

Knowledge Sharing as a Strategic Asset at Caterpillar

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The Strategic Need for Knowledge Sharing at Caterpillar

Caterpillar experienced a “perfect storm” opportunity consisting of three prevailing factors:

1. The company is a highly complex, global organization with over 90,000 employees and over 90,000 dealer employees operating in over 100 facilities in over 70 countries.
2. The shifting demographics of the company will lead to a rapid drain of experience over the next few years as more senior people retire. This drain will be most acutely felt in the manufacturing areas.
3. The new company strategy calls for renewed growth and innovation in current and emerging markets.

Parallel to the initial development and implementation of the knowledge-sharing tool, a global team of managers was commissioned to develop a proposal for enabling the organization to become a learning-focused company. The team’s proposal received strong executive endorsement and the organization’s corporate university was founded January 2001 with knowledge sharing as one of three foundation elements.

The corporate university’s knowledge sharing mission was to provide efficient, reliable, and easy access to knowledge and to enable collaboration across the value chain for the purpose of improving performance. Bringing the existing knowledge sharing tool into the Caterpillar University was a strategic decision. Use of the tool quickly spread to other functional areas of the corporation, as well as through the value chain (dealers, customers, and suppliers). Goals have not changed from the original – share what we know as effectively, efficiently, and broadly as possible.

Structure of the Knowledge Network

Caterpillar, in part, met the strategic challenge for knowledge sharing and continual learning by implementing a knowledge sharing system that enables all employees worldwide to access and codify knowledge:

- *Communities of practice.* Over 46,000 employees and others have accessed one or more of the 3942 communities of practice in the last 12 months. These communities are organized around a specific business-related topic. Anybody with access may initiate a threaded discussion involving members from around the world.
- *Knowledge Entries.* People may post knowledge entries that pertain to a specific work process, tool, problem or solution, quality issue or other questions or problems. Entries are validated pieces of information that must be approved by the community manager. As the number of knowledge entries grows, so does the repository of knowledge.

- *Community Discussion.* Bulletin boards enable anyone with access including outside experts, suppliers, and partners to post information relevant to the community. People may view these bulletin boards to gain access to required expertise.

Knowledge sharing and the knowledge-sharing tool are implemented throughout the organization – functionally and globally. In addition, the concept and use of the tool are expanding within the corporation, among retirees, and among dealers, suppliers, and customers. While management and salaried employees are the primary users of the knowledge-sharing tool, it is available to anyone with the necessary security identification – including the production workforce. There are currently 184, 000 unique community memberships and 3,900 communities of practice. Each community of practice has a Community Manager -- a role that is not tied to a specific functional area or salary grade. Rather, the Community Managers are strong facilitators who are highly engaged in the subject matter of the community – salary grade is not a criterion for selection.

In a corporate culture that encourages sharing, the knowledge-sharing tool is a key enabler. Overall use has increased significantly as shown by a number of measures: number of unique users, range of use – number and nature of communities, growth rate, and functionality provided. The knowledge-sharing tool encourages informal learning and supports best practice transfer. A recent search within the tool on the term “best practices” surfaced over 1600 entries related to best practices from a broad range of disciplines and functional areas.

Because the knowledge sharing tool makes it easy to collaborate over distances, provides easy access to experts, contains a wealth of best practices and lessons learned, and is organized based on key corporate business processes, it provides a variety of additional organizational and employee benefits. Among these benefits are speed to knowledge (and use of knowledge resulting in improved performance at the individual and organizational levels); cost reduction/avoidance through leveraged use of best practices and lessons learned; and 24 x 7 availability as a forum for innovation and the generation of new knowledge. The knowledge-sharing tool provides an environment that enables people to take risks, drive innovation, and achieve higher quality results more quickly than would otherwise be possible.

Evaluation of the Business Benefits of the Knowledge Network

The intention for evaluating the Knowledge Network is twofold: first, to document the financial and intangible value the Knowledge Network creates for the business; and second, to make recommendations about how to accelerate this value creation.

There are two primary sources of benefits: one-time cost reductions and annualized benefits.

1. Utilizing the Knowledge Network *enabled business units to avoid costs* associated with purchasing additional software. These benefits will be compared with the investment that was required to create the Knowledge Network. These cost avoidance benefits will not be used in the return on investment calculations, which only include annualized benefits.

2. The Knowledge Network *produced a financial ROI* based on the business benefits created by users of the Knowledge Network. The ROI is based on annualized net benefits produced by people utilizing the Knowledge Network, factoring in the annual costs associated with supporting the Knowledge Network. The ROI analysis and program evaluation was performed by and external consultant (MetrixGlobal, LLC).

The capability of the Knowledge Network to facilitate value chain integration for Company likely holds the greatest promise for generating financial benefits. During the past 12 months we had 4,792 internal discussions with an estimated value of \$600/discussion and 4,338 discussions involving value chain partners with an estimated value of \$2,500/discussion for a total of \$13.7 M in annualized benefits.

Cost Avoidance

Establishing the system capabilities of the Knowledge Network obviated the need for purchasing certain software applications. There have been several instances in which business / IT groups have avoided additional investments in software by instead utilizing existing capabilities of the Knowledge Network. Only the financial benefit that is directly attributable to the Knowledge Network capability will be documented.

The manager of the Knowledge Network was contacted by Company business and support people throughout the year regarding the capabilities of the Knowledge Network. In many cases significant expenditures of software, hardware and services were avoided through the business and support groups being able to utilize the Knowledge Network for their needs. These savings are summarized below:

Area of Cost Savings	\$	Savings
Business Risk Management	\$	200,000
Global Mining Group	\$	26,750
Total	\$	226,750

A total expenditure of \$ 226,750 was avoided by utilizing the Knowledge Network. These are considered to be one-time savings and not included in the ROI analysis.

Return on Investment

The Knowledge Network enables people to quickly engage the expertise and knowledge necessary to solve complex technical problems. An employee joins a community of practice, initiates a discussion thread and interacts with other community members who contribute ideas and resources to the discussion thread. Quickly collaborating with people with no geographic limitations enables the discussion issue to be addressed more quickly and, in many cases, differently than would have happened without using the Knowledge Network.

Evaluating financial benefits was performed by the external consultant and was done on a case-by-case basis for two communities of practice. One community was selected, the bolted joints and fasteners community, because it was a mature community, one of the five most active communities and dealt with the core of the business. The second community was selected, the Company dealer service training community, because it was one of the newer communities, was less active and dealt with a support group.

The threaded discussions of each community were examined and selected for inclusion in the study if there was at least one response to the thread originator and the thread was not merely informational in nature, e.g., distributing meeting notes or giving notice of a meeting. There were a total of 252 members in the bolted joints and fasteners community, of whom 24 were selected for inclusion in the study. One person declined to participate in the study resulting in 23 discussion threads being explored for this study (96% response rate). There were a total of 96 people in the dealer service training community, of whom 5 were selected for the study and 5 participated (100% response rate).

A researcher contacted every originator of a thread and asked him or her a series of questions according to an interview protocol. The interviews examined how the issue was successfully concluded, what benefits were realized, how the Knowledge Network contributed to these benefits and documented estimations of how utilizing the Knowledge Network contributed to these benefits. The isolated effects of the Knowledge Network were estimated on a percentage basis and an error of this estimation (also a percentage) was included in the analysis. The total financial benefits were discounted by these two estimation percentages.

Results (25% of total score)

The study examined five areas of potential benefits: Personal productivity, the productivity of others, speed of problem resolution, cost savings and quality:

Personal Productivity: This was defined as the number of hours saved because the Knowledge Network was used. Respondents compared problem resolution using the Knowledge Network to traditional problem solving approaches.

Productivity of Others: This was defined as the number of hours of time that others saved as a result of the thread initiator resolving the issue utilizing the Knowledge Network. Without the Knowledge Network, the person with the issue would have called others in his or her personal network in an effort to resolve the issue. Many of these calls would have produced negligible results, wasting time for both parties.

Speed: Speed of Problem Resolution was defined as benefits produced as a result of accelerating the achievement of the solution by using the Knowledge Network. In one example, a production supervisor rapidly gained needed expertise to resolve a problem. A new product production line consisting of three workers had ground to a halt without a solution to this problem. Utilizing the Knowledge Network got the problem solved and the line back in production.

Annualized Cost Savings: Cost Savings was defined as how the use of the Knowledge Network contributed to reducing annualized costs. In one well-documented example, a respondent utilized the Knowledge Network to redesign a part for cylinders used in telescopic handlers. This person said, “If they had pursued the original design, the product would have failed in the field. This would have led to big rework costs.” Several people in Company engineering and finance determined just how big the cost would have been. Blueprints of the part in question were obtained and experts consulted in determining the cost.

Quality: The use of the Knowledge Network to improve the quality of the product was documented. For example, a thread initiator was about to upgrade the specifications of a part. He first initiated a discussion on the Knowledge Network and received a wealth of information that he would not have received without the Knowledge Network. He incorporated many of these ideas into the redesign, significantly improving the quality and customer acceptance of the part.

Calculating the Return on Investment

The monetary benefits were tallied for each community (after eliminating the highest single monetary benefit in each community to be extra conservative). The costs were determined for each community and the ROI was calculated.

Bolted Joints and Fasteners community

$$\text{ROI} = ((\$51,131 - \$16,380) / \$16,380) \times 100 = 212\%$$
$$\text{BCR} = \$51,131 / \$16,380 = 3.1 : 1$$

Dealer Service Training community

$$\text{ROI} = ((\$52,291 - \$6,240) / \$6,240) \times 100 = 738\%$$
$$\text{BCR} = \$52,291 / \$6,240 = 8.4 : 1$$

Lessons Learned and Improvements Implemented

- Importance of ease of use – the redesigned user interface was an improvement as the target audience for the tool broadened.
- Document management and archival – increased use resulted in significant increase in the number of documents to manage. A new process was designed and implemented to enable community managers to review and archive information on a regular basis. Archived documents remain available to community users, but in a separate area of the community.
- User interface “in language” – originally, the user interface was available only in English (although the documents and discussions within a given community were in other languages). As use of the tool spread, it will be increasingly important to

provide the user interface in languages other than English. Currently, the user interface is available in 9 languages.

- Further expansion to dealers, suppliers, customers, and other affiliates.
- Need for integration with/ direct “connection with” the corporate learning management system – such integration will enable combining the power of formal and informal learning.