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Sustaining Knowledge in the Neutron Generator Community and Benchmarking Study

Tameka C. Barrentine, Jennifer Turgeon, Julia T. Schneider, Esther Baldonado, William A. Stubblefield, Bryan C. Kennedy, and Antony W. Saba.

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Sustaining Knowledge in the Neutron Generator Community and Benchmarking Study

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Abstract

In 2004, the Responsive Neutron Generator Product Deployment department embarked upon a partnership with the Systems Engineering and Analysis knowledge management (KM) team to develop knowledge management systems for the neutron generator (NG) community. This partnership continues today. The most recent challenge was to improve the current KM system (KMS) development approach by identifying a process that will allow staff members to capture knowledge as they learn it. This "as-you-go" approach will lead to a sustainable KM process for the NG community. This paper presents a historical overview of NG KMSs, as well as research conducted to move toward sustainable KM.

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CONTENTS

FIGURES

NOMENCLATURE

AWE	Atomic Weapons Establishment
BP	British Petroleum
CIP	Critical Infrastructure Protection
COP	Community of Practice
CRM	Customer Relations Manager
CTF	Central Technical File
DDM	Design Definition Manager
DOE	Department of Energy
EDF	Electricity of France
ESSP	Employee Safety and Security Program
FDA	Food & Drug Administration
FTE	Full-Time Employee
FY	Fiscal Year
HP	Hewlett-Packard
HR	Human Resources
HTML	Hypertext Markup Language
IKA	Integrated Knowledge Architecture
IMS	Image Management System
JOWOG	Joint Working Group
KB	Knowledge Broker
KPP	Knowledge Preservation Project
KM	Knowledge Management
KMS	Knowledge Management System
KM-SAL	Knowledge Management Streaming Asset Library
NAVSEA	Naval Sea Systems Command
NDA	New Drug Applications
NG	Neutron Generator
NISAC	National Infrastructure Simulation and Analysis Center
NTTL	Neutron Tube Target Loading
NWiE	Nuclear Weapons Information Environment
OAA	Office Administrative Assistant
OP	Operating Procedures
PMF	Performance Management Form
PRT	Product Realization Team
RNGPD	Responsive Neutron Generator Product Deployment
RTA	Roads & Traffic Authority
SEA	Systems Engineering and Analysis
S-Drive	Shared Drive
SKM	Sustainable Knowledge Management
SME	Subject Matter Expert
WFS	Web FileShare
WI	Work Instructions
WIP	Weapon Intern Program

EXECUTIVE SUMMARY

Knowledge management (KM) has proven essential to many organizations across Sandia and across industry as a whole. It houses information from the past and provides momentum and decision-making power for the future. KM is the window into an organization, providing a thorough view of all that is embodied within a community. The Neutron Generator (NG) organization has found much value in KM, and continues to strive toward improving its preservation of critical organizational knowledge. The NG organization believes that KM is crucial to its survival. One scenario, described below, is an example of a KM problem that occurred in the NG organization.

> *A major problem has occurred during NG production. The neutron tube is experiencing run-out of the braze joint. (A braze run-out occurs when braze material runs out across the metal surface and into other areas outside of the joint.) This is a problem because other areas of the tube need to be free of braze material. Run-out causes cracks and poor tube strength. Production engineers have been tasked with researching the causes of this braze run-out. They decided to run experiments on joint pressure and furnace temperature to see how these constraints affect braze run-out. While consulting with others about these experiments, they learned that these experiments have been performed before. The engineers searched for documentation of the experiments and the results, but did not find anything. They spent weeks running experiments that included adding more weight to the subassemblies and tweaking the furnace temperatures to solve the problem of braze run-out. Since there was no documentation to be found, past experiments were repeated, wasting time and money.*

While the specifics of this example are unique to the NG community, repeating what was done in the past is one example of KM problems found in other organizations as well. There is another implicit problem presented in the scenario above: what will the engineers do with the new knowledge and data collected from the recent braze run-out experiments? Without a KM process in which everyone understands when to document and where to save documentation, the problem of repeating experiments will continue to occur.

The Responsive Neutron Generator Product Deployment (RNGPD) department has been taking steps to ensure that information does not get lost by enlisting the Systems Engineering and Analysis (SEA) KM team to develop its KM systems (KMSs). These systems are an effort to capture the experiences and research of experts in the NG community. The current approach is to capture knowledge from experts through interviews, and to preserve their knowledge through web sites, SAND reports, or similar documents. Interviews capture experiences from a high level, but the detailed, contextual information is often lost over time. Timeliness is important to this process, and using an interview approach as the sole mechanism for knowledge capture often leads to information gaps. This issue initiated the research towards a sustainable knowledge management (SKM) approach that allows engineers and scientists to capture their expertise and critical data.

This report presents the research conducted to identify possible paths towards an "as-you-go" approach to a SKM program for the NG community.

Part 1 gives a brief introduction to KM and the historical approach to KMSs developed by the SEA KM team for the NG organization.

Part 2 presents the fieldwork conducted to understand the KM needs of the NG community and benchmarking research conducted to identify how other organizations address the KM challenge. This section includes interview information from NG staff members and KM project leads at Sandia. It also presents the results of the KM Team benchmarking efforts.

Part 3 presents recommendations for a suitable KM approach in the NG organization that will help it move towards an SKM process. These recommendations are based on the fieldwork and research conducted.

PART 1: INTRODUCTION

What is Knowledge Management?

The Systems Engineering and Analysis (SEA) knowledge management (KM) team defines KM as a community's process of sharing and consistently documenting the flow of critical information throughout s product's lifecycle.

The SEA KM team has been developing KMSs for the NG organization to capture the expertise, experiences, and research on work significant to the design, development, and production of NGs. These systems are an effort to ensure that critical information is preserved.

Why Knowledge Management is Critical to the Neutron Generator Community

A wide range of specialized expertise is necessary to design, develop, and produce NGs. Various types of equipment, processes, and procedures encompass the entire NG effort. It is critical to ensure this knowledge is captured and preserved for the future.

For KM to be successful, it must efficiently capture and preserve information and align with the NG Center's business values and objectives. The current business objectives for the NG Center are as follows:

- Deliver – Realize NGs, NG monitors, and switch tubes
- Learn – Grow NG Center's employees
- Know – Understand NG Center's products
- Think – Manage NG Center's risks cost effectively
- Improve – Create and deploy responsive production systems for the Laboratory

KM supports these objectives and provides the NG Center with a documented understanding of its designs across the center, while also reducing redundancy from repeated research. Overall, using KM supports the NG Center by documenting design intent, reducing redundancy, improving the ability to learn from past experiences, increasing productivity and efficiency, increasing employee satisfaction, reducing time for research efforts, and reducing costs.

Understanding the Design Intent

When designing components for nuclear weapons, many experiments and tests are conducted to ensure the integrity of the design. The rationale for many design decisions is not evident in the design itself, but may stem from an effort to improve manufacturability, reliability, longevity, or other product qualities. It is important to document the procedures and results of these experiments so that future designers can expand on past findings.

Business objective(s): Know, Improve

Reducing Redundancy

The potential for unnecessarily repeating projects and experiments increases when information is not documented and accessible to researchers for future use. Without documented and accessible information, the amount of time and costs to develop a process or product increases. Redundancy is costly and increases the risk of repeating past mistakes. KM provides a mechanism for storing and retrieving critical knowledge.

Business objective(s): Deliver, Think, Improve

Improving the Ability to Learn from Past Experiences

KM involves preserving information for future use so that an organization will be able to learn from past experiences. KM documents these experiences to ensure they are captured for use as future learning tools.

Business objective(s): Know

Increasing Productivity and Efficiency

KM increases productivity and efficiency by:

- Reducing the amount of time necessary to find relevant information that supports research and assists with troubleshooting.
- Providing a consistent process for the documentation and storage of information deemed critical by the organization.

Business objective(s): Deliver, Improve, Think

Increasing Employee Satisfaction

Day-to-day work can be less complicated when a KMS is in place that is well understood and used across the organization. Employee satisfaction is increased because:

- Employees are rewarded for their KM efforts and therefore feel they are making a difference
- KM processes encourage employees to learn from each other
- KM allows employees to feel an increased sense of community

Business objective(s): Learn

Reducing Time and Costs

Reducing the amount of time to find information, as well as redundancy, correlates with a decrease in costs. Redoing an experiment could take weeks or months, but reviewing the documentation from a past experiment could reduce this effort to a matter of days.

Business objective(s): Deliver, Improve, Think

History of Neutron Generator Knowledge Management Systems

The Responsive Neutron Generator Product Deployment (RNGPD) department management team has been actively ensuring that critical knowledge about neutron generators is documented and archived for future use. In 2004, members of the RNGPD management team identified the need for a Neutron Tube Cleaning KM site because the two Sandians most knowledgeable in the subject had already retired. Fear that the NG community might forever lose this knowledge made this a critical activity. In response to this need, the RNGPD enlisted the SEA KM team to assist with a solution.

In general, the process for building these systems was to interview subject matter experts (SMEs) in the field about their research and experiences. The interviews were documented and reviewed by others in the field. The information was then reviewed by a technical writer and a derivative classifier to check classification. Once the information had been thoroughly reviewed, it was placed in a domain-specific website. This approach ensures that multiple people contribute to the content and that information pertaining to a particular domain does not get lost.

Although this process was a great step toward preserving critical knowledge, there were gaps in the process. The RNGPD management team requested that the SEA KM team improve the existing process by developing an "as-you-go" approach to knowledge capture.

As-You-Go Knowledge Management Systems

The problem with interviewing retired Sandians and other staff members is that the interviews are conducted after the fact. Past KM team experience has included interviewing engineers and scientists who worked on the project years ago. These SMEs were asked to recall what happened and what they learned in the past. Often, key contextual aspects of decisions were forgotten. Conducting interviews years after a project greatly increased the chances of not capturing the entire story. As a result, the existing KMSs may be missing pieces of the puzzle.

Another problem encountered when capturing knowledge after the fact was the lack of proper documentation about what occurred during meetings, experiments, and other activities that led to an important decision. Missing documentation can lead to redundant activities, especially when more time and money is spent repeating activities that were already performed in the past.

An "as-you-go" approach to knowledge capture means that engineers and scientists capture the knowledge as they learn it. For example, if a problem occurs on the production floor, the problem, steps taken to correct the problem, and solution are captured immediately while it is still fresh in the minds of everyone involved. Capturing this information while it occurs makes for more complete documentation that could assist people who may encounter the same problem in the future.

In fiscal year (FY) 2006, the KM team was tasked with continuing to develop the existing systems, but to also experiment with the as-you-go approach. During this time, the

Neutron Tube Target Loading (NTTL) process was being transferred from Los Alamos National Laboratories to Sandia National Laboratories. Since this would be a new process for the NG organization, it was decided that capturing the move would be a beneficial KM as-you-go pilot project. Some of the Sandia engineers and scientists assigned to this transition were new to the NTTL process. The idea was that someone new to the process might identify additional information to document that someone very familiar with the process would automatically assume and therefore not record. In addition, the transition of laboratories and processes from Los Alamos to Sandia was an ideal time to capture as-you-go knowledge.

This pilot was initiated to determine if an SME in the NG community would consistently document information about day-to-day activities related to the Target Loading transition. To be successful, a tool was needed that would be easy for the SME to use with little or no training. A "wiki" appeared to be the best tool for the KM pilot project. A wiki is essentially a webpage that can be edited by anyone. The user does not have to learn Hypertext Markup Language, but there is a minimal markup language used to create wiki pages. The wiki was given to the person in charge of the NTTL mission move, and they were told to use it however they wished. The wiki quickly evolved into an electronic notebook and a job request tool.

The pilot project was conducted throughout FY 2006. Final findings from the project indicated that it is possible for a SME to find time to document information on a consistent and timely basis. However, it was evident that the KM wiki experiment was successful because the person in charge of the wiki understood the importance of preserving the information. Without a KM champion or leader (whether from the subject matter community or the KM community), there is little chance of this method succeeding. One reason is the problem of creating a large amount of critical information. Without a large amount of useful information, the average user has little incentive to adopt the system. Not everyone will take the time to document information about their work unless they see value in the activity.

Purpose of Sustainable KM Research

The success of the sustainable KM (SKM) wiki was a first step toward building an SKM in the NG community. The KM team was then tasked by RGNPD management to look at the bigger picture and identify a KM process for the entire NG Center.

The purpose of the SKM research project was to investigate KM practices across industry; to understand KM needs in the NG community; and to identify an improved set of KM processes, agreed upon by the NG community, that fosters knowledge sharing and supports continued research and development of products. Part 2 of this report presents the research conducted and the results identified from this SKM research.

PART 2: SUSTAINABLE KNOWLEDGE MANAGEMENT

Developing an improved KM program inevitably requires changing the corporate culture. In order to fully understand the KM needs within the NG community, the SEA KM team interviewed a number of individuals in the organization to understand how information and knowledge was currently being shared and documented. The intent was to create a KM process with minimal impact on the existing organizational culture. The approach to starting this project involved:

- Interviewing members of the NG community that could give a perspective on how KM was currently performed
- Reviewing other KM tools, processes, and programs at Sandia/NM to understand their strategy, the problems they solved, and possibly leverage these programs into a new SKM
- Benchmarking KM processes and tools external to Sandia National Laboratories to identify KM standards and practices that might be beneficial in the NG community.

Fieldwork Observations

Approach

To fully grasp the needs of the NG community, the SEA KM team conducted interviews to understand the current state of documentation and knowledge sharing. RNGPD management identified current staff members to interview. Product Realization Team (PRT) leads were also interviewed. PRT leads offered a variety of perspectives within the NG community because they lead several teams within a variety of domains. Some production engineers were interviewed as well.

Other non-NG staff members across Sandia National Laboratories who work on KM projects were interviewed. The SEA KM team spoke to different KM project leaders at Sandia to understand their strategies and to determine how to leverage existing systems and processes within the Laboratory.

Problems

While investigating the current state of documentation and knowledge sharing, several recurring issues were identified. Interviews uncovered potential problems in the following areas: standardization of KM processes, consistent use of those processes with a predetermined set of tools, and establishment and use of collaborative environments.

Document Management

Multiple repositories are used to store project and product documentation. The NG community tends to use the following as repositories most frequently: Design Definition Manager (DDM), Web FileShare (WFS), Image Management System (IMS), and the Shared drive (S-Drive). However, not everyone uses these repositories or even knows they exist. As a result, people do not know what documents are available and where they are located. There are no standards or processes for how to use the repositories, how to

categorize information within the repositories, or what types of documents should be stored. In addition, each of the repositories has unique complications that inhibit easy use.

Design Definition Manager

DDM is the repository for all required documents such as work instructions (WI) and operating procedures (OP). The problem with DDM, which was repeatedly mentioned during interviews, is the difficulty of finding documents in the repository. One contributing factor is that the search function does not enforce metadata. A person can submit a document to the system without providing important information, such as a title, author, or description of the document. If the document has no metadata, there is no way to search for it. A repository is useless if documents cannot be efficiently retrieved from it.

Web FileShare

Of the people interviewed, very few used WFS. The few who knew of WFS preferred not to use it, stating that the user interface is not intuitive and that there is a large amount of metadata that must be completed to submit a document. Interviewees also mentioned not being able to find the document they are looking for in WFS, even when they know it is in the system.

Image Management System and Shared Drive

IMS and the S-Drive elicited few negative responses from interviewees. IMS is a well-used tool in the NG community. It was evident that most interviewees understood the S-Drive is not a long-term solution to document management, but it is very easy to use. The S-Drive is basically a shared folder structure of files that anyone in the NG community can use to track and share documents. The S-Drive has been used for years in the NG community and it is massive. There is no systematic method for identifying how files are stored or which files should go into the S-Drive. Additionally, there is no maintenance of the files.

Capturing Knowledge

The first step to ensure knowledge is preserved is to capture and document it. Not everyone in the NG community writes down or records what they know. Not capturing knowledge causes redundancy in all aspects of work because activities that have already been done before are repeated, resulting in lost time and money. A couple of quotes from the fieldwork on the topic of capturing knowledge were very interesting:

> *"If you weren't there, it's like it never happened."*
>
> *"75% of the work currently being done has been done before."*

These strong quotes imply that staff members know some of the work they are currently doing has been done before. This is a major problem when the manufacturing goal is to reduce production realization time and decrease costs. Employees must document their experiences so their work will be more productive and they can move toward innovative work activities.

Documentation is also the key to understanding why certain things were done in the past. Thorough documentation of activities, conducted as the activities occur, can positively influence future activities. Staff members are currently using weapon requirements that have been passed down through the years. Since the design intent behind these requirements was lost, employees take a conservative approach and treat these requirements as if they are written in stone and are never to be changed. This "better to be safe than sorry" approach creates potential bottlenecks in improving current production processes. If employees in the past had fully documented the rationale behind the requirements, future staff members would understand their intent. The current problem is that staff members do not know why certain requirements exist, and are thus too afraid to change them. The cycle of no documentation continues, because employees who want to modify the requirements are not capturing their insights, either.

Sharing Knowledge

One of the first lessons children learn is to share, but in the adult workplace, sharing can be uncommon. This is probably a result of everyone working on their task and towards their own personal goals. In the workplace, people are typically praised for being experts in their field. Those regarded as the ultimate source for critical knowledge receive accolades for their accomplishments. While this seems positive, it tends to reward knowledge hoarding. If one shares his or her knowledge with others, they no longer receive the same praise or status of being a "subject matter guru." Recognizing those with critical knowledge is not a bad thing; however, to shift cultural behaviors towards a more collaborative environment, it is better to praise the consistent and timely sharing of knowledge and the mentorship of newer staff members. At the moment, there are no incentives for sharing knowledge with others.

Another problem is the barrier of knowledge sharing between the operator and the engineer or scientist. There is little sharing across job levels, which can hinder work progress and continue the communication breakdown in the community. Job-level sub-communities begin to operate in a vacuum, causing miscommunication and lack of understanding across the entire community. Sharing with others helps build a sense of connection, which, based upon interviews, is currently lacking in the NG community.

There are known experts throughout the NG community who have a great deal of experience and have been working on a component or a process for many years. Even those new to the organization quickly become SMEs when they specialize within a small product or process domain. This singular expert practice can cause problems within the NG community. When only one SME has knowledge about a system, problems occur if that person leaves the organization or goes on vacation. Tying work production to a SME creates bottlenecks and often stops work until the SME returns. It is essential that more than one SME is familiar with tools, systems, or processes critical to production.

Standards and Processes

Staff members might document and share knowledge more frequently if they knew when and how to do so. Without a structure or process, documentation will not be consistently produced. There are many tools in the NG community, but not all employees are aware of them or how to use them. There are processes for quality and required documents, but not

everyone creates formal documentation. What about informal documents? There is no standard for when and how to preserve knowledge.

Additional Issues

Another issue mentioned during the interviews was all the data collected in the past. Old data exists on microfilm in the library and is stored "in the mountains." Scattered information that came to the NG group when NG production was moved from Pinellas to Sandia exists in multiple locations, often on systems that are no longer easily accessible due to technology changes over the years. This data is hardly ever reviewed because it is very difficult to obtain.

Other factors that contribute to documentation and knowledge-sharing problems are time and money. Staff members are so busy with their everyday work that they feel there is no time for documentation. There are also complaints of no money for documentation, because documentation costs are typically not factored into project costs. The overarching problem is that documentation is not regarded as a natural part of work activities and therefore employees do not make time for it. Documentation is viewed as something above and beyond their work assignments.

Current State

Current Processes

The NG community is made up of PRTs that are responsible for a particular weapon system. Each PRT has a lead that is required to provide documentation. Each PRT lead has a process for documentation unique to the PRT. Some PRT leads document every week, and others document when there is a meeting. Some PRT leads use tools and others just use email. There are no organizational standards or guidelines for the PRT that define what needs to be documented, or how or when information should be documented.

One clear process that is consistently used in the NG community is what to do when a problem concerning production occurs. A problem is one of the main triggers for documentation. When a problem occurs, staff members will typically brief the management team by giving a presentation. Staff members also conduct a kaizen event, a process improvement event, or a meeting where they work on the steps to solve the problem. After the problem has been resolved, staff members move on to the next step in their process. Final decisions are documented through presentation slides or diagrams and other outputs from kaizen events; however, there is typically no concrete documentation of the events that led to and revolved the problem. Additionally, final documentation of resolutions to these problems may be scattered in multiple repositories or multiple locations within a single repository.

Finding Information

The SEA KM team asked interviewees how they go about finding information needed to support their daily work and research. It is clear that staff members primarily rely on each other to find information. According to the interviewees, finding information always begins with asking an expert or the author of a particular paper. Staff members do not typically go to the library or search a document repository. Instead, they always approach

their peers. This method of information discovery supports a collaborative environment, but also tends to reward those who "own" the critical knowledge. Thus, information and knowledge flows through a "pull" rather than "push" model.

Building Community

The interviews suggested that many in the community are exclusively focused on their particular task and that there is not much time for anything else. Of course, each project has team meetings, but there is not much knowledge sharing across departments. Meetings tend to reflect status more than in-depth discussions on issues. The consensus of the interviewees indicated that most wished there were more opportunities for knowledge sharing within the community. Some example knowledge-sharing opportunities might include conferences, workshops, brown bags, and technical talks. Having people come together helps employees learn from each other, as well as feel they are a part of the community. It is important to include social activities as well, so that people enjoy coming to work and being a part of that particular community.

Critical Information

Not all information needs to be documented. One documentation challenge is capturing the right amount of information to be preserved. The following is a list of responses when the interviewees were asked what is considered critical information to capture:

- Anomalies to production
- Information consistently passed verbally that is deemed "tribal knowledge"
- Knowledge stuck in someone's head (unique to the individual and not documented)
- Rationale behind why things were done in the past
- Performance margins
- Product information

Knowledge Management Systems

In addition to interviewing employees in the NG community, the SEA KM team also interviewed staff at Sandia working on knowledge management projects across the laboratory to learn, as well as possibly utilize, each others' services.

Nuclear Weapons Information Environment Portal

During interview sessions with PRTs, the Nuclear Weapons information Environment (NWiE) portal was identified as a tool occasionally used by individuals in the NG community. The KM team was told it was a very useful tool and a form of knowledge management. The NWiE portal developer was interviewed to understand how the NWiE portal is used and why it was developed.

NWiE is a portal of information related to the nuclear weapon stockpile. It was developed to ensure the consistent identification of critical documents related to components within the stockpile and to support documentation compliance. The portal contains all required documents for weapon systems. The portal users interviewed during the fieldwork sessions felt the portal was easy to use. It is a useful tool because it provides access to all data repositories related to weapon systems information; a user can search any of the

repositories with the NWiE tool. In the future, the portal development team plans to take it a step further and provide a federated search of the data repositories. This would allow the user to submit one search and receive results from multiple data sources. Any KMS used will need an advanced search function. Therefore, the KM team is interested in any future search technology that is used for the portal.

Technical Library

Librarians have been knowledge managers for years. The librarians at the Sandia/NM technical library were interviewed for their insight on the KM problem, as well as to learn about how information at Sandia was managed in the past.

Times have definitely changed since the dawning of the computer age. In the past, all informal and formal documents were sent to a distribution list in the form of a memorandum. The memorandum would include all those who needed a copy, and a copy was always sent to the Central Technical File (CTF) located in the technical library. This process ensured that all documents were archived and managed by the technical library. The CTF was a system for informal and unpublished documents. Organizations at Sandia would send their informal and unpublished documents to the CTF and a librarian would filter through the documents and categorize them correctly. The librarian would then create an index to the documents for easy retrieval.

An interesting observation of the librarians is that currently, everyone is essentially their own secretary. The process above began with the distribution of a memorandum. In the past, the memorandum would be written by a secretary. Secretaries ensured that everything was documented, distributed to the right people, and appropriately archived. Currently, there is no secretarial staff, and all employees are responsible for writing documents, ensuring others can access them, and archiving or maintaining them appropriately.

Another interesting point made during the discussion was that as Sandia's line of business has grown, it is harder to share knowledge and keep track of documentation. In the past, Sandia had only one line of business: nuclear weapons. Everyone knew how things were categorized and everyone understood the domain. Sandia has grown since then and is now multidimensional. It is impossible to know where everything goes and for everyone in the laboratory to know everything about the different domains.

The librarians have an interesting perspective on knowledge and documentation. From them, the SEA KM team gained that there must be someone in charge of the knowledge captured and documented. This individual must be able to filter the information and ensure the knowledge is stored properly and accessible to others.

The library provides services that could benefit the mission of creating better documentation to be preserved for the future. For example, the NG community has a convention of naming their documents by number (e.g. FD26329). There is no way for a person (other than the one that created the document) to know what is in the document by looking at the title. The library could help the NG community develop better naming conventions for documents.

Knowledge Preservation Project

The Knowledge Preservation Project (KPP) is a knowledge video capture project to secure weapons knowledge from experts. It was initiated in response to a Department of Energy (DOE) study regarding the passing of weapons knowledge to new engineers. In the past, knowledge was passed down to engineers using a master-to-apprentice approach. The system was successful until the discontinuation of new weapons production. Eventually, SMEs began to retire and department transfers occurred. While new weapons were no longer being built, it was still crucial to pass this knowledge on to new generations. The solution was the Weapon Intern Program (WIP) and KPP. The WIP is a one-year program where new engineers travel and learn from retired weapons engineers.

For the initial KPP effort, management at the laboratories put together a list of people that were critical to interview on video. Other employees then began recommending people to interview. Initially, the interviews were a general, "tell me about your experience at Sandia" collection. This captured too much information, so KPP developers began conducting interviews with a panel of experts discussing weapon systems. There would be an engineer, preferably someone who was not in the same community, who moderated the interviews. The KPP developers learned that if the moderator was an engineer from the NG community, everyone would speak in acronyms and there was a risk that important pieces of information would not be preserved.

The videos from KPP have been transcribed and are stored in the Knowledge Management Streaming Asset Library (KM-SAL). KM-SAL allows a keyword search on the transcript. The videos from KPP are used, but recently there has not been much video capture from past experts. The KPP project lead believes that capturing current knowledge is preferable. Instead of interviewing a senior expert on their way to retirement, current events should be captured. This practice aligns with SKM goals. The KM-SAL technology could be leveraged by using KPP and KM-SAL for as-you-go video capture. For example, the NG community could videotape briefings to management regarding identified process and product "problems" and the resolutions to those problems. Video capture of critical operations in the NG community might also be useful.

Brain Bank

Another knowledge management tool in the NG community was started as a grassroots effort. A group of designers and staff in NG production began meetings to discuss design issues and challenges. This team convened weekly and an individual outside the NG community with an engineering background would take notes at all meetings and document discussions on a website. The website included a full-text search of meeting notes and documents on the website. This has been a sustainable process because it has continued for 10 years. Formally, this process is called a Community of Practice (COP), where groups of people in organizations come together to share what they know and to learn from one another.

Critical Infrastructure Protection Knowledge Management Portal

The Critical Infrastructure Protection (CIP) KM portal is a one-stop shop for CIP analysts, modelers, and administrators. It provides a comprehensive, integrated view of CIP knowledge, including documents, reports, simulations, analytical models, data sets, project and program information, policies, and analyses. The CIP KM portal has a searchable and navigational scheme that is useful for the National Infrastructure Simulation and Analysis Center (NISAC) team. Other features include drag-and-drop capability, default metadata, a taxonomy manager, and a wiki component. The project lead for the CIP KM portal shared the challenges and lessons learned for developing a KM initiative.

The biggest challenge for the CIP KM portal team was to get users to adopt the tool. The social barriers, understanding the culture and fitting a KM process into the culture, to KM and difficulty defining the KM process were huge hurdles. The key was to make employees understand how using the portal would make their lives easier.

Another observation about the CIP KM portal is that it is starting to experience the problems associated with a large corpus of unmaintained data. As documents age someone needs to decide when and how to archive them. As a body of documents on a topic accumulates, ensuring the knowledge is useful may require synthesizing, analyzing, and condensing the documents. In a sense, documents are accumulated in the portal, but are not managed in any meaningful sense of the word.

Final lessons learned from this interview were:

- The KM team must know the group and understand its culture.
- The KM tool must be useful and easy to use.
- Management support is essential for the tool to be utilized.

Knowledge Management Solutions based on Neutron Generator Community Interviews

During interviews with members of the NG community and KM project leads at Sandia, many ideas for KM solutions were identified. The following is a list of solutions towards sustaining knowledge in the NG community. More details regarding some of these solutions are discussed in the Recommendations section.

- The KM tool chosen to assist the process must have advanced search capabilities.
  - "Recommended documents" feature similar to Amazon's "recommended list" feature
  - Browse and search capability, such as faceted metadata
  - Ability to search multiple repositories
- The KM process must have a knowledge leader such as a domain librarian, curator, editor, or information steward.

- Knowledge, whether residing in staff, or recorded in websites, reports, or other documents, should be treated like any other resource. Every effort should be made to extract the maximum value from it.
- Useful aids could assist the KM process.
  - Webpage of kills and expertise
  - Image database of problems, lessons learned, etc.
  - Knowledge index or catalog for document repositories
  - Equipment database
  - Lessons learned database
  - Desktop reference or job aid for a new employee
- Management must enforce the KM solution.
- Management must convey a clear vision/business practice.
- Incentives and rewards for knowledge sharing should exist.
- Management could be involved in the review and approval process.
- Better naming conventions for documents would improve document retrieval.
- Using templates may force employees to capture only the critical knowledge.
- An ideal structure for documents would be organized by document number and title.
- A list of documents without context is not useful.
- A notification mechanism would be useful to let people know when documents have been added to the repository.
- Job shadowing would benefit new employees.
- Use a two-in-a-box system where two people are responsible for a process or product to cover manufacturing processes.
- Mentor new engineers to help them quickly understand the domain of their job assignment.
- A defined process for information management in the NG community would provide consistency.

Benchmarking Study

KM is an issue that many companies are tackling, especially because many of the baby boomers are retiring. Another step towards defining a KM process for the NG community is to survey what other companies are doing for KM. A benchmark study was conducted to identify best practices and standards for KM activities and to gather ideas for creating a KM program at Sandia.

Company Profiles

For this benchmark study, KM case studies of different companies were researched to gain a broader prospective of KM activities in industry. Case studies were purchased from Arkgroup, as well as Gartner. Additional KM case studies were found via a public web search. The KM team reviewed many case studies and selected 25 companies on which to focus. Listed in alphabetical order below is a brief summary of each company assessed. The top five companies that the KM team rated as outstanding are elaborated upon in the Benchmark Results section.

Arup
Arup provides engineering design, planning, and project management services [1]. It has 7,000 employees and 70 offices worldwide. Arup's KM solution is to use communities of practice. Communities are expected to exchange knowledge and information, and to facilitate learning in their skill area. Each community is tasked with reflecting on and learning from project experience, acting as custodians of the Arup knowledge base by looking across project experiences, and reviewing external knowledge to find the best practices.

Baker & McKenzie
Baker & McKenzie is a leading global law firm that has been providing sophisticated legal advice and services to many of the world's most dynamic and global organizations for more than 50 years. There are 3,000 employees in 69 offices worldwide. Their KM goal is to create, identify, capture, access, and apply knowledge methodically and efficiently to improve their competitive edge in chosen markets [1]. Their knowledge action plan consists of collecting know-how, connecting lawyers with others who have the knowledge they require, providing standards, and supporting KM development.

Boygues Telecom
Boygues telecom has developed a system that uses the SharePoint Access Portal. It gives technicians online access to a company knowledge base of technical information. Technicians can search the knowledge base according to various criteria, including full text, and their specific areas of interest [2].

British Petroleum
British Petroleum's (BP's) solution is called Virtual Teamwork, and is used to support collaboration across the barriers of distance and organizational structure. BP uses desktop videoconferencing equipment, multimedia e-mail application sharing, shared chalkboards, tools to record video clips, groupware, and a web browser. They also use the system to create "virtual coffee breaks." Water cooler conversations are how people absorb corporate culture; they also bring about chance conversations that sometimes spark creative ideas [3].

Buckman Laboratories
Buckman Laboratories is in the business of providing advanced chemical treatment technologies and technical service. Knowledge sharing at Buckman Laboratories occurs with communities of practice. Employees share knowledge with customers via seminars. Buckman Laboratories uses a technology called F Forums. F Forums is a bulletin-board application used to share knowledge internally [1] [4].

Burson-Marsteller
Burson-Marsteller is a global public relations and public affairs firm. Burson-Marsteller wanted to increase knowledge sharing because there were problems with individuals guarding their knowledge. Their KM solution was to use the corporate intranet called InfoDesk. Executives share information by giving seminars to colleagues (online and in person) and writing white papers [1]. Burson-Marsteller is one of the KM team's top five KM companies. More detailed information appears below.

Cisco Systems
The KM solution for Cisco is called the Integrated Knowledge Architecture (IKA), which provides a guide for organizing information, learning, and splitting knowledge into smaller pieces referred to as knowledge objects [5]. As part of IKA, Cisco Systems also created a 90-day new hire roadmap for new employees already in place and looking for direction.

CNA
CNA is an insurance company with 175 branch offices and 35 separate business units [6]. CNA wanted to present a uniform face to customers even though the company is spread out. The company decided that each employee had to move from narrow product expertise to knowledge of CNA's entire product portfolio. The company turned to an expert locator system which helps people find experts to answer KM questions. CNA is one of the KM Team's top five KM companies, and more detailed information appears below.

Electricity of France
Electricity of France (EDF) has each engineer become a knowledge contributor, gradually enhancing the widely accessible business knowledge base over the course of time. The knowledge base is a portal with collections of documents, internet or intranet sites, and active users' files, permitting one to discover who knew what, as well as a variety of other types of information potentially useful for the job [7].

Ernst & Young
Ernst & Young is a professional services organization. The company utilizes a knowledge base called KWeb. KWeb is used by employees to submit meeting notes and lessons learned to the knowledge base. In addition to KWeb, Ernst & Young organizes peer group knowledge-sharing sessions, collects lessons learned, and participates in coaching sessions. The coaching sessions allow a seasoned worker to coach newcomers on how to set up their workspace for accessible knowledge management [1].

Frito-Lay
Frito-Lay is a snack product company with over 40,000 employees. Frito-Lay wanted to start capturing best practices, but they knew their information was scattered around the company in disparate systems. Their KM solution was to build a knowledge management portal on the corporate intranet. The portal gave the sales department a central location for all sales-related customers and corporate information. The portal cut down on the time it took to find and share research. The portal also contains profiles of experts in the company [8].

Haliburton
Haliburton, an oil technologies company, uses problem-solving communities for knowledge management. Their KM process revolves around issues identified by community members. In general, when a community member has an issue, he or she performs a search in their company's repository. If the required information is not in the repository, the member posts details regarding the issue to the community portal. The collaboration section of the community portal is monitored by a knowledge broker (KB). If an answer is not found quickly, the KB contacts community experts for help [1].

Hewlett Packard (HP)

Hewlett Packard has 112,000 employees with over 600 locations around the world. The company had little organized sharing of information, resources, or employees across units. Their solution was to use Lotus Notes to create a discussion database, a collection of training documents, and consumer reports to evaluate training resources [9].

Hoffmann-LaRoche

Hoffmann-LaRoche is a prescription drug company. Hoffmann-LoaRoche knew if they had a better KM process, they could pare down the average approval time of New Drug Applications (NDAs) and increase the return on investment. They implemented a comprehensive "map" of the knowledge sources in the company. The knowledge map is a straightforward directory pointing those who need access to knowledge to the places where it can be found. The map recognizes both explicit and tacit knowledge. It is also tied into the completion of the NDA [10].

In the past, filing time typically took 18 months, but with the new knowledge tools, it takes just 90 days. Approval from the Food & Drug Administration (FDA), originally projected at three years, came within nine months. The company also received an outpouring of gratitude from those using the knowledge map.

Marconi

Marconi is a telecommunications company that supports 500 engineers scattered in 14 call centers around the world. When Marconi acquired 10 additional telecommunications companies, it faced a challenge: How could Marconi ensure that its technical support agents knew enough about newly acquired technology to provide quick and accurate answers to customers on the phone? How could Marconi bring new agents up to speed on company products? Marconi developed a system called KnowledgeBase which is linked to the company's customer relations management system and powered by an Oracle database. The system has an integrated view of Marconi's customers and products and provides a comprehensive history of interactions. Marconi's KM efforts allowed engineers to solve twice as many calls themselves (50% instead of 25%) in a shorter time (10 minutes vs. 30 minutes) [11].

Monsanto

Monsanto is a multinational agricultural biotechnology corporation. Monsanto had five objectives for their KM efforts:

- Connecting people with other knowledgeable people
- Enabling the conversion of information to knowledge
- Encapsulating knowledge, to make it easier to transfer
- Disseminating knowledge around the firm

Their KM methodology was based on a series of maps:

- Learning map – maps the overall business model driving the firm's performance and profitability

- Knowledge map – illustrates how information is codified, transformed into knowledge, and used
- Scorecard – the set of performance measures that top management uses to gauge the health and progress of the business
- Information technology map – reflects the infrastructure and systems needed to support the knowledge work of the organization [12]

Naval Sea Systems Command

Naval Sea Systems Command (NAVSEA) had a problem with invariably losing many of its employees to retirement or new tours of duty. Out went the experience those employees gained about the acquisition process, and in came increased time and costs to recreate the knowledge [13]. NAVSEA's KM solution was to develop a library of best practices based on NAVSEA's acquisition life cycles. Individual practitioners in NAVSEA met to develop a list of 16 best practices they wanted to safeguard.

Orange Mobile Phone Company

Orange Mobile Phone Company needed help making better use of the know-how locked in employees' heads. Their goal was to get knowledge to the front line of the call center, where customer loyalty can be made or broken. The KM solution for Orange Mobile Phone Company was adapting a community style to the call center. By working as a community, the knowledge of the call center staff is reviewed from different perspectives. Coaches take turns listening to a representative take the call, and then they swap roles. At the end, they share their feedback and ideas on what went well and how to better handle the calls. Knowledge is renewed by using a mix of techniques and perspectives to assess problems, implement solutions, and validate and review the outcome.

The coaching approach for Orange has increased customer satisfaction from 69% to 76%. There has also been a reduction in staff turnover and improved morale with the knowledge that employees can better help customers. The number of calls dealt with successfully the first time also improved [1].

Roads & Traffic Authority

Roads & Traffic Authority (RTA) is a state government agency in New South Wales that builds major roads, promotes road safety, manages traffic, and regulates vehicles and licenses. Step Two Designs was contracted to develop a KMS for RTA. The goal of the KMS was to provide improved service to customers, help new staff bridge the knowledge gap to policies and procedures, and reduce training costs [14]. The KMS process consists of information capture, review, and publishing. Information is captured by a SME, and then reviewed by a team of content owners. Once reviewed, it is placed in a custom-made web system.

Shell

Shell is a worldwide group of oil, gas, and petrochemical companies with interests in biofuels, wind, solar power, and hydrogen. Shell is interested in making knowledge and the employees who possess it flow more easily around a global enterprise. Shell has found that a storytelling approach is increasingly useful and influential in helping to

shape their knowledge-sharing culture. They have built a few electronic networks to allow employees to post questions and share information [15].

Siemens

Siemens' Information and Communication Networks division is a global provider of telecommunications solutions, active in more than 100 countries. Siemens created a KMS to encourage employees to stop hoarding their know-how. Siemens created a system called ShareNet [16]. Siemens is one of the KM team's top five KM companies. More detailed information appears below.

Tufts University

Tufts University is a college in Boston with a faculty of 4,000 people and student enrollment of 8,500. The KM solution to address the large amount of medical data needed to be studied was a Health Sciences Database, a virtual medical student's brain containing lectures, lab slides, anatomy illustrations, and personal notes. The system helps students master course material more easily, keeping the curriculum up-to-date and increasing organizational efficiency [17].

Viant

Viant was a San Francisco-based internet consulting firm, founded in April 1996. It was one of the first consulting firms to attempt to integrate the disparate disciplines of strategy, creativity, and technology into a single value proposition and project approach. The company was sold in September 2002 to Divine Corporation.

Viant's knowledge management process involves a training called QuickStart. They have also combined aspects of KM into their intranet. Viant is one of the KM team's top five KM companies. More detailed information appears below.

Wipro Infotech

Wipro Infotech is the leading strategic information technology partner for companies across India, the Middle East, and Asia-Pacific regions. Wipro Infotech uses the SharePoint Access Portal as their KM tool [18].

Xerox

Xerox, a known document company, developed a KM initiative that impacted the organization's business strategy and improved its customer service and financial performance.

Xerox service technicians make approximately 1 million service calls per month to maintain copiers, printers, and networks. Sometimes technicians will discover problems not seen in the existing documentation. These problems can create a lengthy downtime for the customer, so Eureka was developed. Eureka is a knowledge base that allows Xerox's service organization to create and reuse intellectual capital among its representatives worldwide [19]. Xerox is one of the KM Team's top five KM companies. More detailed information appears below.

Assessment Strategy

After the SEA KM team selected the above 25 companies, they reviewed the fieldwork interview notes to determine key themes they felt were most important to address in a successful KM process for the NG community. The KM themes are as follows:

- Management support
- KM experts
- KM process
- Sharing knowledge
- Incentives/rewards
- Metrics

For each theme, the KM team created a set of questions to help determine which theme the KM activities addressed and to help them rate the activity. For example, the questions for the management support theme were: How does management support KM? How does management convey the importance of KM? The team read through the case studies to identify answers to the theme questions and then noted any KM activities that supported the theme.

A spreadsheet was used to organize all the information. The rows contained the KM themes and the columns listed the companies involved. For each company, the team would fill in as much information on KM activities pertaining to the themes that could be found in the case study. After all 25 companies were put in the table, the team reviewed the KM activities and rated the companies' solutions to the KM themes.

Once the spreadsheet was complete, the companies were rated. The following rating scale was used:

- 5 – Excellent. The company went above and beyond for KM
- 4 – Good. The company is making a really good effort at KM
- 3 – Fair. The company is making an average effort at KM
- 2 – Needs work. There was not enough information to support their effort
- 1 – Poor. The company was not really doing anything at all
- 0 – N/A. The case study did not mention anything about the theme and therefore the company could not be rated fairly.

The KM team rated the KM activities based on what they considered a strong or weak level of effort. The process is somewhat subjective, but it is a good first step to determining KM activities for an organization. Once the KM team went through the rating process, the ratings were tallied to determine the top five companies with the highest scores (See Appendix A and B to view details of the company scores and results).

Benchmark Results

Many of the companies assessed had interesting processes and activities for the major KM themes identified by the KM team. Some companies received high scores for one theme, but did not score at all for other themes. The top five companies received higher

scores because their processes contained more than one of the KM themes. Recommendations are based on processes from several of the companies, and not just the top five. The top five companies are featured below in order of their scores.

Xerox (Score: 22)

Xerox began their KM process by first looking at KM outside the organization. They interviewed 60 knowledge workers to research the productivity of knowledge work. Xerox found that many companies use KM in a number of ways, depending on the culture. They did find that almost every organization uses KM for knowledge sharing or the transfer of best practices. Xerox analyzed the activities that organizations associate with KM and divided them into 10 distinct areas. The areas were as follows:

- Sharing knowledge and best practices
- Instilling responsibility for knowledge sharing
- Capturing and reusing past experiences
- Embedding knowledge in products, services, and processes
- Producing knowledge as a product
- Driving knowledge generations for innovation
- Mapping networks of experts
- Building and mining customer knowledge bases
- Understanding and measuring the value of knowledge
- Leveraging intellectual assets

These domains were useful in helping Xerox employees understand KM. Xerox feels that to be a knowledge-based company, it is necessary to master all 10.

Xerox has been putting knowledge in action by developing a number of grassroots initiatives and several corporate initiatives, as well. They developed an application called Eureka, which is a knowledge base that allows Xerox's service organization to create and reuse the company's intellectual capital. Xerox service technicians make approximately 1 million service calls per month to maintain copiers, printers, and networks. Sometimes technicians will discover problems not seen in the existing documentation. Eureka was developed so if an employee spends a lot of time developing an expensive solution, it gets shared, and other employees do not have to repeat the process.

Eureka is self-sustaining, and the service representatives themselves, instead of outside writers, contribute their innovative solutions to the knowledge base on their own time. To access the tool, service representatives use their laptops and enter the specific problem that needs to be fixed and receive suggested solutions submitted by other Xerox employees. The employees have incorporated this tool into their natural working process. Xerox believes the voluntary submission of the shared tips is due primarily to the service representatives receiving personal recognition for their contributions.

Xerox currently saves between 5 percent and 10 percent on labor and parts costs from the success of its Eureka project. The savings total tens of millions of dollars [19].

Siemens (Score: 22)

Siemens' focus for KM was to stop employees from hoarding their know-how and to share it with others. Siemens created a website called ShareNet. The site combines elements of a chat room, a database, and a search engine. An online entry form lets employees store information they think might be useful to colleagues. This includes anything from a description of a successful project to a PowerPoint presentation. Siemens workers can browse by topic and then contact the authors via email for more information.

Siemens uses incentives and rewards to encourage their employees to contribute to ShareNet. Managers receive bonuses if they use ShareNet and generate additional sales. Chief executive officers and chief financial officers of the company's business units cannot collect all of their performance-linked bonuses unless they demonstrate that they either gave information over ShareNet or borrowed information from it to build sales. Employees receive prizes like trips to professional conferences if they contribute knowledge that proves valuable to someone else. The real incentive to using the tool is that employees see the benefit.

Siemens says the challenge is to spread ShareNet around the company without creating a monstrous amount of data. Siemens employs teams of people to keep an eye on ShareNet content and weed out the trivial or irrelevant. They feel the system has to serve up the best ideas in digestible bites that help people perform their job better.

The return on investment for ShareNet has been exceptional. Since its inception in April, 1999, it has been put to the test by nearly 12,000 salespeople in Siemens' Information & Communications Networks Group, which provides telecom equipment and services. The tool, which cost only $7.8 million, has added $122 million in sales [16].

Burson-Marsteller (Score: 21)

Burson-Marsteller KM system is called InfoDesk. InfoDesk supports Burson-Marsteller's mission by providing access to critical business resources. It is a way for colleagues to network with each other across areas of expertise and geographical barriers. InfoDesk is overseen by an executive board member.

Burson-Marsteller creates an internal culture that promotes knowledge sharing. They do this in several ways:

- Instill trust and confidence by keeping open lines of communication.
- Distribute surveys to uncover problem areas with InfoDesk.
- Provide multiple venues for people to contribute knowledge with group meetings, brainstorming sessions, training, etc.
- Visibly promote knowledge sharing with a newsletter that is directly connected to InfoDesk.
- Receive support from knowledge champions who actively promote InfoDesk.

Burson-Marsteller encourages collaboration and information sharing via virtual networks in InfoDesk. These virtual networks bring together colleagues who share similar interests

or are working to solve a common problem. InfoDesk currently has 26 interactive expertise suites that allow teams to collaborate with each other and their clients.

Burson-Marsteller believes that incentives play an important role in developing a knowledge-sharing culture. The following is a list of incentives provided for knowledge sharing:

- Knowledge sharing is tied to performance goals. Employees who achieve knowledge goals are eligible to receive a bonus
- Teams responsible for developing and implementing award-winning campaigns share a monetary award
- Contests and internal promotions are created to drive InfoDesk usage
- Public recognition is given to employees for sharing knowledge.
- InfoDesk features a "spotlight on talent" section that acknowledges the achievements of employees

To get the knowledge that resides in people's heads, Burson-Marsteller encourages offline knowledge sharing, as well. They bring mentors and mentees together for programs that last six months or longer. They also hold a global training program where employees participate as professors, coaches, and students to share knowledge and exchange ideas for solving real-world client challenges.

InfoDesk saves time and money, and supports new business. The system helps to promote a unified culture, teamwork, and employee satisfaction. It has won 116 industry awards and honors, as well as the Computerworld Smithsonian Institution Award for innovation in technology [1].

Viant (Score: 20)

All employees start their careers at Viant with a mandatory training program called QuickStart. These sessions are held monthly and allow all new hires from multiple offices to spend three weeks together learning about Viant's culture and processes. KM specialists give help on the best use of the available systems and tools.

Sharing knowledge and experience is actively encouraged. Viant rewards performance and growth in the form of public recognition and direct compensation. Training is also tied to rewards. Two-thirds of Viant's recognition and compensation program is based on growth and learning.

Viant has three ways of measuring the success of KM efforts: activity, investment, and effectiveness. Activity is measured monthly by analyzing information associated with KM system use. Examples of this are the total number of documents classified as "core knowledge," and total number of collaborative community workspace sessions conducted. Investment is measured monthly in total dollars allocated to salaries, hardware, software, and services. Examples include the total number and salary of KM personnel, total spent on outside KM services/contractors, and total person-weeks allocated to dedicated training. Effectiveness is measured through a set of proxies. The

items tracked are the percent of accesses to KM directory assets that lead to using a project-related asset, and the percent of project deliverables derived from reused assets.

Within Viant, several groups participate in processes that directly support KM. The development and learning group runs the QuickStart program. Regional discipline leaders help organize the technology, strategy, and creative communities by chairing periodic conference calls called conduit calls. These calls include a few key members of the community from each office, who then to report back to the rest of the local community. They also capture news and issues from the community and discuss them on conduit calls. The discipline leaders track the needs of their communities in terms of best practices, emerging trends, and needs for training and resources. Regional project catalysts support project teams by coaching them in best practices in the delivery process, helping them locate assets and expertise relevant to the work they are performing, and training them in the correct and complete use of the various systems available to them.

Viant has combined KM elements into their intranet system. They have been using a web-based enterprise document store that allows categorization and search, and supports secured access. Separate workspaces are organized for each project team, community, and area of corporate core knowledge. Through a separate system, employee information is available, with project staffing history and skill profiles [20].

CNA (Score: 17)

The goal for CNA was to get out of the distribution business and become a great underwriting company. In order to do that, the company had to become more informed about the industries and customers it served. CNA's traditional structure of 35 separate strategic business units made sharing internal information among employees nearly impossible. CNA knew it had to consolidate branch offices and equip employees with the much broader knowledge of the company's products instead of focusing on niche markets. To accomplish that task, CNA built a web-based knowledge network that captures the expertise of its employees.

To create a single face for customers, CNA reorganized their company into three major business units. For each employee to gain a wider understanding of the company's knowledge, CNA had to make it easy for any individual to access people within CNA who have the information. They came up with the idea of an expert locator system, software that allows employees to post questions and provide answers via the internet. They chose AskMe Enterprise software from AskMe Corporation of Seattle. This software was chosen because it is scalable and capable of being integrated with Microsoft Outlook.

The process for using the tool is as follows. A CNA employee types in a query and other employees are notified via e-mail that a question in their area of expertise has been posted. When employees answer questions, the software automatically adds to the archive, which eliminates the problem of answering the same question over and over again.

After the process was initiated, a chief knowledge officer (CKO) role was created, along with a four-person team dedicated to promoting KM. This department was put under the corporate development umbrella so employees would recognize its importance. CNA chose not to put it in a technology department because they did not want it viewed as technology. They did not put the team in the Human Resources (HR) department because it is not a training program. For CNA, KM involves brand development, research, and employee communication.

Interest in the knowledge network is attributed to the CKO. He has long emphasized to employees and leadership the connection between presenting one face to the customer and shared knowledge. He does this by telling stories about how sharing knowledge has helped employees on the job. He highlights individual success stories and publicizes them on CNA's intranet via a newsletter. He has also recruited knowledge champions in two functional areas of the company that are responsible for collecting stories and passing them his way [6].

Additional Case Studies

While conducting fieldwork and interviewing different people about this project, the KM team heard about KM processes at two different companies. These case studies were not included in the benchmarking process due to the lack of complete information on the companies' processes. However, their KM processes were considered during brainstorming sessions.

KM at Accenture

The fieldwork team was tasked to research advanced search capabilities available at Sandia. During an interview regarding search functions, the interviewee mentioned his past KM experience when he worked at Accenture. The process was as follows.

Every project had a worldwide knowledge base that included project information and contacts. The knowledge database was assigned to new people working on the project. The database contained templates, lessons learned, and contacts for access to project information.

Every project had a knowledge champion. The knowledge champion was responsible for collecting everyone's documents and ensuring documents followed defined standards. Knowledge champions were given a monetary bonus for taking that role. "*It was clear that KM was very important at Accenture because it was pushed down through the partnership."* Management lost some of their bonus if they did not have a KM component that was similar to training.

Another important point made by the interviewee was that the knowledge champion should not be an office administrative assistant (OAA). It should be someone who has a good understanding of the knowledge being generated.

The interviewee's perspective on the KM process is stated as follows: *"The KM process was painful, but everyone understood why it was needed. Everyone was saved at one time by using the knowledge base."*

Atomic Weapons Establishment Knowledge Management Pilot

Annually, the NG organization at Sandia National Laboratories meets with their British counterpart in a joint working group session referred to as JOWOG. It is an opportunity for the two groups to discuss common issues and brainstorm solutions. KM has been a hot topic at these working group meetings. At the JOWOG meeting in Spring 2007, both groups shared their KM activities. The Automatic Weapons Establishment (AWE) shared an upcoming KM pilot that deals with transferring knowledge to new employees. The pilot is described below.

AWE assigns a capability owner to each capability of value to the company. The capability owner is responsible for assessing the current state of the capability using a risk-based methodology. This approach accounts for both the criticality of the capability and threats to it, such as a lack of knowledgeable staff, critical experts nearing retirement, etc. Once the capability areas at greatest risk have been selected, AWE implements a systematic approach for knowledge preservation. Rather than relying on KM specialists or expecting experts to record their own knowledge, AWE relies upon young engineers or scientists in the threatened specialty to acquire expert knowledge. This has two benefits: (1) because they are trained in the specialty area, the younger staff members "speak the technical language" and can interpret what they are told; and (2) in addition to formally capturing expert knowledge, the younger engineers undergo a form of apprenticeship that increases their own knowledge.

New employees are trained by KM experts on how to capture knowledge and create KMSs. For three months, these newly KM-trained employees will job shadow a senior expert and create a knowledge site based on what they learn from job shadowing. The senior expert is chosen based on the critical impact of the knowledge that needs to be captured.

This KM activity is still in the pilot stage. However, the KM team will follow-up on the results of the pilot project when it is completed.

Advanced Search

A KMS cannot be successful without search capabilities. As part of the sustainable project, the fieldwork team was asked to research advanced search capabilities. The team looked at capabilities currently available at Sandia. The available search tools investigated were SAS Enterprise Miner, Goldfire, and Inxight.

SAS Enterprise Miner

The SAS Enterprise Miner is beneficial for text mining. SAS gives the user metadata, a unique identifier, and allows categories to be created. An example of where this might be useful for the NG community is with the S-Drive. The miner searches through the files, creates categories, and separates the documents into categories. One downside to SAS is that there is a lot of preparatory work to configuring the data correctly. After SAS mines, the keywords have to be reviewed manually to ensure they are the best choice.

SAS Enterprise Miner is a client application and the software costs $500.00/user.

Goldfire

Goldfire is a commercial manufacturing tool. It allows users to create knowledge bases and fish diagrams that help determine the root causes of problems. The search function is used to see if there is an existing solution. The cost is $10,000.00/user.

Inxight

Inxight can search through a document and map entities to identify similarities in the document. Inxight is useful because a normal text question can be asked: the software recognizes nouns, verbs, adjectives, and other entities, and looks for similar words. The cost is $2,600.00/user.

Future research on search functions will be conducted once the KM tool of choice for the NG community is selected.

PART 3: RECOMMENDATIONS

The purpose of conducting research for the SKM project was to develop recommendations as to how the NG organization could begin to capture its own knowledge. This section includes suggestions on how to move towards an SKM program. The same topics used to evaluate other KM programs from the benchmarking research are used as topics for the recommendations. This section also includes recommendations for current tools and additional requests for domains which are the current approach to KMSs.

Management Support

One message was very clear from the interviews and the benchmarking research: management support is critical to the success of the KM process. KM will fail if management does not enforce it. This was apparent from the number interviews where staff members stated they would not support KM if it was not on their performance management form (PMF). Placing KM on the PMF says that management regards this as a major part of the work the employee is to perform.

In the benchmarking research, several articles mentioned the importance of management being involved in the KM process. There were managers who were KM champions and who even contributed to the tool on a regular basis. In other companies, the tool was mandated by managers. In all cases, management was clearly visible in the KM processes. It is highly recommended that all levels of management in the NG organization are on board with the KM process and that they are the main champions for this effort.

Capturing Knowledge Process (includes KM Experts)

Currently, the NG community is structured into different PRTs. Each team has a PRT lead. In the new KM process, the PRT lead will also be the knowledge leader for their team. The knowledge leader will be responsible for:

- Providing templates for team members to capture critical information
- Ensuring critical information is captured timely and consistently
- Ensuring that the information is reviewed by a domain or SME
- Submitting documents for manager approval
- Collaborating with all other PRT leads to ensure PRT activities are consistently practiced

Documents will be submitted for manager approval through existing corporate tools like WebCars or Workbox review and approval. A document waiting for approval will appear in the manager's workbox. Once the manager approves the document, the document will be sent to the knowledge broker.

The knowledge broker will release the document to the KM tool. The knowledge broker will be responsible for:

- Entering information into the system
- Training employees in how to use the KM system
- Identifying all experts and the domains for which they are responsible
- Answering knowledge questions posted by employees
- Posting all questions and information to a frequently asked question page or an archival system
- Maintaining, installing, and updating the KM system
- Monitoring the KM system

The knowledge broker will be a full-time employee dedicated to KM in the NG community. This person will be the expert for locating knowledge in the NG organization. Figures 1 and 2 diagram the knowledge capture process.

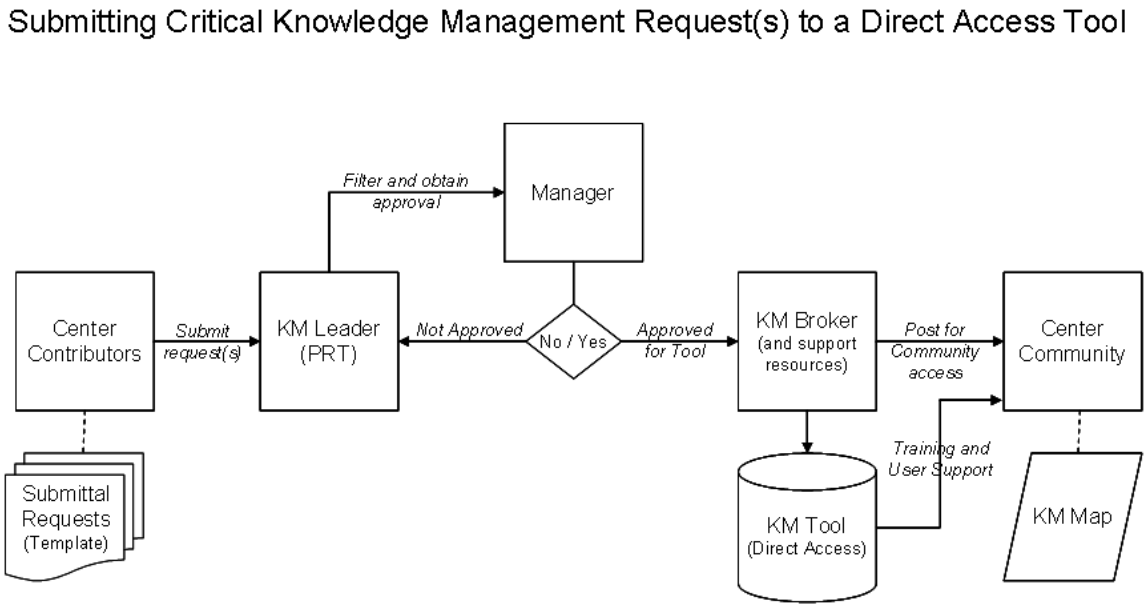

Figure 1: Proposed Knowledge Capture Process

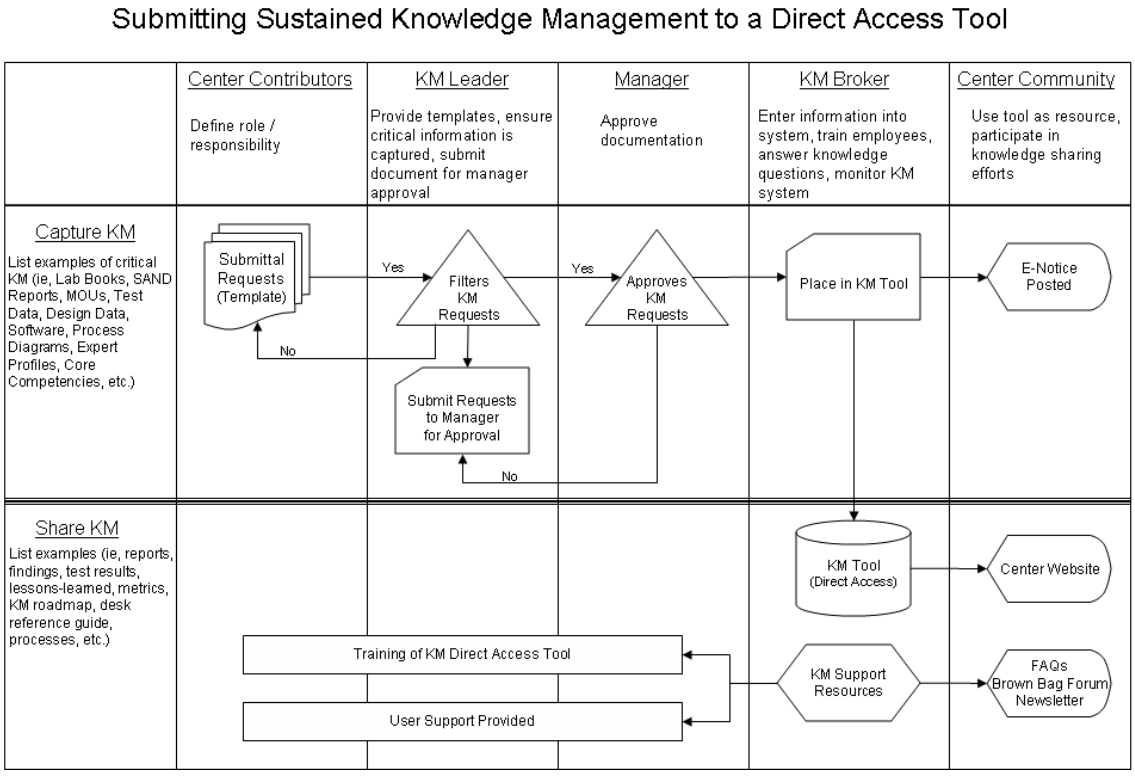

Figure 2: Process for Submitting Information to KM Tool

Incentives/Rewards

Creating a new KM process will be a challenge because it will change the culture of the NG community. There must be some incentive or reward for the staff to accept the process. Providing criteria for incentives or an award will motivate staff to accept and efficiently utilize the process. The following are some suggested rewards and incentives for those who adopt the KM process:

- Public recognition – Being recognized for KM efforts will demonstrate to others KM's importance in the community
- Spot Awards – These monetary awards should be given in addition to public recognition of KM efforts
- Money for KM storage, similar to the Employee Safety and Security Program – The NG community has a process in which employees can earn a dollar (fake money) monthly for participating in an employee safety program. This is a popular program, and could be leveraged by adding a KM incentive to the community.
- Earn trips to conferences or professional development training – Sandia allots money to employees every year for conferences. Employees could be recognized for their KM efforts by earning a trip to a popular conference.
- KM activities must be on the employee's PMF – This is a necessary incentive to complete KM work.

Over time, employees will see value in the KMS, which will give them an additional incentive to contribute.

Sharing Knowledge/Knowledge Transfer

Knowledge sharing helps individuals grow and continue learning. It also makes employees feel a part of a community. The following are recommendations for how to share and/or transfer knowledge within the NG community.

Community of Practice

COPs are groups of employees that form to share what they know and learn from one another. They are usually an informal, voluntary gathering and sharing of expertise. The NG community has implemented a COP (Brain Bank) for over 10 years, and it has been very useful to those involved. It is important that employees with a common interest continue to share experiences and critical data.

Knowledge Map

The KMS should contain information about knowledge, resources, and experts in the NG organization to ensure that employees know who to see and where to find information. Knowledge map ideas include:

- Network of experts
- Expert profiles
- Map of knowledge sources
- Information on skills and expertise
- Indicators that show with whom and at what point a person should share knowledge

New Hires

Currently, people new to the NG community are thrown into the job without any training or any guidance. These individuals should be part of the KM community. It would be highly productive for everyone if knowledge was formally transferred to new employees. The following are suggestions for sharing knowledge with new employees:

- Allow a new hire to job shadow
- Provide mentors to new hires
- Ensure mentors are trained on how to mentor and what critical information should be imparted to a new hire
- Create a 90-day roadmap or desktop reference for new hires and retirees
- Train new hires on the KM system

Two in a Box

Employees in the NG community are in charge of specific roles, processes, and systems. It is likely that each person is responsible for a specific job. This practice becomes a problem when the employee leaves or goes on vacation because nobody else can cover for them if an issue occurs. It is recommended that the manufacturing community look into a “two in a box” process. “Two in a box” means that staff members will have

overlapping duties and responsibilities to ensure there is more than one person to maintain and capture the knowledge. The two-in-a-box process should be required for critical equipment, products, and processes.

Problem Briefing

The main trigger for documentation in the NG community is when a problem occurs. Problems are big motivators because they have the potential to shut down production. Currently, when a problem occurs, the engineers brief management on the problem. All information about the problem is documented in a PowerPoint file. One solution to ensure that these problems are documented beyond PowerPoint is to use video capture to document the problem briefings. This is a form of as-you-go knowledge capture because the information is captured as it happens. As soon as a problem occurs, the engineers will put together a presentation to brief management. Video services would videotape the briefing, and the video would be stored in KM-SAL. This process would not create extra work because the process is no different from what is currently done, except video services will tape the session. Not only would the presentation be captured, but all discussion of the problem would be captured. The presentations would be archived for future employees to access them.

Metrics

Once a KM program is in place, metrics to evaluate the knowledge management process should be considered. Possible metrics for the recommendations include:

- Results of employee satisfaction surveys
- Total number of questions posted to the knowledge broker weekly
- Total number of documents submitted to workbox for manager approval
- Total number of management-approved documents versus management-disapproved documents
- Total number of active communities in practice groups
- Time it takes for knowledge broker to successfully answer questions
- Time it takes for knowledge broker to successfully find experts
- Amount of rewards distributed to employees
- Total costs spent on KM rewards

Current Tools

As stated previously, there are many repositories used by different teams in the NG organization. At this time, there is no recommendation for a sole KM tool. However, there are recommendations for how current tools can be used.

Wiki

The KM team has introduced wikis into the NG organization. A wiki is a type of computer software that allows users to easily create, edit, and link a webpage. Wikis are often used as collaborative website. It is recommended that wikis be used in the NG community for the following purposes:

- Project teams

- Electronic notebook
- Equipment logbook
- Personal journal
- Knowledge capture
- Team meeting minutes

Design Definition Manager

DDM is currently used in the NG organization for required documentation such as work instructions and operating procedures. The DDM repository seems to be used the most; however, not everyone uses this repository. As stated earlier, the search capability in DDM allows users to enter documents without any metadata, making it very hard for users to find documents. It is recommended that the search capability be fixed to allow metadata, or another tool that has better search capability should be chosen.

Web FileShare

WFS is another repository available for use in the NG organization. Many do not use WFS because it is not intuitive. During the fieldwork sessions, interviewees mentioned that there was no standard process for informal information. Informal information could be lessons learned documents, investigation reports, meeting reports, etc. It is recommended that WFS be used to store informal documentation. Even though WFS is not intuitive to many, it is still valuable because it is corporate-supported and documents are backed up. A solution to make WFS more intuitive is to use a customizable interface to WFS created by developers in the SEA organization that is easier for employees to use. This is an option for all project teams in the NG community. Each project team could have a document store for all of their documents with an interface that fits the needs of the project.

IMS

IMS is currently being used throughout the Nuclear Weapon Complex. There are no recommendations to change this document repository at this time.

SharePoint

SharePoint is a collaboration tool that a few groups in the NG organization are currently using for projects. SharePoint is recommended as another option for project teams to share documents, post announcements, and create discussion boards.

S-Drive

The S-Drive has been used for years to store documentation. The S-Drive is not a good source for documentation storage because it has no organization. It is recommended that the S-Drive not be used for storing or sharing documents.

Additional Domains

As the NG organization transitions to the new KM process, there may be requests to create KMSs similar to the domains (i.e. Cleaning, Brazing and Target Loading). The KM team realizes there is still a critical need to capture the expertise of those retiring or leaving the NG organization. The KM team is still available to assist with additional KM requests. The recommendations for KM domain requests are as follows:

- KM team will assist in developing the topics and structure for knowledge to be captured.
- Domain experts are responsible for developing the content of the KM site.
- Domain experts can put information on a wiki or send information to the KM team to create a website of their knowledge.

CONCLUSION

KM is a challenging problem for Sandia organizations. To tackle the problem, the approach was to examine the current state of KM in the NG organization, and research others' approaches to KM. The research conducted for the SKM project gave insight into how KM can be successful in the NG organization. Some clear themes emerged from this research:

- KM must have management support
- A dedicated person must be in charge of KM efforts
- KM must align with business objectives
- Management must provide rewards/incentives for contributing to KM processes and data
- KM is about changing a culture; it is not about tools.

Moving to a culture of SKM will take time and money, though they are resources well spent, as reported by businesses and corporations. The costs of not having KM are even greater when looking at the potential of losing specialized expertise in the field of designing, developing, and producing state-of-the-art NGs.

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APPENDIX A: Company Ratings

LEGEND:

5	**Excellent**
4	**Good**
3	**Fair**
2	**Needs Work**
1	**Poor**
0	**N/A**

Following are the 25 companies included in the benchmarking activity. Companies are listed in alphabetical order.

Arup

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit,, etc.) available? What is the knowledge expert's role in the knowledge management (KM) process?	
	0
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	Knowledge is shared by communities of practice (COPs). Communities are expected to exchange knowledge and information, and facilitate learning in their skill area. Each community is tasked with reflecting on and learning from project experience, acting as the custodians of the Arup knowledge base by looking across project experiences and reviewing external knowledge to distill out best practice. They are expected to identify, absorb and reapply best practice, and help others to share knowledge by encouraging, mentoring, and learning.
	4
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	

Topics	KM Activities
	0
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	
	0
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	
	0
Employee/Other Comments How did people feel about KM? Positive/Negative Comments? Fundamental questions?	**For information only (no rating)**
	Total: 4

Baker & McKenzie

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit,, etc.) available? What is the knowledge expert's role in the KM process?	The firm adopted a set of "knowledge standards," which require that every local office appoint a partner to lead knowledge efforts in that office. These people do not have to be KM visionaries or project taskmasters, but they do have accountability for the local success of KM and for the coordination of local efforts with those of global and regional groups.
	4
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	

Topics	KM Activities
	0
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	
	0
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	
	0
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	
	0
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 4

Boygues Telecom

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit,, etc.) available? What is the knowledge expert's role in the KM process?	
	0

Topics	KM Activities
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	Microsoft's SharePoint Portal Server solution is used because it is easy to implement and flexible enough to meet various requirements. Knowledge base manages the publication and the classification of documents and provides users with a single knowledge portal.
	5
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	
	0
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	Reward was the value to the organization.
	3
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	Managers need to start with the right lessons learned problem. Set definitive goals for what the effort will achieve. KM need not be technology-intensive and should not be technology-driven. Make sure you have the right team for KM. **For information only (no rating)**
Metrics What types of metrics are kept?	
	0
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 8

British Petroleum (BP)

Topics	KM Activities
Management Support How does management support KM?	
	0

Topics	KM Activities
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit,, etc.) available? What is the knowledge expert's role in the KM process?	Knowledge leader - There are five VT clients placed in key BP offices around the world, each with a full-time host whose job is to encourage its use at that location. Coaching is used to help participants understand how to use the technology.
	5
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	
	0
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	BP's solution is called Virtual Teamwork and it's used to support collaboration across the barriers of distance and organizational structure. BP uses desktop videoconferencing equipment, multimedia e-mail application sharing, shared chalkboards, tools to record video clips, groupware, and a web browser. They also included a document scanner which was a last minute addition that proved extremely useful.
	5
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	
	0
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	
	0
Employee/Other Comments How did people feel about KM?	**For information only (no rating)**

Topics	KM Activities
Positive/negative comments? Fundamental questions?	
	Total: 10

Buckman Laboratories

Topics	KM Activities
Management Support How does management support KM?	As with all corporate culture-change initiatives, management support has been critical to the success of the Learning Center. The Learning Center reports into the chief executive officer (CEO), Steve Buckman. The reason the forums are successful is because it was mandated by the head of the department. He monitored all contributions.
	5
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit,, etc.) available? What is the knowledge expert's role in the KM process?	
	0
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	The creative application of knowledge led the company to pursue knowledgeable business processes. These processes go beyond the actual "physical product" and are designed to help a customer in the application of the products. Each process designed is repeatable – not a one-time-use process. This way, once the employee's and customers understand the process, they can take the knowledge forward and share that knowledge with others. Another key success factor for processes is the ability to visualize them. 1960s Distribution of Idea Trap, a notebook for jotting down creative ideas 1984 First attempt at e-mail 1985 First remote access to our mainframe 1986 Introduction of laptops 1987 Successful implementation of global e-mail 1991 Start of effort to use CompuServe for commercial use 1992 Implementation of K'Netix, our knowledge-sharing system 1999 Installation of new information technology infrastructure. Use a technology called F Forums, a bulletin-board application used to share knowledge internally.
	5

Topics	KM Activities
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	
	0
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	
	0
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	(1) Management at all levels must be wooed, won, and involved. Initially Buckman ignored its middle management; it now realizes that no one else has more impact on the day-to-day work environment for its associates. (2) Look for unexpected serendipity - unanticipated benefits and value. Once Buckman spotted unforeseen areas of value and benefit, the company leveraged the newfound sources of value. (3) Create simple processes for your company that are easy to learn, repeatable and match business goals. Buckman's commitment to this has made knowledge sharing easier. (4) Don't get comfortable - continuously innovate. Buckman committed early on to continually examine and improve its KM and learning efforts. **For information only (no rating)**
Metrics What types of metrics are kept?	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.
	4
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 14

Burson-Marsteller

Topics	KM Activities
Management Support How does management support KM?	CEO and upper management support all KM activities. CEO posts a blog on InfoDesk and post new entries at least once a week.
	5

Topics	KM Activities
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	
	0
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	Executives share information by giving seminars to colleagues and writing white papers. KM solution is to use the corporate intranet called InfoDesk. InfoDesk offers global reach and 24/7 access. It is also the gateway for client-team websites and links to 9,000 global publications and media sources.
	3
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	Knowledge sharing is not just about what is on InfoDesk; it is encouraged at group meetings, brainstorming sessions, web conferences, conference calls, corporate training, and by internally promoting new products and points of view. Use of virtual networks to bring together colleagues who share similar interests or who are working to solve a common problem. Also have a six-month mentor program. B-M University where employees participate as professors, coaches and students, both online and offline, to share knowledge of the industry and exchange ideas. Knowledge of experts is captured in flash webinars, conference calls with experts and a media-insight series which features tricks of the trade authored by BM's senior strategists.
	5
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	Knowledge sharing is tied to performance goals. Distinguished industry awards are given to teams. Contents and internal promotions. Public recognition. Intranet has 'spotlight on talent' section that acknowledges employee achievement.
	5

Topics	KM Activities
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	Measure the success of the champion network by monitoring the number of InfoDesk log-ins per office, biographies updated, people who participate actively and regularly in their communities and documents submitted to InfoDesk.
	3
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 21

Cisco Systems

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	
	0
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	Integrated Knowledge Architecture (IKA) - provides a guide for organizing information, learning, and splitting knowledge into smaller pieces called knowledge objects.
	3

Topics	KM Activities
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	Cisco also created a 90-day new hire roadmap for new hires already in place and looking for direction.
	4
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	
	0
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	
	0
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	"I'm a new SSM, and this web site is a gold mine of information." It guided me through my first 90 days, helped me build a support team, and introduced me to other SSMS. Basically, this site just makes my job easier and gives me more time to focus on servicing customers. **For information only (no rating)**
	Total: 7

CNA

Topics	KM Activities
Management Support How does management support KM?	CNA created a chief knowledge officer position and KM department under the wing of corporate development.
	4
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	Employees are identified as subject experts and are known as knowledge sources. The CKO recruited so-called knowledge champions in about 20 functional areas throughout the company who is responsible for collecting stories and passing them his way.
	5

Topics	KM Activities
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	Employee's can send a query and other employees are notified via e-mail that a question in their area of expertise has been posted. When employees answer questions, the software automatically adds to the archive, which eliminates the headache of answering the same question over and over again. CNA chose AskMe Enterprise software from AskMe Corp. of Seattle. Factors in AskMe's favor included software that was scalable and capable of being integrated with Microsoft Outlook.
	5
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	
	0
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	The CKO tells stories about how sharing knowledge has helped employees on the job. He highlights individual success stories and publicizes them on CNA's intranet via a newsletter called Inside Scoop that's pushed to employees' desktops. The CKO and the KM team took their message on the road this summer by visiting CNA's field offices and offering a hands-on introduction.
	4
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	The CKO has plans to incorporate a formal metrics process through regular employee surveys.
	3
Employee/Other Comments How did people feel about KM? Positive/negative comments?	**For information only (no rating)**

Topics	KM Activities
Fundamental questions?	
	Total: 21

EDF

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	
	0
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	
	0
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	Each engineer becomes a knowledge contributor, gradually enhancing the widely accessible business knowledge base over the course of time. The knowledge base is a portal with collections of documents, Internet or Intranet sites and active users' files permitting one to find out who knew what and all kinds of other information potentially useful for the job.
	4
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	
	0

Topics	KM Activities
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	
	0
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 4

Ernst & Young

Topics	KM Activities
Management Support How does management support KM?	Knowledge works best when the industry leader sponsors and supports the practice.
	2
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	
	0
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	
	0
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	
	0

Topics	KM Activities
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	
	0
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	
	0
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 2

Frito-Lay

Topics	KM Activities
Management Support How does management support KM?	The VP of Customer Development was in charge of implementing the KM portal.
	5
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	
	0
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	KM Portals were piloted. Navigator, a consultancy firm, built a prototype using technologies previously approved by Frito-Lay's IS department, including Lotus Domino; BusinessObjects' WebIntelligence; Java and IBM's DB2 database; Autonomy, a natural language search engine that allows users to search information in different repositories such as intranet sites, PowerPoint presentations and spreadsheets.
	5
Sharing Knowledge	

Topics	KM Activities
Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	
	0
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	
	0
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	The test team doubled the growth rate of the customer's business in the salty snack category.
	4
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 14

Haliburton

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	Knowledge broker - full time, dedicated person. Facilitates and serves the community. Oversees and performs various tasks for content management. 1 KB for 200-400 users. Global knowledge champion (part time) - KM implementation for business unit. Makes sure communities are aligned with business strategy & goals. Local Knowledge Champion (part time 10%) - train members on the value of KM and how to use the portal. Subject Matter Experts.
	5

Topics	KM Activities
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	If a community member has an issue that needs to be resolved, they perform a 'self search.' If the required information is not in the repository, the member posts details of his problem using the collaboration tool. Collaboration is constantly monitored by a knowledge broker. If an answer isn't found quickly, the KM contacts community experts for help. Once a solution has been found, the KB makes sure it is validated by a subject-matter expert, and enters it into the repository for future re-use. Collaboration tool - enables virtual conversations and problem solving. Document selector - a portlet that allows the user to find relevant information using search. White board - space used by knowledge broker to post fresh news to community. Community links - links to most important and often used sites.
	5
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	
	0
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	
	0
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	Monthly scorecards and stories with a quarterly ROI calculation. Business scorecards contain customer satisfaction and financial results.
	4
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 14

HP

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	This would have failed without an evangelist.
	2
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	Using Lotus Notes the following systems were created - Trainer's Trading post - a discussion database on training topics. Training Library - a collection of training documents. Training Review - a consumer reports collection of evaluations of training resources. Also have a tool called Knowledge Links, a web-based collection of product development knowledge from the various PPO functions.
	4
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	Training databases listed below. They also created a guide of knowledge resources and directory of HP experts. This is a database of expert profiles.
	4
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	Free Lotus Notes licenses. 3,000 free airline miles for the first 50 readers and another 500 miles for anyone who posted a submission.
	4
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	
	0

Topics	KM Activities
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 14

Hoffmann-LoRache

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	
	0
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	
	0
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	Produce a comprehensive "map" of the knowledge sources in the company. Map is a directory pointing people to places where knowledge can be found. Map is tied to the product. Knowledge links - road signs that show with whom and at what point a person should share knowledge.
	4
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	The reward is demonstrating that it will make their work easier.
	3

Topics	KM Activities
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	Filing time typically took 18 months, but with the new knowledge tools, it took just 90 days. Approval from FDA, projected at three years and it came within nine months. Qualitative - outpouring of gratitude from people using the knowledge map.
	5
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 12

Marconi

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	
	0
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	Marconi uses software from ServiceWare Technologies. This system is called the KnowledgeBase. The data stored in the KnowledgeBase is troubleshooting tips and hints on our various product lines.
	3

Topics	KM Activities
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	Marconi developed a new system called KnowledgeBase which is linked to the company's CRM system and powered by the Oracle DB. The system has an integrated view of Marconi's customers and products and provides a comprehensive history of interactions.
	4
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	Marconi had started basing a percentage of agents' quarterly bonuses on the amount of knowledge they submitted and how they mentored and trained other agents. Besides bonuses, knowledge contributors receive recognition during meetings and in a newsletter.
	4
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	Solve twice as many calls themselves (50% instead of 25%) in a shorter time (10 minutes vs. 30 minutes)
	4
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 15

Monsanto

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	Knowledge steward, topic experts, cross-pollinators, knowledge teams. Knowledge teams create the company's knowledge and serving as points of contact for people seeking information about different subjects.
	5

Topics	KM Activities
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	
	0
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	Learning Map - map of the overall business model driving the firm's performance and profitability. Knowledge Map - illustrates how information is codified, transformed into knowledge and used. Scorecard - set of performance measures that top management should use to gauge the health and progress of the business. Information Technology Map - Reflecting the infrastructure and systems needed to support the knowledge work of the organization.
	5
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	
	0
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	
	0
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 10

Naval Sea Systems Command

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	
	0
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	
	0
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	Develop a library of best practices based on NAVSEA's acquisition life cycles.
	4
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	
	0
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	
	0

Topics	KM Activities
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 4

Orange Mobile Phone Company

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	Coaches focused on performance of the call center by improving learning, knowledge and understanding of the front-line staff.
	5
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	
	0
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	Adapting a community style to the call center. Share knowledge as a community with coaches who help identify knowledge gaps.
	0
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	
	0

Topics	KM Activities
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	Customer satisfaction increased from 69% to 76%, reduction in staff turnover, improved morale with knowing that they can help people better. The number of calls dealt with successfully first time also improved.
	5
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 10

Roads & Traffic Authority

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	
	0
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	The knowledge management system consists of information capture, review and publishing. The core of the publishing system was the authoring environment which includes (1) a full authoring interface, (2) a database for storing content, (3) exporting the content to XML, and (4) publishing to HTML and Word, using Omnimark.
	3

Topics	KM Activities
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	
	0
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	
	0
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	
	0
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 3

Shell

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	
	0

Topics	KM Activities
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	Shell has embraced storytelling as a means of helping shape the knowledge-sharing culture. The tradition of an oral narrative history that records and hands down learning, insight or collective revelation still thrives in social communities and Shell has found it particularly effective in helping change business mindset and improve knowledge practice. Shell has established widespread computer-enabled global knowledge networks among its professional disciplines. They created a knowledge "portal" called the expertise Directory. Rapid advancement in desktop computing, communications technology and 'groupware' PC products, coupled with decreasing prices and a deeper understanding of organizational workflow, now make possible a level of remote collaboration unimaginable only a few years ago. The on line, face-to-face sharing of information and knowledge supported by distributed teaming technologies, enables a rich bandwidth of communication that clearly surpasses the traditional telephone call, email or internet chat-room. Shell has been taking advantage of such developments by aligning its technology infrastructure, management processes and people skills with operational business suitable for the application of global virtual teams.
	5
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	The Shell EP Organizational Performance and Learning team offers a complete methodology for distributed team implementation with complete support, facilitation and coaching programs to get global staff teams up-and-running.
	5
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	The CKO tells stories about how sharing knowledge has helped employees on the job. He highlights individual success stories and publicizes them on CNA's intranet via a newsletter called Inside Scoop that's pushed to employees' desktops.
	4
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	
	0

Topics	KM Activities
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 14

Siemens

Topics	KM Activities
Management Support How does management support KM?	The CEO wants to take the ShareNet approach beyond the telecom unit to every nook and cranny of the Siemens empire. Siemens' top management has shown that it's behind the KM projects.
	4
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	100 internal evangelists drawn from all its country units, who are responsible for training, answering questions, and monitoring the system.
	5
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	Siemens uses a Web site called ShareNet. The site combines elements of a chat room, a database, and a search engine. An online entry form lets employees store information they think might be useful to colleagues--anything from a description of a successful project to a PowerPoint presentation. Other Siemens workers can search or browse by topic, then contact the authors via e-mail for more information. The system lets staffers post an alert when they need help fast.
	5
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	The Learning Center represents a convergence of knowledge and learning initiatives that focuses on the acquisition of organizational capability through accelerated learning at the organizational and individual level.
	3
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	

Topics	KM Activities
	0
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	Since its inception in April, 1999, ShareNet has been put to the test by nearly 12,000 salespeople in Siemens' $10.5 billion Information & Communications Networks Group, which provides telecom equipment and services. The tool, which cost only $7.8 million, has added $122 million in sales.
	5
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 22

Tuft's University

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	
	0
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	
	0

Topics	KM Activities
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	Health Sciences DB – a virtual medical student's brain containing lectures, lab slides, anatomy illustrations, and personal notes. The system helps students to master course material more easily, keeping the curriculum up-to-date and increasing organizational efficiency.
	4
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	
	0
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	
	0
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	"The system isn't going to be a textbook I'm going to throw out in a couple of years because it's no longer accurate. It's always evolving." **For information only (no rating)**
	Total: 4

Viant

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	Regional Discipline Leaders help organize the technology, strategy, and creative communities by chairing periodic conference calls that are called Conduit Calls. These calls include a few key members of the community from each office, who then serve as conduits to report back to the rest of the local community. They also capture news and issues from the community and discuss them on the Conduit Call. The discipline leaders track the needs of their communities in terms of best practices, emerging trends, and needs for training and resources. Regional Project Catalysts support project teams by coaching them in best practices in the delivery process, helping them locate assets and expertise that is relevant to the work they are doing, and training them in the correct and complete use of the various systems available to them.

Topics	KM Activities
	5
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	Viant uses an Intranet system and some custom applications. They have been using a web-based enterprise document store that allows categorization and search, and supports secured access. Several Resource Centers exist to help employees navigate through process-oriented areas or special topics. All employees may contact each other through email and live chat sessions, and may discuss topics of interest through threaded discussion groups and list servers.
	5
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	The Development & Learning group runs the QuickStart program, and organizes much of the subsequent training and direct mentoring available to all individuals. The Project Catalysts publish a monthly report, which is distributed over the Intranet, describing best practices, lessons learned, and best-of-breed assets contributed by those teams.
	5
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	
	0
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	(1) Activity is measured monthly by analyzing information associated with KM system use. (2) Investment is measured monthly in total dollars allocated to salaries, hardware, software, and services, and in total person-weeks spent on KM activities such as training and knowledge capture. (3) Although the effectiveness of our KM program cannot be measured directly, it can be measured through a set of proxies. See comment page for more details.
	5
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**

Topics	KM Activities
	Total: 20

Wipro Infotech

Topics	KM Activities
Management Support How does management support KM?	
	0
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	
	0
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	Approach for Knowledge Architecture and Usability Designing: (1) Vision/Scope (2) Define demographics (3) Information Architecture (4) Goal Definition (5) Conceptualization (6) Visualization (7) Specifications (8) Design Templates. Two teams delivered a content architecture and build architexts in Share Point Portal Server (SPS - Microsoft Corporations flagship product for Document Management and KM). The company used SPS Integration Agents for the following: Integration Components / APIs / Data Access / Portals / Web parts / Digital Dashboard Integration with external systems.
	5
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	
	0
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	The company provides incentives to overcome employees' resistance to change. Managers get bonuses if they use ShareNet and generate additional sales. But CEOs and CFOs of the company's country business units can't collect all their performance-linked bonuses unless they demonstrate that they either gave information over ShareNet or borrowed information from it to build sales. Employees get prizes such as trips to professional conferences if they contribute knowledge that

Topics	KM Activities
	proves valuable to someone else.
	5
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	Design and Implementation: (1) Conduct a content audit: prune ruthlessly (2) Authors own the content (3) Publishing tools must be "ridiculously easy to use" (4) Spend enough time creating business rules (5) maintenance is as important as creation (6) Create content stewards in each domain/unit (7) Allocate enough time to these roles.
	0
Metrics What types of metrics are kept?	
	0
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	
	Total: 10

Xerox

Topics	KM Activities
Management Support How does management support KM?	Xerox has had support from the beginning. The chairman officially kicked off the organization's knowledge management initiative.
	4
KM Expert Does a chief knowledge officer exist? Who is in charge of the knowledge? At what level is the knowledge expert (project, department, business unit, etc.) available? What is the knowledge expert's role in the KM process?	Xerox recruited 100 knowledge managers who were directly involved in leading knowledge initiatives.
	5

Topics	KM Activities
Knowledge Management Process How is the information organized? Does documentation exist? What is the documentation process? How often is the process reviewed? How do people find information in an organization? What is the knowledge capture process? How does knowledge get documented? What tools are used for capturing information? Is there documentation to integrate the tools? What tools are used for storing information? What type of tools are used (collaboration, content management systems etc)? What tools are utilized for finding information? What is the search mechanisms used?	1) Sharing knowledge and best practices 2) Instilling responsibility for knowledge sharing 3) Capturing and reusing past experiences 4) Embedding knowledge in products, services, and processes 5) Producing knowledge as a product 6) Driving knowledge generation for innovation 7) Mapping networks of experts 8) building and mining customer knowledge bases 9) Understanding and measuring the value of knowledge 10) Leveraging intellectual assets Web-based tools called DocuShare allows scientists to collaborate among themselves.
	5
Sharing Knowledge Do training programs exist? How is the knowledge transferred to new people? Should the information be protected? How is information shared across different areas of the company?	Eureka is the knowledge base that is used to share intellectual capital. Service reps contribute their innovative solutions to the knowledge base on their own time.
	4
Incentives/Rewards What positive incentives/rewards exist? What negative incentives/rewards exist? How are incentives/rewards communicated to employees?	(1) Contrast for employees the difference between knowledge management and the way they used to work (2) Don't take for granted that everyone understands what you're trying to build or accomplish. (3) Support from the top is vital in a change initiative, and knowledge management is all about change (4) Getting people to want to participate in knowledge management is easy; getting them to do it right takes more effort.
	0
Lessons Learned Are lessons learned documented? Is this information shared with all employees? Where are lessons learned stored? What is the process for capturing lessons learned?	**For information only (no rating)**
Metrics What types of metrics are kept?	Xerox currently saves between 5 percent and 10 percent on labor and parts costs from the success of its Eureka project. The savings total tens of millions of dollars.
	4
Employee/Other Comments How did people feel about KM? Positive/negative comments? Fundamental questions?	**For information only (no rating)**
	Total: 22

APPENDIX B: Benchmarking Results

Benchmark Ranking Summary
Yellow highlighted rows are top scores

Company	Management Support	Knowledge Management Experts	Knowledge Management Process	Sharing Knowledge	Incentives/ Rewards	Metrics	Total Score
Arup	0	0	4	0	0	0	**4**
Baker & McKenzie	0	4	0	0	0	0	**4**
Boygues Telecom	0	0	5	0	3	0	**8**
British Petroleum	0	5	0	5	0	0	**10**
Buckman Laboratories	5	0	5	0	0	4	**14**
Burson-Marsteller	5	0	3	5	5	3	**21**
Cisco Systems	0	0	3	4	0	0	**7**
CNA	4	5	5	0	4	3	**21**
EDF	0	0	0	4	0	0	**4**
Ernst & Young	2	0	0	0	0	0	**2**
Frito-Lay	5	0	5	0	0	4	**14**
Haliburton	0	5	5	0	0	4	**14**
Hewlett-Packard	0	2	4	4	4	0	**14**
Hoffmann-lorache	0	0	0	4	3	5	**12**
Marconi	0	0	3	4	4	4	**15**
Monsanto	0	5	0	5	0	0	**10**
Naval Sea Systems Command	0	0	0	4	0	0	**4**
Orange	0	5	0	4	0	5	**14**
Roads & Traffic Authority	0	0	3	0	0	0	**3**
Shell	0	0	5	5	4	0	**14**
Siemens	4	5	5	3	0	5	**22**
Tuft's University	0	0	0	4	0	0	**4**
Viant	0	5	5	5	0	5	**20**

Benchmark Ranking Summary Yellow highlighted rows are top scores							
Company	***Management Support***	***Knowledge Management Experts***	***Knowledge Management Process***	***Sharing Knowledge***	***Incentives/ Rewards***	***Metrics***	***Total Score***
Wipro	0	0	5	0	5	0	**10**
Xerox	4	5	5	4	0	4	**22**

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