on an individual’s work profile (i.e., job description and goals) as well as some universal criteria. Much of the RAD has to do with knowledge sharing and how an associate makes use of tools such as K’NetixSM, transition workshops, customer satisfaction surveys, etc. It is not enough that an individual indicates that he or she has used these tools in their job. They must also provide examples of use or reasons as to why they might not have used a tool for a particular team or project.
GAUGING THE RESULTS

Buckman gauges the effectiveness of its knowledge-sharing tools and activities in a variety of ways, including the number of customer satisfaction surveys conducted each year internally and with customers and/or suppliers, the number of trained associates, customer loyalty scores, supplier relationship enhancement, customer satisfaction survey results, rate of new product development, new product sales, and continuous improvement for Buckman and its customers.

With its focus on customer intimacy, it should be no surprise that a number of their results indicators focus on their customers. Everything they do is driven by the desire to enable their customers to work more efficiently and create high-quality products. Buckman uses customer satisfaction surveys and workshops as a measure of their role in helping the customer do those things. Are they really helping? Are they doing what they said they would do? It builds integrity for the organization.

Two other measures of effectiveness include penetration into existing global key corporate accounts as evidence that customers are profiting from the relationship and sales growth. Regarding sales growth, this is the organization’s third year of double-digit sales growth. According to Buckman representatives, they are growing faster than the market, which means they are taking business away from their competition.

Examples of Success

Buckman’s transitioning of business has been very successful in the eyes of all customers due to the workshops they hold with customers and the implementation plan that is the outcome of the workshop. The knowledge-sharing one-on-one with customers has actually caused Buckman to gain more business due to word of mouth by their customers regarding these workshops.

Sharing knowledge on ROI with customers has helped Buckman to maintain loyal customers. As an example, one customer was able to save $12,000 USD per day on their operations due to problem solving and knowledge sharing between the customer and Buckman.

Buckman has had consistent growth in sales since it began the knowledge-sharing process as a way to do business.

Buckman obtains continuous customer feedback through knowledge sharing in ways such as their customer satisfaction surveys, interviews, and workshops.

According to the Buckman team, the benefits realized from their knowledge-sharing activities and strategies include increased customer loyalty, new business with customers, and penetration of global key customer accounts.

Sustaining and Expanding

At this time, Buckman feels that the growth of its knowledge-sharing efforts should move toward a niche area so as to promote them as still a leader in knowledge sharing. The niche should be how they share knowledge with their customers. However, they do not want to lose sight of their history, their continued growth in knowledge-sharing efforts internally, or their work with associations.

Regarding Buckman’s customers who may be entertaining knowledge-management efforts within their organizations, Buckman wants to discover their gaps and needs in order to help them along their knowledge-management journey to achieve their goals. Buckman sees this as another means to strengthening its relationships with its customers.
As an organization that values both learning and sharing, Buckman wants to identify conferences and workshops that are of value to it and its customers and invite them to attend. It also plans to continue to write articles and papers on its continued efforts in knowledge sharing. This will not only help promote Buckman to its customers but also help keep it in the forefront in the KM world.

**Critical Success Factors**

The Buckman team shared the following critical success factors for effective knowledge sharing across the value chain.

- Develop policies addressing with whom, where, and how to share knowledge-sharing strategies and experiences.
- Identify what resources are needed globally to achieve this strategy.
- Track all requests for knowledge-sharing information, including site visits, for learning strategies via the learning center, business practices such as account management programs, or knowledge-sharing information requests via the Web.
- Continue to enhance and improve approaches to run more efficiently and capably, developing a greater ability to help customers and others in the value chain.

**LESSONS LEARNED AND THE FUTURE**

Buckman shared the following lessons learned and plans for the future.

**Lessons Learned**

According to Cheryl Lamb (director, knowledge resource services), it is important to realize that today, people are very competitive and egocentric. We are taught as children that knowledge is power. According to her, if anyone wants to put a knowledge-sharing program in place in their organization and thinks that people will just open up and share, it will not happen. Culture must be addressed. Enablers must be in place to change the mindset to sharing. It will not happen overnight; it truly is a journey.

Also, it is important to know who the customer is and to understand how you and the customer can have a successful engagement together.

**The Future**

Moving forward, Meek indicated that perhaps the largest focus will be on consolidation, so that there is a single business system for the entire organization. Other plans for the future include training customers on knowledge sharing, enhancement of the portal technology in support of collaboration, AMP enhancements, the implementation of a taxonomy, and a continued focus on innovation.
Caterpillar Inc.

Caterpillar Inc. is the world’s leading manufacturer of earthmoving machinery. The company makes construction, mining, and logging machinery as well as diesel and natural gas engines, industrial gas turbines, and electrical power-generation systems. Caterpillar has plants worldwide and sells its equipment globally via a network of independent dealers. Caterpillar offers rental services; provides financing and insurance for its dealers and customers; and develops, owns, and operates electrical power plants around the world.¹⁰

Caterpillar is a global organization with autonomous business units that have their own budgets. As a matrixed organization, it includes its value chain in its collaboration tool. There are approximately 175 dealers around the globe; these are independent businesses not owned by Caterpillar. Some Caterpillar facts follow.

• 75,000 employees
• 250 facilities
• 26 business units
• 300+ models
• $30 billion annual sales
• 90,000 dealer employees
• 1,800 dealer branch locations
• 14,000 suppliers

Knowledge Management

The organization’s vision and mission for knowledge sharing, developed with input from more than 100 community managers, is to be a global leader whose productivity and competitive advantage are maximized because validated, up-to-date knowledge is freely and easily shared across the value chain. The stated mission for knowledge sharing at Caterpillar is to provide efficient, reliable, and easy access to knowledge and collaboration with others across the value chain for the purpose of performance improvement.

Figure 24 (page 104) shows that knowledge sharing is a key component of Caterpillar’s learning model. The organization views knowledge sharing as a key component of informal learning and strives to develop a vibrant learning culture of leadership and knowledge sharing.

¹⁰www.hoovers.com (retrieved November 2005)
Caterpillar’s core knowledge management team comprises three people who support the application, set the strategic direction for knowledge management, assess the value to the organization, provide training, and help with requests. Caterpillar’s Knowledge Network, its primary collaboration tool, is owned by Caterpillar University. In 2002, the organization opened the Knowledge Network to members of its external value chain. Communities are a way for Caterpillar employees to connect with the organization’s global partners, customers, or teams in a virtual environment.

**Gaining Support for Knowledge-Sharing Partnerships**

Caterpillar’s knowledge-sharing approaches and processes have evolved over time. In 1990, Caterpillar shifted from a centralized organization to one organized via business units. In 1998 the organization launched its initial knowledge-sharing effort, looking at knowledge workers with defined roles and responsibilities. In 2000, the organization chartered a team, which became known as the continual learning team, that examined what the organization needed to do to remain competitive in the future with rapidly changing markets and global customers. The outcome was that the organization needed to become a continual learning organization and change faster to meet its goals. At the same time, Caterpillar launched Six Sigma on a worldwide basis as a business process enabler to help control variation. Based on the continual learning team’s recommendations, in 2001, Caterpillar University was created to be the corporate owner for learning as well as taking over the knowledge-sharing efforts to spread them across the entire company.

**Creating Buy-in**

How did Caterpillar’s Knowledge Network team gain support and grow its efforts to share knowledge across the value chain? A very powerful tool has been storytelling. One of Caterpillar’s success stories has been a recovery effort managed through a community of practice (CoP) when one of its major suppliers that was hit by a massive tornado in 2004. It was a very compelling testimonial
demonstrating the value of a community and collaboration. Metrics and business results are also critical in getting support.

Support from the top of the organization has also helped gain buy-in for sharing knowledge across the value chain. One of the critical success factors Caterpillar’s CEO Jim Owens identified in 2005 is the “brand” of Caterpillar people. Because all of the organization’s products are sold through independent dealers, it is vital to have collaboration across the value chain on a global basis. In support of that, Caterpillar’s culture drives employees to be open and willing to share across the value chain with a high level of trust.

The Business Case

In making the case to include external value chain partners in the system, Caterpillar had to address the following business requirements.

- **Security**: how it is controlled and who manages it
- **Legal**: what is shared with whom
- **Metrics**: built-in measurements on activity as well as value are needed
- **Taxonomy**: how it is organized to make sense to value chain partners

Caterpillar also addressed business procedures when it included its value chain in the Knowledge Network system. Procedures that were examined included who was allowed to form a community of practice (the majority of communities are run by Caterpillar employees not the value chain partners), whether roles should change (roles such as manager, delegate, and expert did not change), how to capture and retire knowledge (an automated process to review the content that has been implemented), and information protection guidelines (ways of classifying content according to color-coded security levels).

Early on, the organization assigned a value to collaboration and knowledge sharing. For each new community discussion that is Caterpillar-to-Caterpillar, a value of $600 is assigned. The value jumps to $2,500 when value chain partners are included in the community (not necessarily involved in the discussion). These metrics are tracked and reported monthly. The values were determined by asking employees who posted questions in the communities a series of questions.

- Did using the Knowledge Network increase your personal productivity?
- Please estimate the number of hours you think you saved.
- What percentage of this time would you attribute to using the Knowledge Network?
- Please give a percentage estimate of how confident you are in this estimation.
- Are there any other people (sources) we could contact (access) to learn more about these benefits?

Based on an ROI study conducted a few years ago, Caterpillar learned that the value of including external partners in the communities was four times the value of a community that included Caterpillar people only. Approximately one-third of the entries (initial discussions) in 2004 took place in communities that included individuals who were not Caterpillar employees. For Caterpillar, that means approximately $3 million in value comes from Caterpillar people talking to other Caterpillar people, and approximately $7 million to $8 million in value comes from CoPs and discussions that involve value chain partners. Therefore, the value proposition for communities involving value chain partners is twice that of the communities involving only Caterpillar people.
Funding
Until 2005, the Knowledge Network was funded by the executive offices of the organization. In 2005, the group began charging the business units for its services based on usage using a pay-as-you-go model. Caterpillar University has developed a business unit value statement that provides an overall view of the Knowledge Network (Figure 25). Cat U has dual-line reporting to a lead learning manager in each business unit, and this charge would be a part of the training budget within the business units. The lead learning manager in each business unit acts as the contact person to put this charge into the business unit’s budget process.

To determine the price to charge the business units for using the Knowledge Network, the central team analyzed the number of people per business unit who were using the network (only internal employees) then divided that number into the total Knowledge Network budget for the year. The cost came out to be about $85 per year per Caterpillar employee to have access to the Knowledge Network. The central team then took the number of people using the network per business unit (as of October of the prior year), multiplied that by per person charge, and told the business units that the result would be a one-time charge for the next year. The costs will decrease if more employees begin using the system.

Managing Knowledge, Content, and Intellectual Capital
Caterpillar’s Knowledge Network is a tool that was developed in-house and continuously evolves as the business changes. The organization uses a delegated community management process in which a community manager is the person who has the business need for that community. There is a staff of three people who centrally manage the infrastructure that handles more than 4,000 communities.

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**Example of a Caterpillar CoP Value Statement**

Cat U Technology Enabled Learning Division
Value Statement for
ABC Business
(March 1, 2004- February 28, 2005)

**Sametime**
- 2,380 meetings were initiated by your employees in 2004
- 509 meetings initiated by your employees year to date in 2005
- 636 employees from your business unit and 584 other Cat employees attended meetings initiated by your employees year to date in 2005

**Knowledge Network**
- 366 of your employees used KN
- Each employee belonged to 6 communities on average
- 87 of your employees were identified as experts
- Your employees created 754 postings

**Savings:** $219,800 (83 x $600 + 68 x $2,500)

*Figure 25*
The company has a global scope, but the focus of each community is narrowly defined.

_We simply provide the highway. They [community owners] drive the communities._
—Reed Stuedemann, knowledge sharing manager, Caterpillar Inc.

Community discussions are sent immediately to the audience without requiring approval. Knowledge entries, on the other hand, are validated pieces of information, and they do not go out until they are approved by the community manager. They can be reviewed by selected individuals and modified as needed prior to approval. A knowledge entry can have its own unique security profile, so access can be limited to those members of the community who meet the security profile.

**Communicating/Marketing Knowledge-Sharing Processes and Approaches**

To market the Knowledge Network, the central team initially made presentations to help employees understand what knowledge sharing is, why an employee would use the system, and the benefits to them. Because of audience changes due to retirement and new hires, there is an ongoing need to repeat these presentations. At start-up, these presentations comprised almost 50 percent of the knowledge-sharing manager’s job. Since then, the manager spends more time talking to external organizations and internal process owners than to internal groups. In the initial startup, the focus was on targeted marketing, identifying early adopters and providing them with a rollout plan of how this tool could benefit them. From that grass-roots starting level, participation has grown. Caterpillar believes that if the tool is successful, it will grow based on word of mouth. About 85 percent of the Caterpillar employees who use the Knowledge Network say that they would recommend it to others. In the dealer world, that number is believed to be even higher.

Community members and leaders champion the Knowledge Network system to their colleagues. In one example of promoting the system, the mine managers have created a toolkit that is shared with all global mining partners along with discussion about their community and the expectations of what occurs in it.

With a staff of only three people, the central team does not have the resources to talk with the approximately 7,000 dealers involved in the Knowledge Network. The team has learned to make the system easy and intuitive enough so that members of the value chain can use it and be comfortable with it without a lot of training. Additionally, there is a feedback feature within the Knowledge Network that allows any user in the system to share their opinions with the central team.

**Barriers to Knowledge Sharing**

When the organization transferred its knowledge-sharing tool from the research unit to the corporate university, it realized that the tool was not easy to use. The interface was redesigned for usability in 2002 to address employees’ fears that were creating barriers to knowledge sharing, including concerns of looking foolish as well as the technology itself as a barrier. In late 2002 the new interface was deployed, and since then it has continuously evolved.
Assessing the Risks

When making its Knowledge Network accessible to members of its external value chain, Caterpillar had to assess the risks and implement several changes.

- **Security audit:** Prior to opening the system to the value chain, Caterpillar did an audit on its system security. An outside company was hired to test the system from inside and outside the firewalls. Minor changes resulted from this audit.

- **Disclaimer:** The “mother” of all disclaimers, this prerequisite for using the system is about eight pages in length. There is a one-time step that requires value chain partners to agree to each section before they are allowed to enter the system. Who agrees and when they agree is recorded. Sections include description of service, site access, content, confidentiality of content, code of conduct, disclaimer of warranties, limitation of liability, indemnification, export and/or international laws, miscellaneous, and competition and antitrust. The organization has had very few problematic issues with its disclaimer, and it may be overridden if Caterpillar has signed a specific agreement with another company.

- **Security profile alert:** This visible flag on a community (an exclamation point in a triangle) lets Caterpillar employees know that the community is open to various value chain partners. The alert is not visible to the value chain partners. The security profile also shows who can see the community by affiliation, organization codes, and name. The community manager controls this security profile, and it can be changed at any point in time.

- **Limited search:** Value chain partners cannot surf and browse communities of content for which they do not meet the security profile. Caterpillar employees are given a search option to include content not accessible to them. With this discovery option, if they find content they want to access, they can then request access to it.

- **Encryption:** This feature was added when the value chain was included.

One of the legal concerns about opening the system was that external partners in the value chain would use the community as a platform to talk about price and antitrust issues. Therefore, a section was added into the disclaimer specifically dealing with anti-trust issues. Caterpillar does not allow more than one supplier or competitor to be in a given community at the same time on order to avoid antitrust issues.

Caterpillar has also faced the issue of access. When value chain partners view and expand the list of communities available, they only see those that they can gain access to. Employees, on the other hand, can see the entire list.

BUILDING A STREAMLINED, EXTENDED KNOWLEDGE SPACE

*Caterpillar is a “one-click” culture, and if it takes two clicks to get to something, that is one click too many.*

—Reed A. Stuedemann, knowledge-sharing manager, Caterpillar Inc.

Caterpillar’s Knowledge Network has to be the easiest way for employees to collaborate with their business partners and colleagues. If there is anything easier or better, then the culture at Caterpillar would lead users to stop participating in the Knowledge Network and use something else, according
to Stuedemann. As technology and business initiatives change, the Knowledge Network team has to keep up with the changes.

By developing this knowledge management tool in-house, Caterpillar is able to control the complexity to make it easy for people to use. The Knowledge Network is a “right now” tool to help people get the information they need right away to help them do their day jobs effectively. Communities that are successful have clear, everyday linkages to business and corporate initiatives. The communities are placed into a taxonomy of the organization’s high-level processes—for example, human resources. The central team can relocate a community to a different point in the taxonomy if it fits better or the purpose and subject change over time. Every community has an identification number that ties it to a parent community.

One of the things that the Knowledge Network team has done is integrate heavily with the processes of Six Sigma; the team has built templates into the Knowledge Network to support and enhance those business processes. As project teams join the Knowledge Network, there are embedded tools that support the corporate initiatives and help the teams do their jobs better. To continuously improve, the Knowledge Network team tries to integrate into new, key corporate initiatives (e.g., new product introduction).

Sharing can take place across communities as well as within them. Every discussion and entry within a community is linked with a unique address. If a community manager requests a cross-reference for an entry to another community (or to any community within the system), the other community manager has to agree to the request or it will not happen. If the managers agree, the system will combine the members of the two communities as if they were one to collaborate on that particular entry for that given discussion topic. This powerful problem-solving tool allows community managers the ability to pick any other community to link to. To see all their options, managers can do a search to see all the communities available.

Deploying Knowledge Sharing Across the Value Chain

Caterpillar’s extended value chain includes suppliers, dealers, customers, joint ventures, retirees, and business partners such as colleges and universities. Knowledge is shared across the value chain primarily through membership and participation in Caterpillar’s Knowledge Network communities. In 2002, when the Knowledge Network first went on the Internet, the central team piloted it with several dealer advisory boards from Caterpillar’s marketing organizations. In North America, it was presented to a group of about 35 representatives at an annual meeting. Caterpillar then ran a pilot for several months before returning to the original group to see if they felt the Knowledge Network should continue or not. The team found that there was overwhelming support for the system.

MANAGING THE EXTENDED KNOWLEDGE ENTERPRISE

Caterpillar’s internal governance model for knowledge sharing is integrated into regular business governance entities. The CEO sits on the Caterpillar University Board of Governors and reviews the top 20 communities, including the number of postings, unique members, and unique individuals making those contributions.

Within Caterpillar worldwide, the Knowledge Network has about 79 percent penetration into the salaried and management employees in any given 12-month period. It also has good engagement at all levels of management.
Roles

Responsibility for managing the knowledge, content, and/or intellectual capital that is captured, shared, and reused from the external value chain falls to community managers. The central group provides the platform for collaboration, and the community manager is responsible for the content in his or her community. The community manager defines the measures of success, controls the content, and controls the security. There are no IT experts or resources required or assigned to the various communities.

Training

For community managers and users, the Knowledge Network has online tutorials about using the system. For new community managers, the Knowledge Network help section contains all the help documentation they will need to get started. The Knowledge Network team also offers monthly Web seminars to train new community managers. The central team also conducts Web seminars for general users of the Knowledge Network. Caterpillar has found that ease of use and usability makes the system successful.

To make the system easier to use, the organization allows employees to set their individual preferences for expanding and collapsing different functionality within a community, setting default colors, specifying default search preferences, and changing the displayed language. The organization also allows the community manager to set preferences to build the community, such as specify who the manager is, decide if the logo appears, determine whether members receive an automatic e-mail when someone new joins the community, and turn on/off various functionality.

Reward and Recognition

There are no explicit rewards or incentives for participating or collaborating via the Knowledge Network, so the activity must have some intrinsic value to the participants related to what they are evaluated on (their day job or business process). If being in a community is not providing value as it relates to their business objectives and annual performance, people will “cut and run” in a hurry because they don’t have time to spend posting and browsing.

A lesson learned for Caterpillar’s central team is that the more removed or remote a person or organization is, the more they like and see benefit in the Knowledge Network and the collaboration elements. It allows the remote people to sit at the same “virtual table” as the on-site people. They can better understand how decisions are made, and they get to have a voice. The Knowledge Network helps get everyone on the same page in a global organization.

Privacy and Export Compliance Issues

As the organization expands its engagement in China, there is a strategic business initiative to collaborate through communities in Chinese. The Knowledge Network team has deployed its Knowledge Network as a fully navigable tool with content in Simplified Chinese. The community managers control the security profile for their communities (access), and they determine if external value chain partners and joint ventures have access. The penetration in China is lower, given language and other barriers, but the new language capability is designed to address that.
Assessing Risks

Caterpillar’s criteria for assessing the appropriateness of allowing an external partner into the Knowledge Network are very open and controlled by the community manager. Members of the global value chain include joint venture affiliations, retirees, suppliers, dealers, and customers. If the Caterpillar purchasing organization identifies an organization as an official Caterpillar supplier, then an employee of that external company can be issued a security identification that will allow access into the Knowledge Network, and it will also allow Caterpillar employees to add that person as a community participant.

GAUGING THE RESULTS

Caterpillar’s Knowledge Network and CoPs have been very effective knowledge-sharing tools for the organization. As of late 2005, Caterpillar has about 4,300 communities of practice (not all of which are active). The company receives about 75 new community requests a month, and there are 180,000 community memberships (defined as an individual who becomes a member of a community and then participates in the system push/pull of information). The system has also helped identify about 10,000 experts across the value chain.

As of November 2005, Caterpillar had seen 40,000 unique users in the past 12 months.

- 29,000 Caterpillar employees
- 6,000 Dealer employees
- 2,900 Agency employees
- 1,400 Suppliers
- 500 Joint venture
- 200 Retirees

The Knowledge Network posts live statistics from the system online in chart form. The number of knowledge entries and lessons learned are tracked. The number of users is shown in real time. Behind this live data are spreadsheets that track by affiliation and other categories. The system also tracks initial discussions, and the team runs reports on them monthly. Caterpillar looks at the split between internal (Caterpillar people only) and external communities (involving 10 or more value chain partners in the community). The split is getting closer to 50/50.

Within the Knowledge Network, Caterpillar tracks people metrics by affiliation, role, or business unit over a given timeframe. Anyone with access to the system can see the volume metrics, the role metrics, and more at any point in time. The community managers can also run metrics on their own community at any time, and they can configure it as they go. Since the beginning of the system, the Knowledge Network has tracked volume metrics such as:

- number of communities,
- number of postings,
- number of attachments,
- volume of attachments, and
- content viewed.
A recent addition (two weeks prior to the virtual site visit) allows communities to display many people who had viewed a particular entry. Community members can even see who the individuals were who looked at a particular entry in a given timeframe and how many times they were in the community as well as the date and time that they visited.

**Sustaining and Expanding**

Caterpillar’s extended value chain includes many different groups. The research organization is a big user of the Knowledge Network communities. On the academic front, the organization partners with NCSA and NTSA at the University of Illinois. The organization did a study with the university to look at the impact of culture on sharing.

Knowledge Network is not a purchasing system. Community members collaborate about purchasing issues, supplier quality, etc. They do not determine quantity in a CoP. The organization has been much slower at engaging suppliers than dealers in the Knowledge Network. Supplier relationships are often targeted to specific parts of the organization and, therefore, managed on an individual basis. Dealers have adopted faster in part because they have a lot of products coming from multiple businesses, and it is easier for them to use the communities in the Knowledge Network on a more global basis.

**Critical Success Factors**

Caterpillar has found that people do not share information with other people whom they do not trust. Therefore, for the Knowledge Network to function there must be a high degree of trust among all participants. To date, Caterpillar has not had any problems with value chain partners abusing the system. The authentication process ensures that there is no such thing as anonymous; this works very well. Every community has a security profile so everyone can see who has access to that community. Community member lists provide information such as name, affiliation (e.g., dealer or supplier), and home organization. They intentionally do not disclose an individual’s position, title, or job level. An individual’s name is attached to any contributions he or she makes to the community, and clicking on their name shows their affiliation, organization, location, etc. People will always know the origin of all contributions.

Low barriers to entry are seen as a success factor. Therefore, Caterpillar tries to make the technology as easy to use and intuitive as possible.

**Benefits Realized**

Caterpillar measures the health of its knowledge-sharing processes that extend to the external value chain. The central Knowledge Network team tracks the number of external people using the system (based on log-ins) and can look at this data by affiliation, organization, and location. They also track community growth (e.g., number of new members and number of new contributions) and top dealer communities (i.e., most dealer members and most dealer contributions). Additionally, they track the number of initial discussions (collaborations) with external members in communities and report on these numbers monthly.

Communities typically contain the experts who are the process owners. The process owners are usually the ones responsible for replicating solutions and other best practices across the corporation. Additionally, product groups are often in communities related to their products. Communities will
often refine what Caterpillar already considers to be a “good” practice and embed that into corporate processes and procedures.

There is also a formal lessons learned component of the Knowledge Network that a community manager can activate that allows him or her to capture key entries and consolidate them into an answer or a lesson learned. The content of the entire Knowledge Network is searchable.

Content can be searched within specific communities as well as the entire network. Reference material can be uploaded to the communities, and those files are also searchable. Even software can be put in a searchable downloadable folder. Web site links can also be shared.

Because of the various audiences interacting in a community, they can also help set organizational priorities and provide input for decisions regarding where limited resources should be spent for the most impact.

LESSONS LEARNED AND THE FUTURE

Caterpillar shared the following lessons learned from its experience with its value chain.

- External discussions account for more value than internal activity today.
- Value chain partners are very good participants. The Knowledge Network has not experienced any of the problems (e.g., security issues) Caterpillar was warned to expect when it opened its communities to its value chain partners.
- External partners are forcing internal people to engage in knowledge sharing as they answer questions. The organization has found that communities are an excellent tool to gather the voice of the customer.
- You cannot underestimate the importance of usability. Part of that is making people feel comfortable and not foolish when trying to use the system.
- Listen to the customers.
- The system must provide value because everyone is busy: “What’s in it for me?”
- Allow people to see the metrics. You cannot have too many numbers.
- Document management is critical. You must have a process to ensure the content is periodically reviewed to determine if it should be retained. If you don’t, it will become “e-dump” with “once in, never out.”
- Just because someone has access to a community, that does not mean they are a member of a community or want to be involved. Employees can “vote with their feet” and join or leave a community at any time.

The Future

To stay abreast of changes in trends in communication and collaboration environments, Caterpillar’s Knowledge Network team members watch what is happening externally in the Internet environment. They also track what their users are asking for and what business objectives they are trying to accomplish.

Caterpillar is working on languages with respect to content, navigation, and translation. It is actively looking for a tool that will automatically translate postings. The company is also working to integrate the various learning environments within Caterpillar, including expertise look-up, learning management system, and collaboration (formal and informal). The goal is to allow employees to take
courses, talk to experts, and collaborate worldwide via a single platform regardless of entry point. Caterpillar is also working to make the Knowledge Network into a product.

Caterpillar is implementing a process in which inactive communities are reviewed automatically. This knowledge management retention process will flag communities that either have been inactive for a certain period of time or have no entries in them because of roll off (due to the document management process). The Knowledge Network team is automating this process so that it can remove “dead” communities faster, as some are created for a short-term need. Along with this process is the ability to archive communities to retain the information even though the community may no longer be active. Currently if a community is disbanded, either the community will be kept active, or the content will be moved offline to another storage media. If the content needs to remain accessible, it can be moved to another community (to consolidate content with an active community). Log dates are kept on all these movements.
Raytheon Co.

Raytheon Co. is a global, customer-focused company headquartered in Waltham, Mass. It has more than 80,000 employees worldwide and customers in 76 countries. In 2004 Raytheon posted $20.2 billion in sales. Its vision is to be the most admired defense and technology aerospace systems supplier through world-class people and technology. Raytheon became an industry leader through a series of acquisitions and mergers in the late 1990s, including Hughes Aircraft, TI Defense Systems, and E-systems. With all of those different cultures, many of whom used to be competitors, now under one umbrella, Raytheon recognized a need to work as one organization focused on customer success. They needed to generate synergies and create value beyond the sum of the individual businesses and to find ways to knit so much knowledge, much of it classified, together to be one organization.

Raytheon’s core values center around people, integrity, commitment, and excellence. Diversity is one of the most important aspects of its people value, and Raytheon pays a lot of attention to diversity. CEO Bill Swanson was the first diversity champion in the organization. This role is taken very seriously and rotates among the leadership team. Raytheon’s commitment is to build an inclusive culture that recognizes uniqueness, empowers each employee, values all contributions and contributors, and leverages its diverse work force to maximize Raytheon’s competitive advantage. Much of what the organization does with knowledge, knowledge sharing, and learning has to do with the recognition of the importance of engaging people in good, healthy, robust dialogues. Otherwise, according to Don Ronchi, vice president and chief learning officer, they would be squandering a corporate resource.

Raytheon is very mission and customer focused. In fact, as Figure 26 (page 116) shows, Raytheon’s customers are a key part of Raytheon’s value chain, which also includes its employees, partners, and suppliers. Raytheon’s business philosophy is that if it helps its customers succeed, then it will grow, and as it grows, it will increase its shareholders’ value.

Raytheon bases its customer focus (and growth) on three key pillars:

• **performance**—promises made and promises kept;

• **relationships**—listen, anticipate, respond, and follow through with its customers, partners, and each other; and

• **solutions**—develop and provide superior customer solutions working as one organization.
Underlying all of these is customer-focused marketing, but it was not always that way. Technical excellence has been a cornerstone of Raytheon’s success for more than 80 years. For much of that time, its people—its engineers—were very product focused but not customer focused. This can get in the way of providing the best solutions for its customers. The change to a customer focus represents a fundamental paradigm shift for Raytheon.

Mission Assurance is Raytheon’s commitment to meld its technology into the most reliable integrated mission systems in the world to address urgent defense, security, and aircraft needs.

It is important for Raytheon to understand how to use its cutting edge process knowledge to provide “no doubt” mission assurance for its customers. To maintain its competitive advantage, Raytheon must deliver greater value and predictability to its customers using an integrated set of best practices: Raytheon Six Sigma (R6σ), integrated product development system, EVMS, and a capability maturity model index.

**Raytheon Knowledge Management Overview**

At Raytheon, KM means value creation, and value creation relies on the ability to move knowledge across the enterprise and the integrated supply chain. Raytheon team members describe the KM approach as a three-legged stool where KM is the seat and R6σ, Raytheon Learning, and Raytheon Knowledge Strategy are the legs. Knowledge creation, sharing, capture, and reuse are interwoven throughout these key elements of Raytheon’s culture. Following is a brief overview of R6σ, Raytheon Learning, and Raytheon Knowledge Strategy.
Raytheon Co.

R6σ

Raytheon defines R6σ as the knowledge-based process for transforming Raytheon’s culture to maximize customer value and grow the business. R6σ training and project work have created numerous opportunities for building cross-company networks that form channels of subsequent knowledge transfer and collaboration that improve productivity and create a structured process environment for change.

R6σ provided the common language to bring all the acquired companies together and begin the process of becoming one organization. R6σ is based on the following three key elements.

• **Customer:** Customer satisfaction is the top priority. It is important to understand each customer’s culture and needs, focus on activities that add value to their products and eliminate those that do not, build lasting partnerships and anticipate customer needs to achieve a competitive edge, and be the supplier of choice.

• **Tools:** Combine the statistical process analysis techniques of traditional Six Sigma with the Lean enterprise approach to eliminate waste and non-value add activity. Identify the constraint to achieving the goal and apply the right analytical tools for each situation.

• **Culture:** Transform the culture to embrace a process improvement/measurement focus, teamwork, and empowerment. Shift from valuing functional behavior to adopting a business/customer focus, and change how they do business and think about work.

According to Bernie Saboe, R6σ master expert, these elements make R6σ unique relative to other industries using Six Sigma. Many of their programs are centered around the traditional tools (statistical analysis, variation reduction, etc.) of Six Sigma. R6σ involves the customer as the top priority, uses the traditional tools in nontraditional ways, and uses the language to unite the culture. The combination of these three values accelerates value.

Raytheon Learning

Raytheon Learning comprises the Raytheon Learning Institute (which includes the R6σ Institute) and Raytheon Professional Services. Raytheon Learning is the way they are organized to learn, create, and move knowledge. Key features of Raytheon Learning include:

• **passion**—passionate leaders inspire by creating the bridge across the gap of current state and the end state,

• **bridging gaps**—between what is and what could be creates value, and

• **creating value**—success hinges on how well and timely they deploy their resources to maximize efficiency and innovation.

These three principles are the ingredients they use to create competitive advantage through learning at Raytheon.

It is worth mentioning here that Raytheon Learning Institute leadership programs are anchored at the most basic transition points of a leader’s (or future leader’s) career. There are two main programs: the strategic leadership program and the business leadership program. In these programs, leaders are taught strategies for creating and leveraging social capital, principles and practices of knowledge sharing, and strategic thinking. The result is leaders who are better prepared before, rather than after, job demands shift, which means they add greater value to the organization.
Raytheon Knowledge Strategy

Raytheon’s KM approach is designed to leverage knowledge and learning across the entire value chain. Raytheon says that it brings knowledge to the point of need and gets directly involved in turning it into value. Raytheon wants to leverage R6σ and Raytheon Learning in order to focus on knowledge (locating, capturing, creating, and packaging the knowledge that drives value creation), human capital (creating processes to effectively and efficiently transfer knowledge to Raytheon employees, customers, and suppliers), and social capital (creating processes for bridging the gaps in the social network that links employees across Raytheon, where that bridging creates value through knowledge sharing). R6σ and Raytheon Learning were the foundation helping them launch Raytheon Knowledge Strategy (RKS).

Raytheon’s knowledge strategy is an open architecture philosophy that continues to evolve to support the needs of Raytheon, its customers, and its suppliers. It supports them through a variety of collaboration tools, approaches, and ideas. RKS focuses on a wide variety of knowledge creation and transfer opportunities to create value, such as R6σ projects, formal and informal communities of practice (CoPs), internal and customer/supplier networks, benchmarking and consulting projects, councils and leadership teams, business leadership program and senior leadership program projects (under Raytheon Learning), and innovation projects. The true objective is to use knowledge and human and social capital to create value.

Raytheon’s KM strategy is to leverage systematic processes that create, capture, share, and reuse knowledge to create value for Raytheon and its customers and suppliers. Key to this strategy is the ability to pinpoint knowledge and move it to where it’s needed. This primarily occurs through Raytheon’s networks and CoPs. Benchmarking is another key to their strategy with a recognized benchmarking process at Raytheon that is supported by their knowledge champions and benchmarking core team.

The combination of R6σ, Raytheon Learning, and Raytheon Knowledge Strategy is central to Raytheon’s strategy for value creation and creating a competitive advantage.

GAINING SUPPORT FOR KNOWLEDGE-SHARING PARTNERSHIPS

As Raytheon looked for ways to integrate the many disparate cultures into one organization, it realized that the way to make that transformation was through the use of a common language (Six Sigma), common methodologies (continuous improvement), and common focus (growth). Using these as the foundation, Raytheon would be able to harness its work force for a competitive advantage, regardless of which organization they originally worked for, and truly mold them into Raytheon employees. With this in mind, Raytheon looked to R6σ, Raytheon Learning, and Raytheon Knowledge Strategy to lead the way into the future. The following sections describe the evolution of R6σ, Raytheon Learning, and RKS.

R6σ

Now aligned with Raytheon’s business strategy of customer-focused marketing and its mission to be a mission systems integrator, R6σ has transformed over the years, adapting to the needs of the business. In 1999 when R6σ first began, it focused on debt reduction. The enterprise had just come through a series of acquisitions, and one result was more than $13 billion in debt. At that time, R6σ focused on working capital and mitigating issues that affected cash flow and profitability.
As the organization reduced its debt, R6σ slowly evolved to an application on program performance and predictability. The goal was to be able to deliver on promises (do what they say they will do) and meet commitments. At that time, Raytheon incorporated critical chain theory and design for Six Sigma into its R6σ toolkit. More recently, R6σ has focused on growth as the organization moves forward through the 21st century. R6σ is being applied to its customer-focused marketing model to understand how Raytheon can start collaborating with its customers to solve their mission issues. How can Raytheon look at its customers’ customers and understand what their issues are? One way to answer this question is with a focus on mission assurance (a system will be ready to use on time) and mission support, which cover the whole value chain from design concept through life cycle support to postproduction.

Rolled out in 1998 and 1999, R6σ is a six-step process improvement model with KM integrated throughout the six steps.

1. **Visualize**: Collect knowledge to shape the vision.
2. **Commit**: Use reusable knowledge to gain commitment.
3. **Prioritize**: Create an improvement plan based on benchmarks.
4. **Characterize**: Use past R6σ projects, best practices, and lessons learned to analyze the situation and understand the causes and effects.
5. **Improve**: Continue learning as you improve.

*Tacit knowledge represents Raytheon’s intellectual assets. The process gives R6σ experts new lenses to see some of the previously unseen opportunities out there.*

—Bernie Saboe, R6σ master expert, Raytheon Co.

**Raytheon Learning**

The consolidation of several dispersed learning organizations within Raytheon resulted in the creation of the Raytheon Learning Institute in 1999. This began a journey of change for Raytheon Learning, which, until that point, had primarily focused on providing tactical training with 242 people (collectively) and a certain allocation (high facilities cost) to the organization. Now in 2005, Raytheon Learning Institutes deliver more strategic training through the five learning institutes (Program Leadership Institute, The Leadership Institute, R6σ Institute, Engineering Institute, and Customer and Supply Chain Institute) and with only 20 people at a reduced allocation (lower facilities cost). Design, development, and diagnostic work are supported by Raytheon Professional Services. The five learning institutes serve as the focal point for knowledge creation and transfer in the key capability areas strategic for Raytheon. One common focus for all five institutes is the development of Raytheon talent. Collaboration among the institutes and councils ensures that curricula meet business needs while reducing cycle time for development. Similar to R6σ, the learning institutes look for ways to drive value. The keys to that are selecting (where can they find knowledge capability and processes that can be useful in other parts of the organization), targeting (how do they target them), and mobilizing (how do they bring that knowledge to bear on an immediate need that can drive value in the short term).
Raytheon’s Customer and Supply Chain Institute are unique in that under its auspices Raytheon collaborates with customers. It offers a broad range of engagements including the collaboration center. The collaboration center allows people to work together to develop a common operating picture, develop supplier engagements, or work on product or enterprise engagements.

Additionally, Raytheon has partnered with the University of San Diego, MIT, and Defense Acquisition University to develop content for its courses and programs.

**Raytheon Knowledge Strategy**

As Raytheon went through the series of acquisitions in the late 1990s and began its one-company transformation, they uncovered some good KM practices that were inherent in each of the acquired organizations including a content management system. These principles and practices were deployed into Raytheon but with only limited success. The KM team realized that while introducing these new practices, they had not tied them into the workflow, practices, and continuous improvement efforts within the organization. They realized that these practices and principles needed to be integrated with R6σ, Raytheon’s primary process improvement methodology.

At that time, Raytheon had four objectives for its knowledge strategy: to be more competitive (better, faster, and less expensive), to increase the drive toward a one-company environment, to reduce the duplication of effort (e.g., redundant projects), and to capture knowledge and experience from people before they leave the organization. The CEO, CLO, and Six Sigma Institute (Six Sigma vice president) sponsored the Raytheon knowledge strategy effort in 2001-2002. Their sponsorship secured commitment and removed barriers. With sponsorship secured, Raytheon benchmarked KM practices at 20 other organizations to try to identify critical success factors, best practices, and lessons learned around how to deploy a process within a large organization such as Raytheon that could help pinpoint the knowledge, move the knowledge, and create value for the organization. The revised knowledge strategy was deployed in 2001-2002.

Initially, they focused on R6σ projects, embedding knowledge-sharing practices and principles into the existing work processes leveraged under the R6σ umbrella. They chose this path in order to try to reduce cycles of learning, drive more projects and one company–type projects, and to make sure R6σ experts and specialists shared lessons learned and best practices across the different R6σ projects. At the same time, the KM team also deployed formal CoPs that use R6σ tools to address issues within the community’s knowledge domain to drive improvement across the enterprise. Raytheon soon realized that by integrating knowledge-sharing practices and principles into its R6σ methodology, it would be able to learn and share faster than the competition.

**Knowledge-Sharing Approaches and Processes**

Raytheon’s two primary knowledge-sharing approaches are R6σ and communities of practice (CoPs). The two are not mutually exclusive, since there are R6σ communities and business and/or functional communities with R6σ members and that sponsor R6σ projects. The following sections describe how both R6σ and CoPs support knowledge sharing across Raytheon’s value chain.

**R6σ**

According to Saboe, the transfer of knowledge between R6σ experts and practitioners in the greater R6σ community is similar to the transfer of energy achieved when billiard balls roll into and
bounce off of one another. Information transfers at incredible rates among the 80,000 Raytheon employees, with thousands of collisions happening every minute and every hour.

The R6σ knowledge-sharing process can be summed up in three steps:

1. **collect**—learn from others through Six Sigma projects, internal and external benchmarking, best practices sharing, and many other sources;
2. **abstract**—save their knowledge by loading it into the best practices knowledgebase, capturing it in the project library, leveraging intellectual assets, and sharing tacit and explicit knowledge; and
3. **disseminate**—share their knowledge by matching it with gaps, solving problems, and reusing proven solutions.

Now, with Raytheon’s strategy evolving to focus on growth, R6σ is evolving to meet that need. The R6σ for Growth strategy is a combination of R6σ contributions (focus, discipline, speed, one-company behavior, third-party broker, relationship management, proven tools and methods, and informed risk taking) woven around five primary focus areas: customer relationships (do we have a good relationship, is it based on past performance), customer needs, solutions (help to shape solutions to their needs), profit capture, and growth diagnosis (opportunities for growth to increase profitability). They are adapting the toolset and resources to meet this emerging need within the organization.

**Knowledge-Sharing Process**

As mentioned in the previous section, knowledge-sharing principles and practices have been interwoven throughout the R6σ methodology. However, Raytheon realized that wasn’t enough. In order to ensure that any Raytheon employee has access to these principles and practices, not just those with R6σ training or certification, they developed the Raytheon KM process (Figure 27). With this process, Raytheon wanted to enable its employees to create, capture, share, and reuse knowledge; pinpoint that knowledge; and move it quickly to where it’s needed.
One of the primary knowledge-sharing approaches adopted by Raytheon is CoPs. At Raytheon, CoPs are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting continually. CoPs create opportunities for bridging gaps and linking employees across Raytheon to create value through knowledge sharing. Raytheon has a standardized, robust process to deploy and sustain CoPs that includes training on the KM process. However, because CoPs evolve based on business and member needs, they are often very different. All of Raytheon’s formal CoPs are registered in the KM portal and supported by knowledge champions. Raytheon also has many informal CoPs. Although these CoPs are not formally registered in the KM portal, they do have access to the same self-service features of the portal, and they are supported by knowledge brokers.

Here are examples of two Raytheon CoPs.

**Raytheon Integrated Logistics Community of Practice (RILCOM)**

In 2002 Raytheon’s supply chain council was formed, and it established George Ellis as enterprise supply chain management director. Ellis quickly realized that Raytheon’s logistics network was fragmented with limited interaction and knowledge sharing among the seven Raytheon businesses. At the same time, Raytheon was deploying its Raytheon Knowledge Strategy and CoPs. Ellis decided that a community of practice was the tool needed to pull together the logistics community to execute his primary goal: drive value for the organization. Working within the existing logistics council and network, RILCOM was formed in 2003.

Dedicated to bringing best practices to Raytheon’s logistics functions through knowledge sharing, benchmarking, and continuous improvement, RILCOM comprises representatives from each of the seven businesses as well as a KM champion and R6σ expert, and subject matter experts. Shortly after launching RILCOM, the community met to define its strategic focus and establish its key results areas. Through its approximately 75 active members, the community has access to Raytheon’s logistics resources (people and budget) to execute the community’s strategic focus via several projects or initiatives, all of which tie back to business strategy.

One key way in which RILCOM supports Raytheon’s value chain and strategy is through its annual three-day partner forums, first held in 2004. RILCOM invited Raytheon’s top 15 logistics service providers and diversity suppliers (many of which have enterprise agreements with Raytheon) to participate in the forum, which focuses on how these organizations can help drive value for Raytheon and its customers. Many of these organizations are competitors, and getting them all to sit down in a room together requires a high degree of trust, collaboration, and open dialogue. The key, according to Ellis, is to keep the agenda focused on Raytheon and how they can better service Raytheon. One thing Raytheon wants to do is help them understand how they can work together to present the best solutions to Raytheon and its customers. The agenda also includes recognition time, when they celebrate some of the successes they’ve had with various initiatives. This includes individual and team awards.

**Supplier Quality Community of Practice**

Sponsored by the quality and supply chain councils, the vision of Raytheon’s supplier quality CoP is that supplier quality be a competitive advantage resulting in customer mission success. Its mission is to provide a proactive, cross-functional product life cycle process for partnering with Raytheon’s
supply base through an integrated supplier quality approach across Raytheon, focusing on continuous improvement.

Similar to Raytheon’s logistics network, the supplier quality community was fragmented across the enterprise with no single focal point for supplier quality issues, a lack of sharing, redundancies, confusing messages to suppliers, and a lack of a common road map or vision to the future. Formed in 2003, the SQ CoP comprises enterprise-wide quality, supplier quality, supply chain, and IT professionals. Led by Jason Elwood, the SQ CoP is dedicated to creating and moving knowledge and best practices to where they are needed through a knowledge-sharing strategy to bridge gaps across the seven businesses, identifying best practices through advanced benchmarking techniques, driving process improvements through KM and R6σ, and sponsoring and deploying new supplier quality initiatives.

Creating Buy-In

Early in its KM journey, Raytheon’s KM team members realized that it was important to get commitment from leadership in support of its knowledge strategy, tools, and approaches. One thing that helped them gain this support from leadership was the fact that many of their leaders had been through the strategic leadership and business leadership programs where they learned about social capital, knowledge sharing, peer assists, and other knowledge-sharing principles. This increased the awareness of middle and senior managers of the importance of knowledge sharing, which made it easier to deploy a knowledge strategy.

Another key factor in the strong leadership support that Raytheon’s knowledge strategy enjoys is that R6σ is aligned very closely with Raytheon’s business strategy. This engenders strong leadership commitment for R6σ and knowledge sharing because they can see how it is integrated with business strategy.

Communicating/Marketing Knowledge-Sharing Processes and Approaches

During the benchmarking conducted prior to launching its Raytheon Knowledge Strategy, Raytheon examined communication strategies as means to increase awareness and buy-in. After learning what a key role communication played at the benchmarked organizations, Raytheon deployed a comprehensive communication strategy to increase awareness, obtain buy-in, and ensure success for its knowledge-sharing processes and approaches.

Because many of its knowledge champions are also Six Sigma experts, Raytheon decided to start its communication efforts with that community. They made sure they had booths, online demos, and materials available at all R6σ forums and celebrations (recognition activities). One of its tools to promote knowledge sharing was something called the KM Passport. In the passport were some specific questions designed to drive people to network and introduce themselves to other experts previously unknown to them. The individuals were then prompted to share their experiences on current projects and gather some information in return. They brought the passport back to the booth to be stamped (one stamp per question set). Passports were turned in at the end of the day, and those who participated were recognized. On a personal level, the activity resulted in the creation of an extended network. On a tactical level, the entries in the passports were reviewed for best practices and lessons learned, which were then captured into the best practices database.
Other communication activities and venues included a briefing with each business leadership team and the major councils across the organization, a KM video on storytelling with actual stories from CoPs and individuals about the benefits of sharing and reusing knowledge (which they’ve shown at all of their venues and forums), newsletters, brochures, brown bag lunches, and the KM portal.

Regarding RKS, Raytheon leverages many different venues in its communication, such as R6σ forums and celebrations, R6σ expert/specialist trainings, R6σ master expert meetings, R6σ council meetings, business leadership meetings, and customer/supplier conferences. The KM team looked for venues where there would be a large audience and people were already coming together to share knowledge.

In the communication briefings with Raytheon business leaders, one of the points they try to make is to ask the leaders what role they can play as a business leader. They encouraged their business leaders to ask the following two questions every day.

- What actions have you taken to *share* your knowledge?
- What actions have you taken to *reuse* the knowledge of others?

Business leaders are also encouraged to encourage their R6σ masters, experts, and specialists to incorporate KM processes into their business processes. In fact, the two questions above are asked of each expert when he or she presents his or her project to the defense board.

**Barriers to Knowledge Sharing**

As a result of the mergers and acquisitions, Raytheon faced several barriers to effective knowledge sharing. Raytheon had multiple disparate processes and systems (in 2001 they had 69 supply chain systems) that made it difficult to access, select, and share knowledge and standardize common practices. Raytheon also experienced the “not invented here syndrome,” as many employees and teams did not realize the value that their knowledge had for others in Raytheon. Also, bringing together several companies created a cultural barrier because mistakes were often not valued as learning, and rewards and recognition were often based on individual performance and not team performance. Likewise, the desire to get credit for work led to keeping the information and knowledge close until the completed solution was developed. Engineers are innovative and creative individuals, and because Raytheon is predominately an engineering organization, there is the tendency to “recreate the wheel.” The tendency to recreate has its root cause in several factors: (1) I have a better way. (2) I think I already know. (3) You don’t know what I know. (4) I am rewarded for my work and not others’. (5) I can reinvent the wheel or innovate faster than you can tell me what you know.

In addition, because Raytheon is a global organization, distance is a barrier to knowledge sharing. This can be true even when an enterprise is located in the same city because of multiple sites. Often the barrier is simply time. Simply stated, “knowledge is power” is a culture that Raytheon is working to overcome through the use of R6σ, Raytheon Learning, and the Raytheon Knowledge Strategy.

**Assessing the Risks**

Because they are a U.S. aerospace and defense firm, Raytheon has established formal certification training and procedures to ensure that employees comply with the International Traffic in Arms Regulations (ITAR) to control the export and import of defense articles and defense services. These ITAR regulations govern the types of knowledge and information that Raytheon can share.
with non-U.S. citizens. Raytheon’s IT information security requires that each Raytheon U.S. citizen and external-CoP U.S.-citizen member complete an annual training and certification process prior to allowing them access to the Raytheon CoPs and their collaboration spaces. The IT security also utilizes security profiles to mitigate risks and enable access to the CoP eRoom collaborative space. Raytheon will often use non-disclosure agreements and its benchmarking guidelines as additional risk mitigation tools.

BUILDING A STREAMLINED, EXTENDED KNOWLEDGE SPACE

Raytheon leverages several knowledge-sharing approaches and tools in support of collaboration across the enterprise. These approaches include bulletin boards (by state), CoPs (more than 250 registered, formal CoPs), councils (more than 30 formal councils that cross businesses), technology networks (focus on how to share technology across the enterprise in support of best practices and lessons learned), enterprise project teams, employee networks (27 formally recognized networks), YESNet, and student programs. All of these approaches are for formally recognized groups. One of the requirements for such recognition is that they focus on cross-business efforts.

Raytheon also leverages several internal (to Raytheon) and external (reaching out across organizational boundaries) tools for identifying, capturing, sharing, reusing, and moving tacit and explicit knowledge. For explicit knowledge, the tools primarily focus on connecting people to data. Raytheon has a collaboration CoP that works across the businesses to help improve collaboration by driving people to the tools for connecting people to data and to people. Internal tools include:

- a DocuShare system;
- a best practices knowledgebase that includes their benchmarking library;
- a benchmarking library database that houses all their benchmarking activity and ties into all their external databases;
- R6σ project library/STS—another way to move knowledge and lessons learned across projects; and
- eRoom™/Team port—eRoom,™ their collaborative space, often used by CoPs and networks for virtual meetings and sharing. It also has the capability to connect with external customers and/or suppliers that may be a part of that community or network.

One of the key collaboration tools for the greater R6σ community is the R6σ project library. This is where all of the R6σ experts house their projects. The library features include global access, discussion forums, lessons learned, tasks, lists of team members, financial project information, schedules, timelines, reporting dashboards with metrics, history, meeting rooms, permissions, searches, and show alerts. It has links to parent projects and child projects as well.

External tools include several external databases that Raytheon subscribes to, including APQC, the Global Benchmarking Council, IEEE, and the Lean Aerospace Initiative.

From a tacit knowledge standpoint, Raytheon leverages various knowledge-sharing tools and approaches including those shown in Figure 28, page 126.
Raytheon also uses a KM portal because it firmly believes that a portal capability can make KM easier and more personal. Within this portal, they recognize and register their formal CoPs (CoPs that are supported by a R6σ expert or knowledge champion), and the registration process allows them to track their formal CoPs. One of the critical aspects of the portal is that it provides a certain amount of self-service capability to the CoPs, such as the registration process and online training materials. Other portal features include Raytheon KM training, full-featured search (portal, intranet, Internet, file servers), a Web crawler, single sign on (self-administering), personalization of individual portal, content management, collaborative tools support, standard and ad hoc reporting capability, integration with existing applications (SAP, Web apps, mainframe), e-mail support, remote access support, wireless support, improved security infrastructure (Netegrity), and ability for non-IT users to deploy small scale apps via the portal. It also has a list of all the formal CoPs, a place for community administration, a list of popular links, a people and information search, and links to key KM resources.

The key for Raytheon with any of its knowledge-sharing tools and approaches is one-click knowledge sharing. No matter the tool/approach, it must be as easy as possible to use.

**Deploying Knowledge Sharing Across the Value Chain**

In order to deploy knowledge-sharing approaches and processes across the extended value chain, Raytheon realized it needed to first take a strategic approach and align the knowledge strategy and pilot projects to focus on business needs. This would ensure pull and support from the businesses. They also recognized that it was necessary to involve leadership early on in the process to set direction and focus. This move also established effective sponsorship to address cultural issues as they arose.
Raytheon also looked for early wins and success stories to communicate and build excitement around this thing called knowledge sharing. Pilot experiences served to increase executive awareness of organizational issues. This led the sponsors to identify three key areas to focus on initially: business development, supply chain, and engineering.

**MANAGING THE EXTENDED KNOWLEDGE ENTERPRISE**

Raytheon’s KM office, R6σ council, and Raytheon Learning governance board all work together to oversee the development and deployment of knowledge-sharing processes and activities to promote moving knowledge across the enterprise to create value.

**KM Executive Steering Committee and Central Office**

Raytheon Knowledge Strategy executive governance is provided by the chief learning officer, vice president of Six Sigma, the vice president of the Six Sigma Institute. These executives work with the corporate KM office and the enterprise KM champions to plan and deploy the Raytheon Knowledge Strategy across Raytheon. Because these executives also lead Raytheon’s Learning and R6σ, they insure that alignment and integration with these knowledge based programs. The corporate KM office resides within Raytheon Learning to ensure further synergy.

**R6σ Council**

The R6σ council is a group of business and functional leaders that plan and execute the deployment of R6σ across the enterprise. The council’s mission and charter is to drive the development, deployment, integration, and improvement of R6σ for employees and leadership through:

- alignment of R6σ to business strategy (having listening posts in each business area to hear what their emerging needs are);
- assuring R6σ is focused toward constraints in providing value to customers;
- internal and external knowledge sharing (looking at other companies to learn what they can do);
- establish the learning and development objectives for leaders, master experts, experts, and specialists; and
- governance of the R6σ processes and practices.

**Raytheon Learning Governance Board**

Raytheon’s learning governance board is made up of approximately seven members of the leadership team. The board also has liaisons in each of the seven businesses, called business learning representatives, as well as liaisons to each of the functions, called functional learning representatives. These people work to integrate programs across the institutes with the guidance and oversight of the governance board. This is done through a process where they analyze what they know and what they need to know, where it needs to be moved around, what the solution sets are, content development and delivery, learning administration, and evaluation. With the institutes, Raytheon Learning Institute is responsible for the strategic enterprise initiatives, and Raytheon Professional Services is responsible for the design, development, delivery, administration, and technology. In other words, RLI focuses on learning, while RPS focuses on training functions enabling learning.
Raytheon leverages a number of KM and R6σ roles in support of its knowledge-sharing processes and activities. Brief descriptions of these roles are provided here.

- **KM champions**—They lead KM in support of business improvements organization-wide by practicing and promoting the research and sharing of solutions to shorten the cycles of learning and achieve new process breakthroughs. These individuals take the pulse of KM in their businesses. They also drive, deploy, and sustain effective CoPs and networks. A KM champion is usually one of the first to know what’s going on in another area of the organization because people come to them seeking knowledge, and they help facilitate connections when people from different businesses are looking for similar knowledge. KM champions are also responsible for training leadership teams and R6σ communities in their businesses; they also report KM improvements and rewards/recognition for knowledge sharing and reuse. KM champions also promote:
  - capturing and sharing R6σ project best practices and lessons learned;
  - the abstraction of collected information from projects so that it can be easily shared;
  - the deployment of a KM process across business units;
  - discovering, researching, and understanding emerging and effective methods of improvement;
  - broadly disseminating R6σ best practices and lessons learned through business unit communities and information networks; and
  - connecting individuals and subject matter experts with one another and with the knowledge and tools they need to improve.

- **KM brokers**—They broker KM activities for a business or process, are proficient with KM tools and processes, and coordinate networking and collaboration for knowledge sharing and reuse. Brokers also mentor communities of practice to help them get started, encourage the use of knowledge repositories, and explore the knowledge needs of the business. They help others outside of their business unit by sharing and recognize key contributors for knowledge sharing and reuse.

- **R6σ Champions**—They are senior leaders who plan and execute the deployment of R6σ in their organizations.

- **R6σ Master Experts**—They are fully trained, highly experienced, and full-time leaders that are responsible for planning, training, mentoring/coaching, and results related to R6σ projects. Raytheon has approximately 50 master experts deployed across the enterprise, and these individuals work on strategic R6σ projects to cross boundaries across the enterprise and bridge gaps across the businesses. Master experts understand all the Six Sigma/Lean tools but can also sit at the business table.

- **R6σ Lead Experts**—Not quite validated master experts, they perform many of the same jobs and are the leaders of their organization’s R6σ efforts.

- **R6σ Experts**—They are fully trained, full-time change agents who lead improvement teams, work complex projects across the business, and mentor specialists.

- **R6σ Specialists**—Trained to apply R6σ skills to projects in their job areas on a part-time basis, their one goal for the R6σ program is to train all exempt/salaried employees as specialists.
• **Team members**—They are people with expertise or experience in particular business process areas who are brought in to participate, usually part time, on an R6σ project in their business. Many members are also qualified R6σ specialists.

As the roles illustrate, Raytheon seeks out and encourages involvement at every level across the enterprise.

**Training**

According to Mark Palla, knowledge management and benchmarking champion, there were two keys to launching Raytheon’s knowledge strategy: the training conducted for the R6σ experts and specialists and Raytheon Learning. Learning was a component that they felt was lacking at many of the companies they benchmarked. Training examples were abundant at those organizations, but what they didn’t see was examples of learning and how to create value by moving knowledge across a large, complex network in an organization.

The KM team worked with the Raytheon Learning Institute to develop content for its KM training. This included content on the KM infrastructure, portal navigation, the repository search process, the abstract process, and sharing processes. The KM team then brought together representatives from the R6σ master expert community, Raytheon Learning Institute, and APQC to review the material and convert it for the R6σ process. Why? Raytheon Six Sigma is such a large part of the way that they do business that integrating KM training with R6σ training would be the smart way to embed knowledge sharing into the way people work.

The next step was to pilot the training in some specific community areas. Then, they pulled together a core team of 22 people who had been through the training and that represented both businesses and functions across Raytheon. These people were certified as KM champions and trainers. The number was so large because Raytheon wanted to ensure it had enough of a network that it could support a particular business or function with KM champions who would help them deploy the KM processes.

Next, they held briefings with leadership teams, enterprise-level councils, and master experts (who had not been part of the process to date) across Raytheon to give them an overview of KM. Finally, the training was deployed to their CoPs.

**R6σ Training**

As mentioned in the previous section, training on knowledge sharing and reuse is embedded into R6σ expert training, which is a year-long learning and development process. Raytheon’s R6σ expert training relies on coaching, mentoring, and plenty of face-to-face opportunities to share knowledge and exchange ideas. From the start, R6σ experts-in-training receive coaching from seasoned veterans who have been through the process. There are gates, or opportunities, for coaching and sharing built into the training throughout the year-long process. From 1999 to 2005, Raytheon has trained approximately 1,600 experts and more than 51,000 specialists in its R6σ methodology.

After some initial coaching, the trainees move to a R6σ foundations class focused on the essentials of Six Sigma. After this class, the trainees select one to two tracks within which they will work on their first Six Sigma projects. During this journey, opportunities to share knowledge are built in
through coaching, evaluations, and project work. Additionally, social plans are part of the experience to allow practitioners to get to know one another and build relationships. Four to eight months into the process there is a structured, formal review called a mid-term evaluation. It is an active coaching session where practitioners can share where they are on their projects. There are no presentations during the evaluation. Rather, the focus is on them telling their stories and sharing and learning from each other. People from around the globe fly in for the mid-term evaluations. These represent an opportunity for formal sharing for personal growth. They provide an opportunity to share and learn from each other in their cohorts and receive personal feedback and certification readiness on the seven expert performance keys (see below). The whole process is about discovery and learning from each other. At this point, they are getting feedback from master experts and peer evaluations.

The entire R6σ expert program is geared around a competency model with seven performance keys:
1. business acumen,
2. deliver results,
3. goal deployment,
4. improve performance,
5. influence skills,
6. marketing/customer focus, and
7. project management.

These keys weave across three levels: within a business/function, cross-business/function, and multi-business/function. Raytheon requires its R6σ experts to achieve a minimum of Level 1 before they go to certification. It is when they begin to exceed Level 1 that they are causing business value. By Level 3, they are usually master experts with an enterprise-wide view of strategy and working across boundaries internally and externally.

After nine to 12 months, the trainees should be completing their projects and ready for certification. This is another opportunity to share information with other experts and the certification board (a panel of business leaders that come together to evaluate and certify R6σ experts on their projects). It is an opportunity to show these business leaders that they (the experts) are truly change agents for the organization. They are independently leading and driving change processes. It’s also a great opportunity for the business leaders to identify potential talent and the newly certified experts to receive recognition from these leaders.

All of these courses are designed around the Socratic method of learning, and they encourage debate and learning from each other’s experiences. The R6σ methodology is integrated throughout the foundations course. Participants talk about things from the perspective of Raytheon’s growth strategy and try to bring it all to life. The programs use case studies based on actual business results.

Knowledge-sharing and reuse behaviors and activities are woven into the entire learning experience, although they don’t talk about KM per se. This was done in a calculated manner to further enable the cultural transformation being wrought by R6σ. Also, written into the case studies are the thought processes and exercises around building social networks—how to leverage social capital and borrow strategic capital—thus, baking it into the learning experience.
R6σ expert training programs are open to enrollment from anyone in the organization as well as customers and suppliers. Raytheon also has a more structured R6σ With Suppliers program to help the organization reach out up- and downstream in the value chain. This makes for some very powerful knowledge sharing opportunities between Raytheon employees and customers and suppliers.

**Reward and Recognition**

While Raytheon was benchmarking KM strategies and approaches with other organizations, one important aspect they learned about was the importance of reward and recognition. Many of Raytheon’s CoPs provide recognition, some of which is monetary (achievement awards and spot awards), to members doing an effective job sharing and reusing knowledge. In fact, many of Raytheon’s communities drive value creation through project initiatives, such as R6σ projects. It is through just such projects that R6σ experts and/or specialists are qualified—a form of recognition for the individual. In fact, Raytheon uses a variety of R6σ forums and celebration activities to recognize individual and team contributions. And, while some of the awards may be financial in nature, invitations to the forums themselves serve as their own form of recognition. Finally, Raytheon has several recognition awards for R6σ project teams, including its KSARA, or knowledge sharing and reuse awards for R6σ projects.

**Privacy Issues**

The tools for knowledge sharing, such as DocuShare and eRooms, have built in security profile and team access control. The IT security certified training is required prior to access the eRoom collaborative space. The DocuShare and eRooms provide assignment and control capability that allows the coordinator of each CoP to assign roles and responsibilities to each member. These roles and responsibilities designations ensure that each member can only see the information in the eRoom that is approved for his or her viewing. The DocuShare and eRooms password protection ensures that organization, private, or CoP information is only viewed by approved internal and external members.

**GAUGING THE RESULTS**

Raytheon leverages a number of measures and metrics to determine the effectiveness of its knowledge-sharing processes and approaches across its value chain. The following sections describe how this is performed for R6σ, Raytheon Knowledge Strategy, and the RILCOM CoP.

**R6σ**

In addition to more standard Six Sigma measures such as project savings, Raytheon also wants to understand how well its continuous improvement efforts are penetrating across the organization, enabling the transfer of tacit knowledge and experience. One way R6σ does this is through the use of social network diagrams and analysis to examine their R6σ expert cohorts. Raytheon’s leaders want to know if people are collaborating across business and functional boundaries to move knowledge and drive value. By looking at R6σ expert cohorts, they can identify where individuals and groups are connecting with one another and where there are opportunities for new connections, especially across the white spaces between cohorts.
Raytheon Knowledge Strategy

When Raytheon first started its knowledge strategy, it determined the effectiveness of its efforts through activity and deployment measures such as the number of CoPs deployed, the number of certified knowledge champions, communication metrics, and the number of leadership team and master expert briefings. As Raytheon’s knowledge strategy evolved, however, so did its measures until today they use community and project outcome measures to understand the value created by a network, community, or R6σ project. Raytheon also uses an After-Action Review process to identify lessons learned and best practices and to develop a plan to incorporate those into an improvement plan. Additionally, many of Raytheon’s CoPs use APQC’s community health assessment process, similar to a balanced scorecard, on an annual basis to assess community strengths and gaps. Taken together, these various measures, metrics, and activities provide a vehicle for continuous improvement for Raytheon’s knowledge strategy.

RILCOM CoP

The community’s leaders believe that a comprehensive measurement process drives continuous community improvement; therefore RILCOM uses a comprehensive set of inward- and outward-looking performance and cost metrics enabled by a best-practice Web tool. These metrics have evolved over the history of the community. In Phase I, the community focused on inward-looking performance metrics such as cycle time, pack to ship time, and dock to stock (reported as number of days). In Phase II, the community focused more on cost metrics such as headcount, material handling, transportation, and initiative savings. Again, these were still inward focused. The cost metrics enabled RILCOM leaders to start doing some benchmarking, such as comparing how they were doing in terms of logistics expense as a percentage of sales and other meaningful ratios. These benchmarks help RILCOM and Raytheon understand how they are doing compared to other organizations within the sector and industry. They also helped lay the groundwork to have visibility, via the metrics, into all the different businesses. Each business in Raytheon supplies its metrics on a monthly basis.

The tool, another Web-enabled application, rolls that information up and provides management reports. Moving forward into Phase III, RILCOM plans to focus on more outward-looking metrics such as supplier performance and cost metrics like volume, on-time delivery, transactions, accuracy, quality, claims, and service. RILCOM and Raytheon want to take this approach and deploy it to their top suppliers to enable them to get metrics and data from their partners in real time.

The community also leverages Raytheon’s annual CoP health assessment process and an annual After-Action Review process. Conducted by a third party, the CoP health assessment measures RILCOM against 10 key traits of effective CoPs.\textsuperscript{11} RILCOM and its sub-community, MTrak, scored in the top percentile compared to other Raytheon CoPs across the globe. Also conducted by a third party, the annual CoP After-Action Review helps to identify gaps and lessons learned for continuous improvement on RILCOM projects.

Critical Success Factors

Raytheon shared the following critical success factors that have helped make the integration of R6σ, Raytheon Learning, and Raytheon Knowledge strategy such a success.

- In order for it to be effective, integrate it into your workflow and business processes.
- Develop an open architecture (i.e., inclusive) knowledge strategy that adapts to changing business needs.
- Align the KM mission with the business strategy and customer strategy and secure executive sponsorship and commitment. One vice president of a business unit that leverages the RKS, when he does his annual operating plan, he includes KM as a process. On that scorecard, he includes best practices, external knowledge sharing, and internal best practices, and how effectively have they been deployed across the business.
- Leadership must create a culture that promotes and recognizes knowledge sharing before expecting users to embrace KM tools (i.e., people, process, and culture before tools).
- Enlist a passionate core group to provide enterprise resources that leverage standard KM deployment.
- Assessment and measurement process is critical to deploying and sustaining a repeatable KM and CoP process.
- CoPs are KM’s best practice.

RILCOM CoP Success Factors

- Project aligns with organization goals and ensures customer success.
- Synergy of KM and R6σ provides faster and simpler execution.
- Strong CoP leadership provides support and removes barriers to achieve proper behavior changes.
- Cross-functional and cross-business CoP leverages skills and experience of diverse membership.
- Peer assist process using subject matter experts enables transfer of tacit knowledge and experience and improves cycles of learning.
- Collaborative technology enables knowledge sharing and virtual communication.
- Implementation plan includes key milestones, ongoing action assignments, and measures of progress.
- Regular virtual and face-to-face CoP meetings ensure project success.
- Defined CoP governance model, roles, and responsibilities increase quality and quantity of decision making.

Supplier Quality CoP

- Formal sponsorship of the SQ CoP from leadership and the business.
- Compelling business case and value proposition for leveraging supplier quality knowledge across the value chain.
- Defined CoP roles and responsibilities, including KM champion/R6σ support, business leads, and subject matter experts.
- Regular community virtual meetings, along with face-to-face two-day sessions once per quarter.
- Comprehensive measurement process that drives continuous improvement.
- Strong community leader who communicates with sponsors and stakeholders to remove barriers and secure support.
• Using R6σ and KM to select key best practices and tools that can be transferred to the businesses to close gaps.
• Developing formal communication strategy with sponsors, stakeholders, customers, and suppliers.
• Recognizing and rewarding community members for creating value through knowledge sharing.

Benefits Realized
Raytheon has realized some significant benefits from its CoPs. For instance, the RILCOM community reported a savings of $6.2 million in 2003. In 2004 that number increased to $36 million in documented savings from various RILCOM initiatives across the businesses, and RILCOM’s leaders expect that number to continue to grow.

The PowerTrack system developed and implemented by the RILCOM community is an example of another benefit to the organization. Prior to PowerTrack, Raytheon had 38 freight payment methods. With PowerTrack, the organization moved to one online, Web-enabled system that provides management reports, timely access to data, and even has a system for dispute resolution. This new tool improved cash flow and eliminated multiple manual processes.

MTrak is the result of another RILCOM initiative. Developed internally in 2002, Raytheon formed a team that eventually evolved into a community around MTrak to help implement MTrak across the enterprise. With this tool, Raytheon saved approximately $2.5 million as of November 2005. The MTrak community leader projects additional savings of $26 million over the next two years as they roll it out across the enterprise. MTrak was the first sub-community developed in RILCOM, and it has proven to be a big success. A similar approach has been used several times since then for other sub-communities.

Other, more intangible benefits, realized by RILCOM include improved service provider relations, enhanced visibility, improved compliance, customer satisfaction, improved cycle time, standardized documentation, and a more collaborative work force.

Supplier Quality CoP
The SQ CoP has launched several enterprise-wide initiatives, including its supplier rating system, the Raytheon enterprise supplier assessment, the supplier excellence program, and quality notes. Intangible benefits realized by the SQ CoP include a reduced risk to Raytheon, an optimized supply base, elimination of poor quality and delivery, customer satisfaction, improved cycle time, standardized systems and processes, a collaborative work-force, and supplier partnering.

Supplier Quality CoP Future
Moving forward, the SQ CoP plans to implement supplier quality initiatives such as enhancements to its supplier rating system, to continue enterprise quality and mission assurance strategy and initiatives, to infuse new talent into supplier quality teams, and to increase communication of supplier quality project initiatives and success stories.
LESSONS LEARNED AND THE FUTURE

Members of the Raytheon KM community and RILCOM community shared the following lessons learned.

• Tie KM to a corporate priority and get an executive sponsor.
• Enlist a passionate core group to lead the way.
• Work on the people, process, and culture before diving into the tools.
• Intersection of R6G, Raytheon learning, and Raytheon Knowledge Strategy is key to their success.
• KM and CoP measures are key.
• Start off simple, benchmark, and build momentum.

RILCOM Lessons Learned

• The community leader is the single most important success factor in effective CoPs.
• Failure to meet regularly (at least twice a month) makes it difficult to stay on task and limits effectiveness.
• If utilizing a sub-team structure, regular reporting improves performance and ensures proper focus.
• Action item lists and project schedules enhance project execution.
• If feasible, occasional face-to-face meetings add tremendous value.
• Recognition for CoP members is key.

The Future

Raytheon’s knowledge strategy is a dynamic philosophy that continues to evolve to support the needs of Raytheon, its customers, and its suppliers. During the fourth quarter of 2005, the Raytheon RKS executive governance group held a two-day workshop designed to further advance their knowledge strategy. This workshop brought together the executive governance group and select members from the KM champions, corporate KM office, Raytheon Learning and the Six Sigma Institute and master expert community. The workshop focused opportunities to ensure that RKS is a dynamic operating system that continually identifies knowledge gaps along the value chain and finds the know-how to overcome these gaps rapidly to create value for Raytheon and its customers.
Established in 1907, The Tata Iron and Steel Company (Tata Steel) is India’s largest integrated private steel manufacturing organization. It has approximately 42,000 associates and belongs to the $18 billion Tata Group. The organization’s steel making and finishing facilities, located in Jamshedpur in eastern India, produces 5 million tons of both flat and long products each year. Tata Steel’s products include hot and cold rolled coils and sheets, galvanized sheets, tubes, wire rods, rings, and bearings. The organization sells 35 percent of its products under brands such as Tata Steelium (branded cold rolled steel), Tata Shaktee (galvanized corrugated sheets), Tata Tiscon (re-bars), Tata Agrico (hand tools and implements), and Tata Wiron (wires). From April 2004 to March 2005, Tata Steel’s revenues equaled approximately $3.5 billion.

Tata Steel’s formal knowledge management program began in 1999 in support of the organization’s vision to become an EVA-positive organization and improve the quality of life for its employees. Since that time, the KM program has grown to include Tata Steel’s customers and suppliers. In 2003 and 2004 it won the Most Admired Knowledge Enterprise (MAKE) Asia award. Additionally, Tata Steel was ranked first among world class steel makers by World Steel Dynamics in June 2005.

Tata Steel defines its value chain as a connected series of internal and external organizations, resources, and knowledge streams involved in the creation and delivery of value to end customers. It includes the organization’s suppliers and customers. In fact, one of the organization’s strategic goals is to develop value-creating partnerships with customers and suppliers. Tata Steel wants to build new business models by forging alliances with its customers and suppliers to strengthen the value chain and help the organization to reduce the system costs, improve service levels, and reach and offer new products and services. One of the pillars of its business strategy is to recognize and endorse the importance of knowledge as a source of innovation and competitive advantage. The organization wants to leverage all its associations within and outside the organization to harness ideas and provide the means for exchanging and growing knowledge.

Knowledge is shared across Tata Steel’s value chain via a series of structured processes under the Aspire framework which, as part of the Tata Business Excellence Model, combines Total Productive Maintenance (TPM) philosophy, Six Sigma, total operational performance, suggestion management, and quality circles. The organization’s corporate KM group resides within the Aspire framework and reports directly to the deputy managing director of the organization.

12www.tatasteel.com (retrieved August 2005)
GAINING SUPPORT FOR KNOWLEDGE-SHARING PARTNERSHIPS

In 2007, Tata Steel will celebrate its 100th anniversary. In anticipation of this milestone, they have created an architecture for their overall vision as an organization, aptly named “Vision 2007.” The essence of the Tata Steel vision is two-fold:
1. to seize the opportunities of tomorrow and create a future that will make it an EVA-positive organization and
2. to continue to improve the quality of life of its employees and the communities they serve.

The organization goal is to fully achieve these vision statements by 2007 to coincide with its anniversary.

Knowledge-Sharing Approaches

Knowledge management at Tata Steel supports the overall corporate strategy and strategic goals. The development of knowledge management at Tata Steel began in 1999 with what the organization referred to as the “Modernization of Mind” phase of its plant modernization.

As of 1998, the organization had completed four phases of modernization, which primarily focused on the modernization of physical assets. According to the organization, modernization of mind “does not involve the expenditure of huge sums of money to create physical assets. Instead it will take on the far more difficult task of orienting its greatest asset—people—towards meeting the challenges and opportunities of the future.”\(^\text{13}\) This philosophy led to the creation of a formal system to orient Tata Steel's people and capture their tacit knowledge.

The first phase of the knowledge management journey at Tata Steel started in 1999 and continued into 2000. Figure 29 outlines the road map of knowledge management at the organization. As the figure illustrates, the goals accomplished during the first phase of the journey included creating awareness, designing the necessary processes, designing the system, launching the knowledge management portal on the Tata Steel intranet, and communicating early knowledge management success stories in order to begin generating excitement among the staff.

The second phase occurred in 2000–2001 and involved the creation of knowledge communities, the introduction of security systems in the knowledge management portal, and the linking of knowledge management with performance management systems. Phase 3 began in 2001 and lasted until 2004. During this phase, the organization introduced the Knowledge Management Index, which measures the effectiveness of knowledge management activities. This phase also introduced the Community Index, as well as the integration of customer and supplier knowledge. The “Ask Expert” was also launched during this time period and allows users to post problems or issues onto the organization intranet and receive an answer. Lastly, a formal recognition system was put into place during Phase 3 announcing the knowledge-sharing approaches of the organization. As of 2004, Tata Steel is in Phase 4 of its knowledge management journey. In this phase, the Knowledge Manthan process, which supports the transfer of tacit knowledge, was introduced. Additionally, the organization has linked its knowledge repository with its intellectual property rights (IPR) portal to capture ideas and send these ideas to the appropriate places to be processed.

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\(^{13}\) Tata Steel virtual site visit presentation. November 4, 2005.
The organization has also integrated its knowledge management process with its Aspire framework in order to best leverage the reuse and sharing of information with other departments to avoid duplication of effort. Another focus during this phase is on improving the use of knowledge, as opposed to merely inputting information into the repository, and spreading knowledge across the value chain by integrating supplier and customer information into the knowledge management portal.

At Tata Steel, there are three primary knowledge management strategies.

1. **Codification**: This strategy focuses on capturing tacit knowledge, deploying the knowledge in order to transform it into explicit knowledge, and then properly using the knowledge so it becomes tacit once again. In this strategy, knowledge transfer is independent of time and space.

2. **Personalization**: This strategy encourages the transfer of tacit to tacit knowledge across divisions, departments, customers, suppliers, and knowledge communities and also includes the Knowledge Manthan process.

Within the personalization area, members of the knowledge communities attempt to identify the “pain” areas and aspiration areas each year in their focus area. Once these areas are identified, they try to identify benchmarks for each key performance indicator for that focus area. Once the proper benchmarks and best practices are identified, those best practices are deployed in order to attain or exceed the benchmark. If this benchmark is not attained, then the process starts again from the beginning where more experimentation can be conducted.

The Knowledge Manthan process is also part of the personalization strategy at Tata Steel.

The term “manthan” means “churning milk to get butter,” meaning that in any process, there is a lot of churning, which allows the identification of good and bad practices. In this process, a
select group of employees on identified topics, such as motors, water treatment, hydraulics, etc., are brought together for approximately one to 1.5 days to speak with their colleagues about what practices they have adopted, as well as what practices they have attempted but chosen to discard because they were not effective. This process supports the tacit-to-tacit transfer of knowledge. To date, Tata Steel has conducted this process with 60 departments, resulting in the generation of 500 ideas and three patents. A variation of this process is used in the next category, knowledge diffusion, and is focused on the shop floor employees.

3. **Knowledge Diffusion**: This strategy focuses on the use and spreading of knowledge and utilizes vehicles such as Knowledge Debates, online quizzes, and other assets such as communities of practice and other improvement projects to disseminate relevant information. This strategy also includes the use of the above mentioned Manthan at Shop Floor (MASS), a pilot process to identify areas of improvement.

   During the MASS process, a supervisor or worker spends eight weeks to examine a certain area and to discover best practices in that area. The first week of the process is spent defining the boundaries. The next three weeks are then spent exploring available knowledge and what has already been captured across Tata Steel. Then, approximately two weeks are spent on idea evaluation and syndication within the department, as well as creating an implementation plan. The last two weeks are spent on the documentation of the process and implementation planning. Tata’s objective for this process is to capture knowledge and then diffuse it across the organization to avoid any duplication of effort or redundancies.

   Regarding communication, the knowledge management staff communicates the process to joint department councils, who then assist in identifying workers to participate in the process. The Manthan MASS process is a very recent addition to Tata Steel’s methodology and has completed one pilot process to date.

**Knowledge-Sharing Processes**

In support of its vision and strategic goals, Tata Steel developed two processes in particular to help it manage knowledge across its value chain: the customer value management (CVM) program and its supplier value management (SVM) program. Tata Steel’s CVM program started approximately three years ago. Using criteria such as volume and strategic long-term relationships, Tata prioritized its customers and short-listed 25 of them to participate in this program. One of the goals of the CVM program is to take Tata’s customer relationships (which have traditionally been transactional in nature) and make them more collaborative. Tata structured the CVM program with an internal, cross-functional team that includes representatives from planning, product development, technology, marketing, and sales. One condition of participation is that the customer must create a similar team for themselves. Under the CVM program, the Tata and customer teams share knowledge developments, goals, and processes with each other in order to improve business.

**Customer Value Management**

Tata Steel’s approach to its customers has evolved in recent years. Until 1992 India was under a strict license regime. They had to apply for licenses in order to expand their capacities and had no
freedom to price their products. Since the borders were restricted, Tata was also not able to import goods. This very controlled environment did not allow for a robust marketing or sales initiative. The environment changed in 1992 when India adopted liberalization. Thereafter, Tata Steel was free to increase its capacity and set its own pricing structure, thus giving customers more options. Tata Steel realized it had to become the lowest-cost provider in order to maintain its position in the market. As a result, it invested in a technology upgrade and an ERP application. By 1999 Tata Steel achieved the position of being the lowest cost steel producing organization in the world. During this time, the organization was interacting with customers on a transactional basis only. In 2000 the organization realized it was not focusing on any particular customer segment, so it decided to focus on their automotive and construction customers. The customer value management (CVM) program was launched in 2002 to meet the needs of the selected 20 to 25 customers from the automotive and construction industries. In this program, Tata Steel is exploring methods to work collaboratively and provide comprehensive need fulfillment to its customers and develop a “shared destiny.” This concept of shared destiny refers to the organization’s philosophy that if a customer is growing at a certain rate, then Tata must also grow at the same rate in order to be a strategic partner with that customer.

When Tata Steel decided to adopt CVM, it had four primary objectives.
1. Grow along with select customers with whom there is an existing relationship. Tata wanted to focus more on a customer retention strategy, as opposed to a customer acquisition strategy.
2. Escape from the commodity trap. This involved encouraging its customers to decommoditize and to find ways to help its customers sell their products more effectively. Tata de-emphasized the importance of having a larger portion of the final product but instead, if their steel improves the final quality of the product, then it is a value creation opportunity.
3. Develop an agenda that is non-price related. The organization realized that all customer discussions focus solely on price, so instead they began to focus on finding avenues to cut costs while also creating value.
4. Academic research had shown that by entering into a joint program with customers, Tata could create value that could be as high as 10 percent of the revenue between a customer and a supplier. As a target for systems value creation, this was a good goal to strive for.

In order to attain the above objectives, the CVM program was launched, and it has four key elements.
1. A cross-functional approach to contacting the customer, meaning that all departments must interact with their direct counterpart at the customer organization
2. The concept to “optimally fulfill” customer needs. In other words, Tata must choose what customer issues to focus on and provide value while understanding that they will not be able to meet all customer expectations. Only along specific parameters can Tata demonstrate value to the customer—the key is to find such parameters.
3. The “one firm” approach, which translates to treating customers and Tata Steel as one system rather than disconnecting them once an invoice for sale has been raised. This helps capture value erosions that happen at the interface.
4. The empowerment and energizing of employees. Tata Steel believes in giving its employees who interact with the customers a platform to express their points of view and generate ideas for improvements for customers. A similar experience is also afforded to people from customer organization.

The actual CVM process is a structured, 12-week program for Tata Steel’s selected customers and, as illustrated in Figure 30, is rolled out in a series of five phases.

During the first three-week phase, called database development, Tata Steel stresses the concept called “define the potential.” This entails convincing the customer to set aggressive targets, and Tata then works with that customer to implement improvement projects to achieve that target. The second phase is idea generation and lasts approximately one week in duration. This phase focuses on conducting participatory workshops and role playing exercises with the customers in the customer’s environment to identify the ideas of value creation and to stop value erosion. The third and fourth phases focus on value analysis and demonstrating results. These are particularly important phases because at about this time in the program, customer managers start to feel somewhat restless and are keen to observe results. The final phase is tracking and review. Tata Steel’s philosophy is that “what gets measured gets done.” The organization believes that each idea generated must be measured in light of the incoming benefit. The resulting idea then must be jointly signed off with a physical signature from Tata Steel and the customer. As the bottom of Figure 30 illustrates, the customers have active involvement across all the phases.
Tata Steel summarizes its key concepts in customer value sharing as the following.

- Focus on implementation to develop a congenial atmosphere for sharing; Tata Steel must not concentrate on just obtaining a “win” for itself.
- Use reviews to seek involvement and build trust with customers.
- Transcend into joint study ideas in subsequent improvement cycles to prolong the relationship.

Tata Steel also believes in the concepts of value drain and value creation when dealing with customers within its value chain. The organization believes that value is created in two “buckets”—the first is value drain, which is similar to a leaking drain. When Tata Steel encounters these types of leaks, they must “plug the hole” in order to realize value. Value creation then begins when the organization begins the process of new product development and process modification. Tata Steel was able to increase value with a customer who was only effectively using 69 percent of the steel that Tata was supplying for the manufacture of wheels. Once Tata Steel shifted certain operations to its own factory, they were able to “plug” the value drain and create value for that customer.

Supplier Value Management

As a part of the Aspire initiative in its procurement division, Tata Steel initiated its supplier value management (SVM) program to explore value creating opportunities with suppliers. This program focuses on reducing cost and resources along Tata and the supplier’s combined value chain. It was recognized that this is possible only by creating a system wherein better understanding of user requirements and supplier capabilities is made possible. For example, one of the problems faced at the steel-making shops was to bring about a quantum change in the consumption of aluminum wire used in steel making. Through the SVM program, it was recognized that the machine that feeds the wire is the bottleneck area, and the supplier was in the best position to improve on the machine constraint. Thus the constraint was better understood and solved by leveraging the knowledge and capability of the supplier. This resulted in a 100 percent increase in the consumption of aluminum wire, which was considered to be very difficult before the program. Similar to the CVM program, the SVM program also has a cross-functional team drawn up from key stakeholders in Tata’s organization. The SVM program requires the supplier participants to have had a relationship with the organization for at least three years. Additionally, Tata Steel must be one of the supplier’s five key customers. This is important to create an initial buy in to the process. Each aspect of the SVM program is run as a separate project following a structured methodology, with well-defined timelines as in the DMAIC\(^\text{14}\) approach of Six Sigma.

As with the CVM program, SVM comprises four key elements:

1. a cross-functional approach in which breakthrough improvements ideas are generated across organizations;
2. a “one firm” concept, or system-cost philosophy, in which Tata views itself and the supplier as one entity in order to maximize mutual benefit;
3. a structured measurement system to monitor and review performance levels; and

\(^{14}\)This DMAIC acronym stands for define, measure, analyze, improve and control.
4. energized employees who are given the opportunity to demonstrate leadership, create value, and implement ideas to achieve aspirational targets.

Additionally, the SVM process is a time-bound structure that lasts approximately 12 to 16 weeks and is divided into phases that are similar to the phases of the CVM program. These phases and the accompanying deliverables include the following.

- Database development and target setting (three to four weeks): This phase involves understanding the relevant business issues and the setting of aspiration targets.
- Idea generation (two weeks): This includes brainstorming for ideas covering the key issues and new opportunities.
- Idea evaluation and prioritization (four to six weeks): During this phase, ideas are finalized and prioritized according to system impact and feasibility.
- Implementation planning and syndication (two to three weeks): This phase involves the syndication of ideas with senior management and other relevant stakeholders, as well as the development of an implementation and tracking plan.
- Formal signoffs (one week): As with the CVM program, there must be a joint sign-off from both Tata Steel and the supplier on the documentation.

The SVM program also has a structured, multi-tier review process that is outlined in Figure 31. As the diagram illustrates, there are bi-monthly reviews that begin with a review of the benefits of proposed ideas through various committees.

**The SVM Review Process**

<table>
<thead>
<tr>
<th>Review</th>
<th>Similar review structure at supplier end</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 DMD (Steel)</td>
<td>Management Information Group</td>
</tr>
<tr>
<td>Bi-monthly Review</td>
<td>Provide status on individual ideas</td>
</tr>
<tr>
<td>Steering Committee</td>
<td>- Follow up on delayed ideas</td>
</tr>
<tr>
<td>Bi-monthly Review</td>
<td>- Flag major deviations between plan and actuals</td>
</tr>
<tr>
<td>3 Plant Chief</td>
<td>Submit idea status</td>
</tr>
<tr>
<td>Review once a month ideas, savings, and constraints</td>
<td>Request information on idea status</td>
</tr>
<tr>
<td>Unit Leader/Idea Owner/Analyst</td>
<td></td>
</tr>
<tr>
<td>Submit idea status</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 31*
To date, Tata Steel has conducted its SVM program with nine of its key suppliers and generated a value potential of $6 million involving 165 people. The program also has generated a total of 62 ideas, 33 coming from the suppliers and 29 from Tata Steel. It was recognized that the extended nature of cross-functionality coupled with the interaction of the manufacturing personnel of the suppliers and customers is the key to value creation. This value creation is approximately 10 percent of the spend base of the commodity/service. Since this is a resource-intensive program, it is taken up only with select suppliers.

In order to advance the Vision 2007 objective and accompanying knowledge-sharing programs, Tata Steel reinforces the importance of value creation through various improvement initiatives. The Aspire program was launched in 2003, one year after Vision 2007 was announced. The Aspire program is considered to be an enabler for the organizational goal of becoming EVA positive and has been positioned to help them achieve that goal through internal efforts. As the diagram shows, Aspire includes the relationships with customers and suppliers, which have already been described, as well as the adoption of DMAIC in support of the Aspire methodology. The DMAIC is Tata Steel’s problem-solving methodology originating from the concepts of Six Sigma.

Two overarching principles of these improvement initiatives are both knowledge management and the theory of constraints. The theory of constraints examines issues from a systems perspective and identifies where the organization should focus more efforts to create the most value within the value chain.

Assessing the Risks

Regarding the identification and assessment of risks for sharing knowledge with external partners, Tata Steel realizes that there will always be proprietary or otherwise sensitive information on both sides of the relationship. To mitigate this risk and continue to have a successful relationship, each party must be willing to execute a confidentiality agreement and understand that ideas developed for one customer account cannot necessarily be duplicated for other accounts. Documentation of the entire process with a customer or supplier is key to mitigating potential risks. There is always the possibility that a customer may extend an idea that was developed in collaboration with Tata Steel to one of Tata’s competitors. Tata realizes this risk and manages such by continuing to reinforce and strengthen the relationships with current long-standing customers and suppliers. The organization believes that if they continue to generate more ideas for an organization and maintain an active and long relationship, then the risks associated with that organization will decrease, as the level of trust increases. In the words of Tata Steel representatives, “Once you a mount a tiger, you can’t get off.” Tata Steel is also cautious to only share information that is pertinent to creating value with a customer.

BUILDING A STREAMLINED, EXTENDED KNOWLEDGE SPACE

In order to consistently capture and share learnings from both the CVM and SVM programs, as well as support the knowledge-sharing architecture of the organization, Tata Steel utilizes a number of different vehicles.

Regarding the SVM program, Tata Steel often invites participating suppliers to make presentations during the Manthan process of transferring tacit knowledge among selected Tata Steel employees who are examining effective practices in their respective functional areas.
Additionally, the customer workshops that are conducted during the second phase of the CVM process are thoroughly documented so that the information and knowledge that is captured can be forwarded to the appropriate department.

There is also a Tata Steel intranet where all documents, including customer and supplier visit reports, are posted and shared with the departments who will be able to effectively reuse that information without a duplication of effort.

MANAGING THE EXTENDED KNOWLEDGE ENTERPRISE

Tata’s Apex Quality Council oversees the governance of the Aspire framework and all of its components. This review committee includes representatives from three levels of the organization: the managing director, the sponsor level, and the department level. This committee reviews the performance of the Aspire framework, including the CVM and SVM programs. For the CVM program, this includes quarterly reviews with the customers and monthly internal reviews by the deputy managing director of Tata Steel and the vice presidents of various business units focused on progress against goals. The review process for the SVM program is conducted by the respective chiefs of the departments, the chief of procurement, and the deputy managing director of Tata Steel.

Training

Training on knowledge sharing is offered on an annual basis to any department or group/organization that wants it. This training is conducted on a continual basis. The training of the Tata Steel staff on the CVM and SVM programs is particularly important because the organization realizes that a representative only has one opportunity with a given customer or supplier. Each trainee is coached before he or she is sent out to contact customers and suppliers, and the completion of this workshop makes a trainee eligible for later recognition.

Rewards and Recognition

The Tata Steel philosophy regarding rewards and recognition for its employees that participate in the knowledge-sharing programs across the value chain is that they believe that most humans inherently like to share their knowledge and experiences, and the organization has created an environment to do this. However, they also concede that sometimes a specific reward or recognition is appropriate for particular employees. During the Manthan process, senior managers are often invited to participate so that they can evaluate the performance and participation of the selected employees.

Privacy and Export Compliance Issues

Although India automakers primarily conduct their business in the domestic market, when they are supplying steel to international customers, they search for the most effective method to satisfy that customer. In the opening meeting with a customer, Tata Steel will lay out the entire value chain process and thoroughly explain each step in detail. Tata will also solicit ideas from the customer in order to make the process collaborative. During these early meetings with customers or suppliers, Tata Steel communicates very clearly that the customer or supplier does not have to share any proprietary information that they do not wish to share and that Tata may also have similar information that will not be disclosed.
GAUGING THE RESULTS

A steering committee reviews the performance of the knowledge-sharing approaches at a regular frequency. For example, at the senior management level the SVM program is reviewed on four broad dimensions: value created in the chain, value accrued to the Tata Steel chain, the number of ideas implemented, and the number of people covered under the program. Within each of those dimensions, the review committee looks at a specific set of key performance indicators (KPIs) for shop performance for each of the user departments covered under that dimension. For example, cost and productivity of the steel making shop is governed by parameters such as the life cycle of cost of refractory in the steel ladle and the consumption of aluminum wire.

For the CVM program, typical key performance indicators reviewed by senior management include increase in the share of business and improvement in delivery compliance, system inventory, and volume of new products or grades. In addition, senior management also reviews a few idea-specific KPIs.

For both programs, senior management reviews the trend of the KPIs before and after the completion of the program. This creates sufficient visibility for senior management on the improvements gained through the programs.

LESSONS LEARNED AND THE FUTURE

Regarding the CVM program, Tata Steel has identified the following lessons learned from their experiences.
1. A successful program must have senior management support (from the CEO level).
2. Integrative decisions based on aligned data are critical success factors to the knowledge-sharing program.
3. It is important to consistently manage self and customer expectations.
4. Stretch targets must be set.
5. The program needs meaningful and visible roles within the organization.
6. The CVM process should adapt to the particular environment and culture.

Additionally, on the customer side, Tata has learned to focus on a particular customer segment for collaborative knowledge sharing and to identify where steel can be used to better sell that customer's product. Also, Tata has learned to not rush into selling ideas to customers. Instead, they allow true collaboration so that the customer will have a sense of ownership of the resulting idea.

On the supplier side, Tata Steel has learned the following lessons.
1. The selection of a supplier is a key to a successful relationship.
2. The involvement of the supplier’s and Tata’s senior management is crucial.
3. Mapping the entire value chain of a supplier to that of Tata Steel is important to understand value loss opportunities.
4. Tata Steel needs to be one of the major customers to that supplier.

Other key learnings from the SVM program include the need for a shorter version of the program to accelerate gains. An ideal shorter version would last one to one-and-a-half months. The organization also realizes the importance of training Black Belts within the SVM process, as the functions within the organization are organized into customer/supplier relationship sets.
This would lead to strengthening the overall internal value chain. As a result of implementing the SVM program, Tata Steel has also recognized that the process builds the capabilities of both employees and suppliers involved in the program and excites suppliers about their association with Tata Steel.

The Future

In the future, Tata Steel plans to continue to implement the concept of shared destiny, or collaborating closely with customers to sell their products better. Another is a concept the organization refers to as “solution for sale.” Tata Steel believes that since it has certain advantages as an organization, namely in the areas of production and lead times, they can make offers to certain customers or suppliers to share these advantages. The organization believes in converting their competitive advantage into a premium positioning of products and services for their customers.
A complex and diverse organization, the United States Air Force consists of approximately 600,000 civilians and military personnel worldwide. The Air Force Materiel Command (AFMC) is one of 10 major commands within the Air Force. To achieve its mission, AFMC is charged with delivering war-winning technology, acquisition support, sustainment, and expeditionary capabilities to the warfighter. It is responsible for developing, fielding, and supporting weapons systems across the Air Force. The AFMC’s end customers are the warfighting commands, such as Air Combat Command and Air Mobility Command, that use the weapons systems fielded and sustained by AFMC to execute the Air Force’s mission.

The AFMC is a blended team of Air Force civilians, military personnel, and contractors, headquartered at Wright-Patterson Air Force base (WPAFB) in Dayton, Ohio. In addition to its presence at WPAFB, the AFMC also has locations at nine other bases nationwide. The AFMC oversees a wide variety of complex organizations including a world-class research laboratory, three product centers, two test centers, three air logistics centers, and three specialized units.

AFMC employs approximately 80,000 men and women worldwide, the majority of which are Air Force civilians. The AFMC operates with a budget of $47 billion, which is approximately 40 percent of the overall Air Force budget. Of that, approximately $20 billion is acquisition appropriations budgeted by other Air Force Major Commands for large acquisition programs; $15 billion is for supply and depot maintenance, foreign military sales, and other service logistics; and the remainder is for science and technology, testing and evaluation, and other mission areas.

Every weapon system or support system begins with research and laboratory experiments. The Air Force Research Laboratory (AFRL), headquartered at Wright-Patterson, has operating units spread across the United States. AFRL operates 10 directorates in 10 states working with universities and industry to provide the Air Force with the world’s most advanced technology. This large portion of the budget helps support the three current areas of focus: biotechnology, nanotechnology, and directing energy.

AFMC is also an international operation. Through its Foreign Military Sales program, and with assistance from 400-plus supply outlets, AFMC oversees a portfolio valued at more than $90 billion consisting of parts, technologies, research, and other vital support services to its customers in 103 countries the world.
Additionally, the AFMC has three product centers that acquire weapon systems and components, as well as three electronic systems centers that are focused primarily on communications and electronics. There are also test centers located at the Arnold Air Force base. This base conducts primarily airplane and airframe testing. In addition, the AFMC has three logistics centers that do all of the supply chain management for the Air Force.

Because of the unique responsibilities of the AFMC, communications and knowledge are critical to success at the Air Force and all of the United States armed forces. The AFMC works diligently to make sure that they communicate effectively not only within the Air Force but also across the other services and coalition partners.

**Knowledge Management Overview**

AFMC’s mandate to work globally across services and organizations means that knowledge management is crucial to the organization’s mission. Therefore, AFMC sponsors Air Force Knowledge Now (AFKN), which has evolved into the center of excellence (CoE) for KM on behalf of the entire Air Force. The United States Air Force core values of “integrity first, service before self, and excellence in all that we do” are essential attributes of AFMC and provide the context for effective KM implementation.

The AFKN program has four primary objectives:

1. decision-quality information,
2. transform military functions,
3. retain “corporate” skills, and
4. accelerate learning processes.

The first, decision-quality information, refers not only to data but also to the meaning, context, and timing of that data as well. AFKN wants to accelerate decision making and improve the quality of the decisions by having the best information and the best knowledge at the time. The second objective is to transform military functions. This objective refers to the amount of time it takes to make a decision or complete a task. Before CoPs and discussion forums, a person might leave a message or e-mail a message and wait anywhere from two days to two weeks for a response. Now, users can post an inquiry on a community of practice page in a discussion forum and get an answer within an hour from a multitude of people. This leveraging of knowledge and information improves overall effectiveness and efficiency within the organization. AFMC has determined that KM is one of the key enablers in the transformation of information and breaking the knowledge barrier. Like many corporations, the Air Force is concerned with the impact retirement, and the subsequent potential loss of tacit knowledge, will have on its work force. In fact, a USAF strategic planning directive states: "In light of the current workforce demographics, particular attention must be focused on assuring the Air Force captures and makes available the wealth of experience and expertise the current workforce possesses.”

Therefore, a third objective is to retain “corporate” skills. This involves capturing the experience of the best personnel for reuse with new personnel, perhaps in a CoP discussion forum. The fourth objective is to accelerate the learning process by utilizing mechanisms to share information, knowledge, and experience.
Members of the AFKN team shared the following example of how AFKN is breaking the knowledge barriers for the Air Force. A non-commissioned Marine officer in the desert needed advice regarding a security issue. During his training, he was instructed that if he needed information while in a remote locale, a good resource to try was the AFKN Web site. Using an Army computer, he issued a request through an AFKN community of practice, asking participants if they had any advice on how to solve his particular problem. He received numerous responses from personnel pointing him to documents containing the information he needed. However, when he tried to access the information, he found that he could not download the documents because they were encrypted. So, he called the AFKN helpdesk in the United States, and the team was able to find and download this document and e-mail it to him within 15 minutes. This story not only demonstrates how AFKN is achieving its objectives, but it also demonstrates how AFKN is creating boundaryless knowledge sharing with a Marine officer using an Army computer and looking for information on an Air Force Web site.

Knowledge that is just sitting there has no value. It’s when that knowledge is moving and getting to the right people, regardless of where they are, that it has value.
—Randy Adkins, director, Air Force Knowledge Now

GAINING SUPPORT FOR KNOWLEDGE-SHARING PARTNERSHIPS

The evolution of the AFKN program began in 1999 when Randy Adkins, a civilian employee who was working on an e-learning initiative called the Virtual Schoolhouse, was tasked with exploring the concept of KM and creating a business case analysis for the organization. At that time, the buzz words in KM were best practices and lessons learned, so the team began by constructing a database for personnel to enter their best practices and lessons learned. The next step was the purchase of a search engine to enable personnel to search AFMC content and to establish a Web site for the organization. However, the team soon learned that most people store administrative information (e.g., organization charts) on Web sites, not actual knowledge. This realization led to the creation of communities of practice (CoPs) and the Air Force Deskbook. AFKN and the CoE for KM continue to refine their knowledge-sharing processes.

Knowledge-Sharing Approaches and Processes

AFMC and the CoE for KM define the extended value chain (e.g., internal and external) to include AFMC’s end customers (e.g., Air Combat Command and Air Mobility Command) as well as suppliers. There are six primary activities (research, develop, test, acquire, deliver, and support) and four support activities (procurement, human resource management, technology development, and KM) in AFMC’s value chain. These support activities, and especially KM, enable all of the primary activities.

Communities are the heart of AFKN’s KM approaches because they can most accurately reflect how knowledge really gets shared across the value chain. Each CoP has a role in supporting the AFMC mission and a place on the value chain. In fact, many of them actually cross one or more of the primary activities of the value chain (research, develop, test, acquire, deliver, and support).

The four pillars of the AFKN’s current KM strategy framework are strategy (organizational and KM), people, process, and technology. Key components of this framework include mission integration, governance, content mapping, content management, and change management.
Each of these components crosses one or more of the four pillars, ensuring a sound framework for AFKN’s KM activities, whether they are CoPs or some other KM approach or process.

When AFKN engages with its customers, they approach each project from a consulting perspective. According to Doug Acker (knowledge architect, AFKN), KM is more than mere document organization, decision-support systems, artificial intelligence, re-engineering processes, and many other practices that have become slogans, including “e-” terms. One of AFKN’s working definitions for KM is that it is “a conscious act of managing intellectual capital within a domain for the sake of achieving meaningful objectives.” With that philosophy in mind, the AFKN team concluded that there are three main factors that contribute to the interest in knowledge-centric solutions.

1. **Need:** Within the Air Force, as in many organizations, there is more existing data, information, and knowledge available than ever before, and it all must be captured and easily accessible to personnel.

2. **Recognition of need:** People have come to recognize that knowledge is a primary strategic mission asset.

3. **Something can be done about the need:** Powerful processes and tools can meet this need.

AFKN has a growing body of KM case studies and best practices available to learn from and leverage.

To meet this need, AFKN developed its engineering process (Figure 32). Part of the purpose of the process is to move people from working in stovepipes to communities, to enable decisions and actions to occur in parallel (rather than sequentially), and to enable information items to become information markets. Many times, the customers approach their KM efforts from a grass-roots level
and do not know they are actually engaging in KM practices and managing their knowledge capital. When AFKN brings its knowledge engineering process to the customer, they are better able to identify and leverage their particular knowledge management needs.

The framework for AFKN’s engineering process is crucial to the process of setting expectations (i.e., change management) for the groups AFKN works with and across the organization. As Figure 32 outlines, the three primary components of the framework are qualify, execute, and sustain, and each has underlying processes.

- **Qualify:** The first component under the framework is to “qualify,” or to evaluate and assess the level of readiness and technical proficiency among the work force, level-set expectations, begin developing the business case, and set long-term project plans. At this time, conversations held between the stakeholders and the AFKN team help the stakeholders understand where they belong in the value chain—where they receive intellectual capital from and who receives it from them.

- **Execute:** The next component in the framework is “execute.” A significant portion of the execute phase is performing a requirements analysis to capture current-state, define future-state, and develop a road map including significant milestones. Another phase of the execute portion of the framework is design and development, which includes designing and developing enabling tools that collectively define the client’s solution set. During this phase, modules can be customized to the specific needs of the customer, as well as designing and developing their taxonomy. In the governance modeling portion of the “execute” phase, the focus is on constructing the management framework that will support the solution-set life cycle. This type of framework could include establishing roles such as “cybrarians,” or content managers, and CoP owners. This is also the point where content mapping occurs in order to identify the location of the content and the best method for delivery of that content. The last part of the execute phase involves deployment and implementation. This is a marketing and communications strategy that includes marketing and deploying KM in accordance with the road map, ensuring effective communication with all stakeholders along the value chain.

- **Sustain:** The final component of the framework is “sustain.” The sustain portion of the framework includes measuring and refining, as well as solution support. The measure and refine aspect is the establishment of measures for continuous advancement and maturity of the KM solution (whatever it may look like). Such measures can include the number of users and customer responsiveness, as well as capturing success stories from the users. Solution support refers to providing the required assistance and problem solving when necessary.

Supporting the execute and sustain components of the process is change management, a key element of the entire process. In this instance, change management refers to aligning the organization’s people and culture with changes in mission, strategy, structure, and systems.

People engage with AFKN in many different ways. Someone may see a presentation at a conference, for instance or maybe they hear about AFKN through word of mouth. However, due to the time and labor intensiveness of the process, AFKN will not engage with a customer unless it does a preliminary screening first to determine what that customer’s expectations are and their willingness to support and participate in the process (will they put funds and resources toward it). Once these things are addressed and understood on both sides, the process can begin.
AFKN now has a broad audience and realizes that it cannot approach everyone in the same way because different audiences come to them with different levels of readiness. It also realizes that it cannot lead by saying, “We’re here to facilitate your knowledge management undertaking.” To address these issues, it has begun to productize its process. One example of this is its KM methodology. The AFKN team created a KM platform consisting of a five-step model as shown in Figure 33.

**AKFN Methodology Full-Spectrum Service Offering**

<table>
<thead>
<tr>
<th>Controls, Constraints</th>
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</thead>
<tbody>
<tr>
<td>Organizational mission</td>
</tr>
<tr>
<td>Management support</td>
</tr>
<tr>
<td>Management buy-in</td>
</tr>
<tr>
<td>Approval budget</td>
</tr>
</tbody>
</table>

**Inputs**

- AF Knowledge Now
- Organization’s strategic plan
- Organizational readiness
- Knowledge/Content
- KM tools & technology
- KM industry benchmarks
- (Best practices/Lessons learned)
- KM training & education

**Establish KM Oversight Structure**

**Outputs**

- KM executive board charter
- KM strategic plan
- Operational KM solution
- Performance dashboard
- Newly acquired knowledge

**Design & Develop KM Solution**

**Deploy KM Solution**

**Evaluate KM Solution**

**Resources**

- KM evaluation methods
- KM champion (executive)
- KM facilitator (AFKN)

**Based on DOD IDEF Model**

AFKN believes that adhering to these steps will create a KM solution that is more robust than the mere sharing of information. Surrounding those five steps are inputs, outputs, resources, and controls and constraints, each of which needs to be taken into consideration during the five steps.

Other groups, however, may not be looking for the full-scale methodology. These groups may just want a workshop or two to help them improve. For these groups, AFKN created a series of workshops on change management, knowledge mapping, content management, governance, mission integration, and more. These workshops are based on the engineering process, and all share certain characteristics, listed here.
• Modular—allows the AFKN team to mix and match content to meet the customer’s needs
• Timely—held when the customer is ready for it
• Have a high impact—allow for focused, undivided attention for a set period of time that allows the facilitator to convey an important message, solicit requirements, and obtain feedback
• Meaningful—the facilitator works with the customer to develop the workshop agenda to ensure it reflects his or her needs
• Flexible—the workshop format is flexible enough to meet changing needs, even during the workshop itself
• Easy—tools and approaches need to be easy to understand and use

AFKN maintains a strategic focus to further the mission of driving the usage of KM, either through CoPs or putting other processes into place for a customer to manage their information capital.

Buy-In and Support
When asked how AFKN had gained so much support so quickly, the response was that from the beginning they tried to “think big,” be flexible, and be open to new ideas. Anything implemented had to be scaleable, even the most customized of workshops. Additionally, the Air Force’s core values of integrity, service, and excellence create a culture primed to support KM, according to Adkins.

In 2004 the early successes of the AFKN program resulted in the Air Force CIO naming the AFKN program as the Air Force center of excellence for KM in 2004. Leadership believes so strongly in KM that it has incorporated the language in documentation and flight plans across the Air Force. The following quotes from the Air Force CIO and the Air Force Information Resources Flight Plan demonstrate the level of support that AFKN has obtained from organizational leadership for the KM program. AFKN considers having its program documented in key strategy documents as a significant achievement for their program.

_Air Force Knowledge Now has not only achieved successful implementation within AFMC but in multiple organizations across the Air Force demonstrating success strategy….I would like to adopt the approach developed by Air Force Knowledge Now Air Force-wide. I would also propose that we leverage the expertise and success of the AFKN team by designating the Air Force Knowledge Now office as the Air Force Center of Excellence for Knowledge Management._

—AF/CIO internal memo, February 18, 2004

_AFMC, as lead command, will establish a knowledge management pilot program…to share knowledge and support knowledge communities across the Air Force enterprise._

—AF Information Resources Flight Plan, August 2004

Consequently, the AFMC has become the lead command for KM across the Air Force, responsible for introducing KM processes and approaches across the organization.
Change Management and Communication

The concept of change management has been inherent to the AFKN program since its inception. AFKN team members recognize the importance of strong change management practices with regard to the work they do. Two key questions they must ask themselves follow.

1. “How is this going to affect behavior and the social structure?” Communities break real and imaginary barriers, and it is important to have a positive impact on those affected.
2. “How does this affect other organizations?” Communities cross organizational boundaries, and it is important to understand who the stakeholders are and what the impact will be on them.

AFKN’s change management values include consistently being:
- airmen-centric (listening to customer feedback),
- fast (having a fast response time to end user questions),
- simple (intuitive, conventional interface, minimize extraneous features),
- flexible (tailored to group needs and each CoP creates their own requirements),
- contextual (applicable to current work, having a common language and taxonomy), and
- boundaryless (not limited to organizational, cultural, or physical boundaries).

Change management is so important in fact, that it has been called out and recognized as a key component of AFKN’s knowledge-engineering process (Figure 32), crossing all phases of the process.

One of the other important concepts that AFKN tries to convey to Air Force personnel is the difference between information and KM. Figure 34 illustrates the information sphere model that AFKN developed to help educate the Air Force personnel.
As the diagram shows, on one side lie organizational elements such as processes and documents that comprise explicit knowledge. The other side includes environmental factors such as culture, world events, and climate that are constantly influencing organizational tacit knowledge. KM’s purpose is to bridge the gap between these two very different environments by enabling the person-to-person collaboration required to discover and capture organizational knowledge.

In addition, the constant flow of information and knowledge throughout the system facilitated by KM results in the creation of new knowledge and innovations.

Providing effective communication and training is a key component to facilitating the change process. The AFKN team realizes the importance of simple, non-technical communications when conveying the business purpose of AFKN to the end users. One message they want to get across is that CoPs (or whatever the solution may be) are a long-term investment that will benefit stakeholders across the value chain. Key components of each message include what, why, and how (benefits).

Although training is not mandated, it is made available to everyone who is interested and addresses each of the areas of the above framework. The length of the training can also be determined by the size and complexity of the Air Force organization needing a particular solution.

**Managing Knowledge, Content, and Intellectual Capital**

Although AFKN owns the processes, tools, and approaches for managing knowledge, content, and intellectual capital, the actual responsibility for it resides with the community owners and members. AFKN provides some training to community owners and members on the use of the processes and tools and is available to provide assistance when needed, but the day-to-day management of knowledge and content belongs with the command, division, community owners, and individuals.

**BUILDING A STREAMLINED, EXTENDED KNOWLEDGE SPACE**

*Our bottom line is our customers.*

—Chris Albee, technical lead, AFKN

The AFKN Web site began as a small Microsoft Access application, which quickly progressed to a more robust SQL to support the growth of the program. The AFKN system is simple and intuitive, and very customer driven. Every enhancement to the system must be consistent with the AFKN vision and philosophy, “Build for one, share with all.” Plus, they must be based on customer need. However, although a system may be built for one particular customer, AFKN makes it generic enough for more widespread use.

The general architecture of the AFKN knowledge-sharing program is a simple hub-and-spoke configuration. The hub is the entry page for a given CoP, and the spokes are all of the features and applications available from that entry page. The entry page identifies the CoP, listing its mission and resources (applications) available to its members. All applications are modules and are accessible from the entry page but not from other modules. The goal is for the system to be tightly integrated but loosely coupled, so that as many modules can be added as necessary, making AFKN scaleable by users. With a hub-and-spoke configuration, AFKN can add as many modules to the system as necessary.
almost instantly. In addition to the technology, AFKN provides a team of consultants, as well as a helpdesk staffed with retired Air Force personnel who are versed in the organization’s culture and restrictions.

The components of the AFKN system are:

- the AFKN methodology (which can be tailored to different organizations),
- an e-learning architecture allowing a community owner to link eCourses to their CoP,
- the Air Force Deskbook (a storehouse of current validated practices documentation; each document has an owner responsible for updating it on a rotating cycle),
- CoPs (see next section for more information),
- a Verity search engine, and
- the Wisdom Exchange (a method to gain access to experts or advisers).

The Air Force Deskbook tool began with floppy disks and CD-Roms for the larger acquisition community within the Department of Defense. This is the only tool with validated information, meaning subject matter experts have approved the information. Deskbook includes common validated practices, templates, key documents, and Deskbook advice. Deskbook tools include acronym lists, forms, keywords, references, and Web site links. Owners of documents within the system receive reminders to update document content at least once a year per document. As of October 31, 2005 all of these documents were current, meaning they were less than a year old. Users can also rate a document on its usefulness through a voting feature.

The Wisdom Exchange module is a means to access advisers (subject matter experts). In the Wisdom Exchange, an end user posts a question in the relevant subject area discussion forum, and the system notifies the adviser of questions within their realm of expertise. In certain instances, the initial response time can be less than 30 minutes. If a CoP wants to use the Wisdom Exchange to locate advisers for its members, then the CoP owners must first consult with AFKN so that the team can understand their subject areas and identify which persons within the organization might be suitable advisers.

The Verity search engine facilitates all of these components for knowledge discovery. This search engine will search across all of these resources for a user but will also go to outside sources and discussion forums. Alternatively, a user can also choose to conduct a search within one specific CoP.

From the AFKN Web site, a user can search for a particular CoP by topic or by an alphabetical list of all CoPs. A taxonomy arranges information and CoPs around a “knowledge area” such as financial management. CoPs are also grouped by access level, including open, partial access (entry), and closed (password protected). CoP owners, with AFKN assistance, determine access levels based on sensitivity of subject matter. All members of the AFKN team that have administrator access must sign a confidentiality agreement because of the proprietary nature of some of the communities.

One of the most important aspects of the CoP entry page is the mission statement. The mission statement of each community is displayed at the top of the entry page.

Other resources in the AFKN system include links to collaboration tools (action item tracker, CoP mailing lists, CoP member list, etc.), articles, FAQs, and related sites. To help them manage their information, AFKN users and CoP members can set up alerts that will inform them when new documents are uploaded or modified, or new topics have been added to discussion forums.
To support the Air Force philosophy of being airmen-centric, certain rules must be followed within the communities. For instance, the owner of a CoP makes the decisions on who should be granted access to that community, including external contractors and suppliers.

Additionally, there is the general rule of not doing anything within a virtual environment that would not be done in a face-to-face environment. To reinforce the various rules, there is annual information assurance training.

Initially, the AFKN system emphasized information management (connecting people to information) through its document management system and discussion forums. More recently, AFKN began to see an increase in the number of requests for applications that provide collaborative capabilities (connecting people to people). The future trend appears to be connecting people to process or workflow.

**Deploying Knowledge Sharing Across the Value Chain**

As referenced above, CoPs are a major part of AFKN and the primary means by which knowledge is deployed across the Air Force value chain. AFKN supports more than 2,700 CoPs, which have more than 77,000 members. According to AFKN representatives, suppliers represent approximately 5 percent of the system users, primarily because of security constraints. However, specific CoPs can engage with suppliers and sponsor them into that CoP. For example, within the F-117 Stealth fighter program, a large government defense contractor and supplier needed to be engaged in a CoP for that program. The Air Force organization that manages that program sponsored their participation in the CoP.

AFKN supports both formal and informal communities. The formal communities go through a workshop strategy development. The informal ones are the virtual workspaces that require less support from AFKN. Both types of communities have proven to be successful. AFKN also has what it refers to as knowledge areas (KAs) (which can be thought of as “super” communities). This is a CoP within a large domain area that has several sub-communities within it. One example of this is the financial management (FM) KA. The FM KA was developed to be a one-stop shop for everyone and anyone whose job touches financial management. FM KA membership represents all of the major Air Force commands. In fact, representatives from these commands were involved in a series of AFKN workshops to design the FM KA, which accounts at least in part for this CoP’s success, according to Dave Hoopengardner (SAF/FM CKO). It was a challenge to start because by nature, financial analysts deal with numbers, not people. When launching the CoP, the champions made the value proposition for participation very clear to potential members: Connect to anybody, 24/7 access, get smarter, think faster, and carry more information more effectively. One of the unique features of the CoP is its Virtual Leadership Dialogue application, where anyone can log on and talk to a bi-annually rotating panel of select senior leaders. Culturally, this has been huge because it’s very atypical of the military with its strict chain of command. However, the champions of the FM community felt it was important that young airmen be able to talk to senior leadership as part of the need to achieve objectives, such as accelerating the learning process, and retain corporate skills.
AFKN does not manage the various communities. Instead, they provide the processes, tools, guidance, and support, while the community owners manage the operations. However, they do monitor the health of the communities because they realize that communities do have life cycles, and some must be closed when they are no longer needed.

**MANAGING THE EXTENDED KNOWLEDGE ENTERPRISE**

The CoE for KM comprises 19 people responsible for strategy, IT/tech support, community of practice support and facilitation, and partnering with other Air Force organizations and programs in support of their KM needs.

The CoE for KM also has a formal methodology for working with community owners on KM education, organizational change management, taxonomy development, knowledge process engineering, and KM governance. This methodology/model was developed as part of a cultural and technical assessment of AFMC in 2001 and has been used with great success by both Air Force and non-Air Force organizations.

**Roles**

One of the key roles in AFKN is the chief knowledge officer (CKO). The CKO plays a significantly different role than the CIO, whose primary role is to provide guidance on technical issues. The focus of the CKO includes leadership and strategy, outcomes, best practices and processes, knowledge-sharing culture, CoPs, rewards and incentives, tools and technologies, education, taxonomy, and resources. From the viewpoint of the Federal CIO Council, an effective CKO should be a transformation agent, support innovation, create a knowledge-sharing culture, champion CoPs, educate leadership, and facilitate understanding of knowledge concepts.

**Training**

As discussed previously, providing effective training is a key component to implementing the AFKN knowledge-sharing program and, more specifically, facilitating the change process needed to implement the AFKN approach to various departments within the Air Force. Although training is not mandated, it is made available to everyone who is interested and addresses each of the areas of the AFKN framework. The length of the training can be determined by the size and complexity of the Air Force organization needing a particular solution. The system is designed to be intuitive, and most people learn just by accessing the system and playing around on it. Specific training is focused on how to apply the system to address organizational knowledge needs.

**Reward and Recognition**

Rewarding successful KM users such as CoPs has been a beneficial practice for AFKN. In fact, AFKN supports both a “CoP of the Quarter” and a “CoP of the Year” award. These awards are beneficial for two reasons: First, they recognize CoP owners who are doing outstanding work and provide incentives for other CoP owners. Second, they give AFKN feedback on how the communities are being used through the nomination forms, which require applicants to list CoP achievements that occur within the time period for which the CoP is being submitted for the award (i.e., during that
quarter or year). Applicants must answer the following questions regarding their CoP to qualify for the award.

- What is the objective of the CoP?
- How was the objective accomplished or being accomplished? Please cite specific examples.
- Did use of the CoP lead to time/resource savings? Please cite specific examples.
- What processes or innovative ideas have you created using your CoP?
- How have you tailored, modified, or added to your CoP capabilities?

While receiving this feedback, AFKN also keeps the users motivated by recognizing their efforts and forwarding that recognition to their leaders as well. “CoP of the Year” winners are also invited to an annual conference in Orlando to discuss their communities with personnel across the entire Department of Defense. One of the major benefits associated with this awards process is that it has provided the AFKN team with feedback on how the systems are being utilized.

The most recent “CoP of the Year” award went to a community dedicated to the relief efforts for Hurricane Katrina. This CoP was heavily used both during and after the hurricane by the personnel involved in the relief efforts. This CoP leveraged discussion threads to increase communication capabilities and in support of planning and reporting efforts. There are 1,700 people operating this particular CoP, including representatives from the Air Force, the U.S. Army, U.S. Navy, and U.S. Marines. Another award-winning CoP is the Full Spectrum Response CoP. Benefits realized by this CoP include a two-way information exchange during disaster/terror events, 300 percent reductions for coordination for Air Force publications, delivery of critical protective equipment information to deployed airmen in real time, and offsite computer backup for six deployed organizations, which preserved extensive data during a real-world crisis.

Another form of recognition on a more individual basis is the AFKN coin. The military sometimes gives out special, customized coins as recognition for certain achievements, so AFKN has adopted this process by distributing “AFKN” coins to CoP members or to anyone they recognize as advancing knowledge management in the Air Force. The coins say “Changing the way we work together” on one side and have the AFKN URL on the other side.

Information Assurance

The Air Force has strong information assurance and security processes in place to protect classified information and define appropriate behavior within a virtual environment. The CoE for KM leverages these processes to mitigate and minimize risks around sharing classified information, whether that is in document form or in a discussion forum. The CoE provides some initial training and guidance on what is/is not appropriate and copies of Air Force policy documents on what can/cannot be done in virtual environments. Responsibility for the oversight of content and discussions then moves to individual CoP owners. However, the CoE for KM is available to provide assistance if needed. Additionally, the CoE developed a banner to remind users that they are participating in an unclassified CoP. This banner is mostly optional, but there are a few CoPs for which the CoE insists on the banner being on their community site due to the sensitive nature of that community’s work.
GAUGING THE RESULTS

AFKN currently has more than 75,000 registered users in the system and more than 27,000 documents uploaded into the system (as of the end of September 2005).

The AFKN team can measure the number of participants who have created accounts, the number of documents uploaded into the communities, the number of pages displayed per month, as well as the number of submissions received for CoP awards. They can also see how many people visit a community each day, what base they are from, and the searches they performed. Anybody within the Air Force can view the metrics for a given community, even if the community is closed. Metrics can be automatically generated on a monthly or daily basis.

LESSONS LEARNED AND THE FUTURE

To date, AFKN has been extremely successful in introducing the concepts of KM and trying to get personnel to share knowledge and information across the Air Force. Currently, the center of excellence is focusing on solidifying a KM culture across the entire Air Force and Department of Defense.

The AFKN team identified the following lessons learned from the evolution of its knowledge-sharing program.

- Creating a boundaryless knowledge-sharing culture—This concept is AFKN’s primary objective. The team’s philosophy is that knowledge and information should flow where it is needed most regardless of stovepipes or other barriers.
- Be responsive to the end user and his or her needs.
- Keep it simple.
- Pay attention to those that are interested; do not waste energy on detractors.
- Do not try to be everything to everyone.
- Keep it contextual.

Future Plans

AFKN and the CoE for KM realize the importance of identifying future objectives for the program. AFKN team members stress the importance of representing best practices, leading-edge thinking, leveraging knowledge and expertise across the organization, and continually enhancing the AFMC capabilities within the organization. AFKN is still in the early stages of implementing these objectives and eventually developing a Collaboration and Knowledge Operations (CKO) concept. The vision of the CKO concept is to create an environment that provides integrated processes, best practices, and operations designed and structured to enhance and institutionalize collaborative and innovative knowledge-enabling capabilities across the Air Force. The ultimate mission of this KM culture is to accelerate decision-making capabilities and enable superior battle space awareness through boundaryless sharing of intellectual capital. Other objectives for the CKO concept are listed here.

- Create a boundaryless knowledge-sharing culture within the Air Force. This is the number one goal behind this concept.
- Focus on connecting people-to-people, to enable tacit and explicit knowledge sharing, learning, integration, and knowledge transfer critical to Air Force knowledge superiority.
• Provide airmen and commanders with access to the intellectual capital necessary to make timely, informed decisions required to achieve desired effects and to sustain the momentum of battle.

• Institutionalize knowledge creating and collaborative policies, processes, and integrated capabilities designed to ensure knowledge flow, innovative war fighting operations, and to achieve war fighter strategies, concepts, and priorities.

• Develop innovative knowledge capabilities that enable airmen, organization leaders, and commanders to capitalize on state-of-the-art IT infrastructures and tools provided through knowledge-based operations.

The organization wants to continue to educate Air Force personnel in the area of KM to achieve its objective boundaryless knowledge sharing. The AFKN team continues to find boundaries to be removed, such as information sharing restrictions and differentiating between networks for classified information and networks containing unclassified information.
<table>
<thead>
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<th><strong>Stage</strong></th>
<th><strong>Goals</strong></th>
<th><strong>Activities</strong></th>
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<tbody>
<tr>
<td><strong>Stage 1: Get Started</strong></td>
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<tr>
<td><strong>Objectives</strong></td>
<td>• Build awareness of KM potential</td>
<td>• Develop KM strategy group</td>
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<td></td>
<td>• Develop interest and enthusiasm</td>
<td>• Link KM to key business objectives and related initiatives</td>
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<td></td>
<td>• Create the initial rationale or vision</td>
<td>• Identify resources and support</td>
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<td></td>
<td>• Identify a champion or sponsor</td>
<td>• Build widespread acceptance and understanding of KM</td>
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<td></td>
<td>• Identify high-potential opportunities</td>
<td>• Create an integrated process and people improvement strategy using KM, PI, and OL</td>
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<td></td>
<td>• Identify at-risk areas for knowledge loss</td>
<td>• Identify critical business process measures</td>
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<td></td>
<td>• Identify external benchmarks and best practices in KM, PI and OL</td>
<td>• Identify potential gains in value chain partnerships</td>
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<tr>
<td><strong>Business Case</strong></td>
<td>• Base the case on the value of knowledge</td>
<td>• Focus on building people and process capability and how KM approaches will work</td>
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<td></td>
<td>• Reflect the desire to leverage connectivity tools</td>
<td>• Reflect value of investment potential of pilots, initiatives</td>
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<tr>
<td></td>
<td>• Formal business with ROI is neither possible, nor needed</td>
<td>• Better relationships within value chain</td>
</tr>
<tr>
<td><strong>Budget</strong></td>
<td>• Redirect existing resources</td>
<td>• If possible, identify areas to share resources with process improvement and/or organizational learning</td>
</tr>
<tr>
<td></td>
<td>• Budget for education and training on KM</td>
<td>• Donate central or sponsor funding and time for design, pilots, and IT costs</td>
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<tr>
<td></td>
<td>• Include value chain partner input in strategy</td>
<td>• Mix corporate and business unit funding for pilots and/or initiatives</td>
</tr>
<tr>
<td><strong>Governance, Structure</strong></td>
<td>• Recruit initial champion or task force</td>
<td>• Include value chain partner input in strategy</td>
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<td></td>
<td>• Convene interested parties from IT, HR, and business units</td>
<td>• Develop CoE to implement and manage KM and other process improvement initiatives</td>
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<td></td>
<td>• Communicate through informal, cross-functional mechanisms</td>
<td>• Recruit senior executive sponsorship</td>
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<td></td>
<td>• Involve small advisory board</td>
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<td>• Institute a cross-functional task force or strategy team</td>
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<td></td>
<td></td>
<td>• Identify business unit liaisons</td>
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<td><strong>Information Technology</strong></td>
<td>• Champion leveraging existing technology</td>
<td>• Develop clear vision linked to corporate strategies</td>
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<td></td>
<td>• Benchmark/Assess good knowledge-sharing tools</td>
<td>• Onboard business unit liaisons</td>
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<tr>
<td></td>
<td>• Use existing communication tools where possible</td>
<td>• Develop executive sponsorship messaging</td>
</tr>
<tr>
<td></td>
<td>• Use existing communication tools where possible</td>
<td>• Create communication strategy</td>
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<td></td>
<td></td>
<td>• Develop recognition strategy</td>
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<tr>
<td><strong>Change Management</strong></td>
<td>• Develop basic concepts/definitions of KM, process improvement, organizational learning</td>
<td>• Develop clear vision linked to corporate strategies</td>
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<td></td>
<td>• Link with champions of PI and OL</td>
<td>• Onboard business unit liaisons</td>
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<td></td>
<td>• Understand organizational culture, potential barriers, and competing issues to KM</td>
<td>• Develop executive sponsorship messaging</td>
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<td></td>
<td>• Communicate benefits for practitioners and organization as a whole</td>
<td>• Create communication strategy</td>
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<td></td>
<td>• Identify and communicate current anecdotes of success</td>
<td>• Develop recognition strategy</td>
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<tr>
<td><strong>Assessment</strong></td>
<td>• Conduct feasibility assessments to understand need</td>
<td>• Conduct and/or update KM strategy alignment with business and IT objectives</td>
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<td></td>
<td>• Identify external benchmarks and best practices in KM, OL, PI</td>
<td>• Conduct role analysis for KM and other process initiatives</td>
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<td></td>
<td>• Identify critical business process measures that drive strategic goals</td>
<td>• Conduct cultural readiness assessment with relevant employee groups</td>
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<td></td>
<td></td>
<td>• Conduct vendor assessment (for IT applications and implementation)</td>
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<tr>
<td><strong>Measurement</strong></td>
<td>• Identify benchmark activity, process, and outcome measures</td>
<td>• Develop key performance indicators of potential pilot areas</td>
</tr>
<tr>
<td></td>
<td>• Note that few formal measures are possible at this stage</td>
<td>• Identify and gain buy-in on critical measures from senior management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Develop measurement and tracking systems for each pilot/initiative</td>
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<tr>
<td></td>
<td></td>
<td>• Develop roll-up scorecard for overall health of initiative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Establish baseline performance for each initiative and post-pilot performance using current process and outcome measures</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>• Capture company anecdotes of success and failure in knowledge sharing</td>
<td>• Identify and communicate current anecdotes of success</td>
</tr>
<tr>
<td></td>
<td>• Present concepts at key event</td>
<td>• Develop communication strategy for organization</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Communicate vision for improved sharing across value chain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Create short “elevator speech” on why, how, and what KM will do for employees</td>
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<tr>
<td></td>
<td></td>
<td>• Develop road show content to deliver consistent messages</td>
</tr>
<tr>
<td><strong>Tools and Processes</strong></td>
<td>• Benchmark reports</td>
<td>• Develop communication strategy for organization</td>
</tr>
<tr>
<td></td>
<td>• KM reading materials</td>
<td>• Communicate vision for improved sharing across value chain</td>
</tr>
<tr>
<td></td>
<td>• APQC KM Conference</td>
<td>• Create short “elevator speech” on why, how, and what KM will do for employees</td>
</tr>
<tr>
<td></td>
<td>• KM World Conference</td>
<td>• Develop road show content to deliver consistent messages</td>
</tr>
<tr>
<td></td>
<td>• Braintrust Conference</td>
<td>• Use criteria testing matrix to select from potential pilots</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Process and knowledge mapping</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• KM design framework for approaches to address planning and design and launch steps</td>
</tr>
<tr>
<td></td>
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<td>• Taxonomy development for consistent classification of content</td>
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<tr>
<td></td>
<td></td>
<td>• Facilitator guides for “self-service”</td>
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<tr>
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<td></td>
<td>• CoP implementation tools for consistency</td>
</tr>
<tr>
<td></td>
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<td>• After-Action Reviews to gather lessons learned from pilots</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Discussion boards</td>
</tr>
</tbody>
</table>
### STAGE 4: Integrate, Expand, & Support

- Enhance CoP competencies
- Develop integrated KM, process improvement, and organizational learning links
- Engage key value chain business partners
- Develop replication processes for process improvement programs
- Capture and publicize success stories
- Develop expansion strategy
- Develop expansion plan for action
- Enhance competencies and infrastructure
- Determine accountability and resource models
- Integrate KM into business initiatives

- Create formal business case for expansion and integration
- Create common KM, PI, and OL approaches and focus on subsequent cost savings
- Build value of investment for replication inside of process improvement function
- Require value of investment and ROI if possible

- Active senior executive sponsorship
- Common reporting structure for KM, OL, and PI
- Recruit champions and sponsors from business units
- Central CoE maintains management of processes and tools
- Develop network of knowledge/process/learning champions
- Recruit and support design teams as necessary
- IT manages infrastructure

- Integrate systems organization-wide as needed
- Implement IT to support external partners where needed
- Develop and sustain enhancements to existing platform and applications
- Ensure that compliance and security remain strong

- Integrate KM into performance management systems (individual and business units)
- Revise and sustain communication plans
- Provide training and e-learning opportunities in conjunction with KM links
- Develop sustainable implementation plans and strategy
- Create supply chain and external customer partner teams
- Build knowledge sharing into corporate competencies

- Employee/Member satisfaction assessments for each approach/initiative or community
- Encourage each pilot/community to assess alignment to initial and corporate goals
- Assess overall alignment to initial goals and corporate goals

- Create and report on overall measures using balanced scorecard or family of measures
- Develop formal ROI/value of investment where possible

- Continue communication strategy
- Communicate with value chain partners
- Set up face-to-face value chain partner forums where possible
- Develop external communication strategy to publicize results/programs

- Competency mapping for individual roles and/or job classifications
- Benchmark financial performance of value chain partnerships
- Self-directed implementation guides for facilitators for CoPs, ELS, virtual collaboration, AARs, etc.

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### STAGE 5: Institutionalize KM Across Value Chain

- Provide information, activities, and tools to knowledge workers at the point of need that furthers their effectiveness
- Seamless integration with their work practice
- Fully integrate KM, organizational learning, and process improvement into “performance program”
- Develop value chain partner performance scorecards
- Close alignment of “performance program” with business model
- Monitor health of KM activities and results
- Align performance management system with knowledge sharing
- Capture and retain valuable individual knowledge

- “Performance program” becomes part of the organization’s differentiator in marketplace
- Recognize “performance program” as value-add across business ecosystem

- Central resource and budget seen as investment; may or may not come from distributed model (e.g., business units pay into a central fund)
- Create standard budgeting process for central CoE
- Embed budgeting process inside business units
- Create budget for IT costs
- Create budget to support communities of practice

- Tools built into work flows and integrate with common applications
- Consolidation and providing one face to the user with push and search features with some room for customization
- People, process, and content available via one portal
- Make technology accessible to value chain partners

- “Performance program” seamlessly aligned with performance management systems
- “Performance program” linked to talent management and leadership development
- Embed “performance program” change agenda and knowledge experts in processes and business units
- Build “performance program” into new-hire training
- Provide ongoing recognition

- Correlate with business and human performance and responsiveness to need of workers to increase their capacity for quality and delivery
- Should be seen as pervasive rather than initiative driven so does not make sense to measure separate initiatives
- Identify links to productivity and revenue improvements, cost and cycle time reductions, etc.
- Assess health and alignment to business needs

- Separate measurement not needed
- Business metrics should reflect strong knowledge sharing, process improvement, and learning

- Communicate value chain partnership successes externally
- Make part of employment “brand” for prospective employees by communicating as differentiator for employment

- Competency mapping
- New hire training
- External partner forums

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