The Thesis Committee for Richard William Talis Elkington
Certifies that this is the approved version of the following thesis:

Transferring Experiential Knowledge from the Near-Retirement Generation to the Next Generation

APPROVED BY
SUPERVISING COMMITTEE:

Supervisor : Carlos Caldas

Co-Supervisor : James O'Connor

Transferring Experiential Knowledge from the Near-Retirement Generation to the Next Generation

by

Richard William Talis Elkington, B.S.

Thesis

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Master of Science in Engineering

The University of Texas at Austin

May 2013

Acknowledgements

This research was conducted in conjunction with the Construction Industry Institute project team RT-292.

Abstract

Transferring Experiential Knowledge from the Near-Retirement Generation to the Next Generation

Richard William Talis Elkington, M.S.E.

The University of Texas at Austin, 2013

Supervisors: Carlos Caldas, James O'Connor

This thesis delves into the issues associated with the aging workforce in the capital projects industry and proposes a methodology for mitigation of the loss of experiential knowledge. In the context of the capital projects industry the thesis examines the dynamics of the aging workforce, the nature of experiential knowledge, and the risks associated with the loss this knowledge. The thesis reviews state-of-the art literature surrounding these issues, and goes on to discuss the mitigation program developed by the Construction Industry Institute's research team RT 292, of which the author was a key investigator. The combined industry experience of the research team was used to guide the development of the program and was supplemented by interviews and surveys with industry experts. The program proposes a methodology for effectively pairing a retiree with an effective experiential knowledge transfer strategy. A broader goal of the program is to instigate a cultural shift within organizations to a more proactive approach to experiential knowledge retention.

Contents

List of Figures

List of Tables

Chapter 1 Introduction

1.1 Problem Statement

The capital projects industry is experiencing a dramatic increase in the rate of experienced people leaving the workforce; this is due to the large number of retirements from the baby boomer generation and too few workers that are able to effectively fill the resulting employment gap. Organizations are using traditional techniques to address the situation, but the acceleration of the loss of experiential knowledge calls for a revised approach. For example, hiring mid-level employees fills the seats but only partially replaces the wealth of experiential knowledge of the departing, seasoned professionals. While the "bubble" in terms of employee numbers is being addressed, the experiential knowledge loss remains a problem. A comprehensive, proactive, method to address this will offer organizations a competitive advantage.

1.1.1 How the Problem Affects Industry

In the latter part of the 20th century, the capital projects industry effectively managed the natural loss of knowledge through normal attrition. The subsequent higher than normal rate of knowledge loss due to the baby-boomer retirements emphasizes the importance of changing our knowledge transfer practices. From January 2011 to 2030, more than 10,000 baby boomers will reach the traditional retirement age of 65 each day (Pew Research Center, 2011). This loss of manpower due to age is not exclusive to the United States; it is also becoming a common problem in both current advanced economies and emerging markets (Eberstadt, 2011). While organizations have always experienced people leaving, either due to retirement or switching jobs, this issue is of paramount importance now due to the increase in the retirement rate. In some cases employers are benefitting from people delaying their retirement and remaining in the workforce; however this only mitigates the issue, it does not eliminate the problem. The

global elderly support ratio, which is the number of working age people for every person over the age of 65, is expected to drop from nine in 2010 to four by 2050, while in 1950 it was 12 (Jacobsen, Kent, Lee, & Mather, 2011). This trend indicates that the rate of people leaving the workforce is drastically greater than what has been experienced in the past. There is an opportunity available to seize the initiative to make up for the loss of employees through focusing on better retention of the collective knowledge of the organization.

In addition to an increase in retirements, another concern for the capital projects industry has to do with recruiting challenges. Based on the "long hours, frequent periods of being away from home for days, weeks, or months at a time, last-minute scheduling demands, and harsh working conditions," the industry is not attractive to younger generations (Ball & Gotsill, 2011). While the characteristics of the industry have not changed in recent years, generational expectations have. Generation Xers and Millennials now seek a definitive work-life balance and are willing to switch careers to get it. This contrasts with the Baby Boomer attitude where an individual was tied to a company for the duration of their career. While these differences have been apparent for years, the emerging multinational demands of modern projects in the capital projects industry is contributing to a decline in interest of the industry as a career selection. Thus, the capital projects industry faces two hurdles in replacing the disproportionately large retiring employee population: differences in generational desires and the demands of the global environment in which the industry operates.

1.1.2 How the Problem Affects Capital Projects Organizations

The problem of the knowledge gap created by the extraordinarily high rate of retiring employees introduces issues with both operational and cost implications. The operational effects of a knowledge gap within an organization include: reduced efficiency, an increase in the number of critical errors, reduced ability to innovate and a reduced ability to pursue growth strategies. These issues arise

due to a lack of expertise which forces the remaining employees to “re-invent the wheel” when addressing common problems, contributing to loss of efficiency and more mistakes. Furthermore, without sufficient competent employees it is difficult to successfully expand an organization (De Long, 2002). In addition to the economic effects of the reduced operational capacity, the additional cost of replacing an employee, on top of the new hire’s salary, can range from 50% to 150% of the departed employee’s salary depending on the quantity and criticality of the knowledge lost (Perrin, 2005). The problems a company faces when an experiential knowledge gap develops clearly has a detrimental effect on it’s competitiveness. Implementing an effective experiential knowledge management strategy which includes proactive identification and mitigation of knowledge loss is the best method to circumvent the issues above.

To illustrate the impact of experiential knowledge loss the concept of “knowledge units” will be introduced. Knowledge units are a metric that attempt to quantify an individual’s job related experiential knowledge by allocating a knowledge unit for each year worked (1 year of experience = 1 knowledge unit). For instance a new graduate will likely have zero knowledge units upon graduation, but after five years of employment in their field, they will have accumulated five knowledge units. When considering the knowledge units of mid-career hires it important to note that their accumulated knowledge inventory may be discounted when moving between organizations as it takes time to align with the culture and business needs of the new organization. Analyzing the net quantity of knowledge units within an organization is a means of evaluating the organization’s knowledge.

Consider a situation where an organization has 1,500 employees with the age distribution shown in Figure 1-1. In this example the company maintains a fixed headcount by replacing attrition with new hires, as is industry standard (note that the hiring practice is not to hire green applicants exclusively. It is assumed that the inflow/outflow of mid-career employees is net zero).

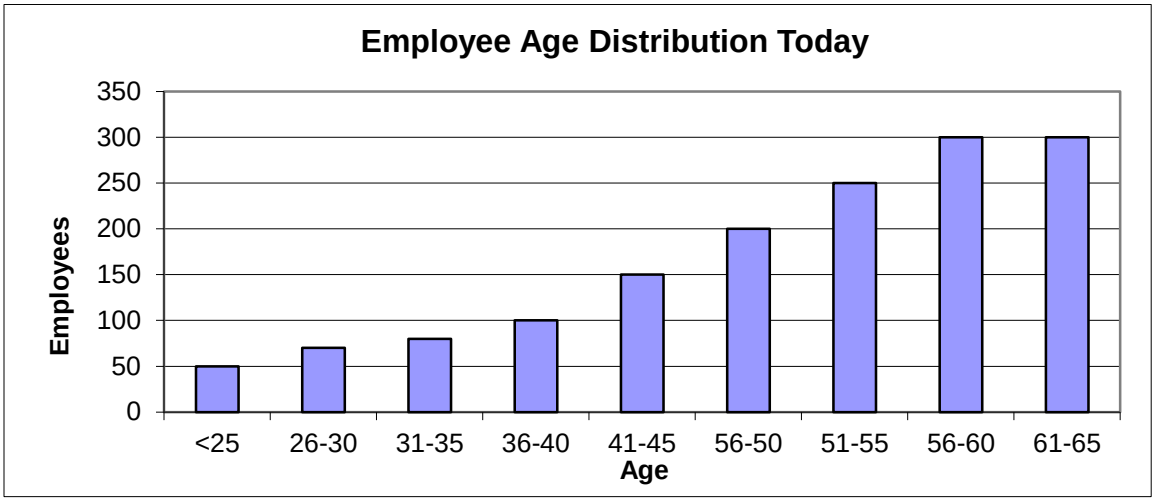


Figure 1-1: Current Employee Age Distribution -Example

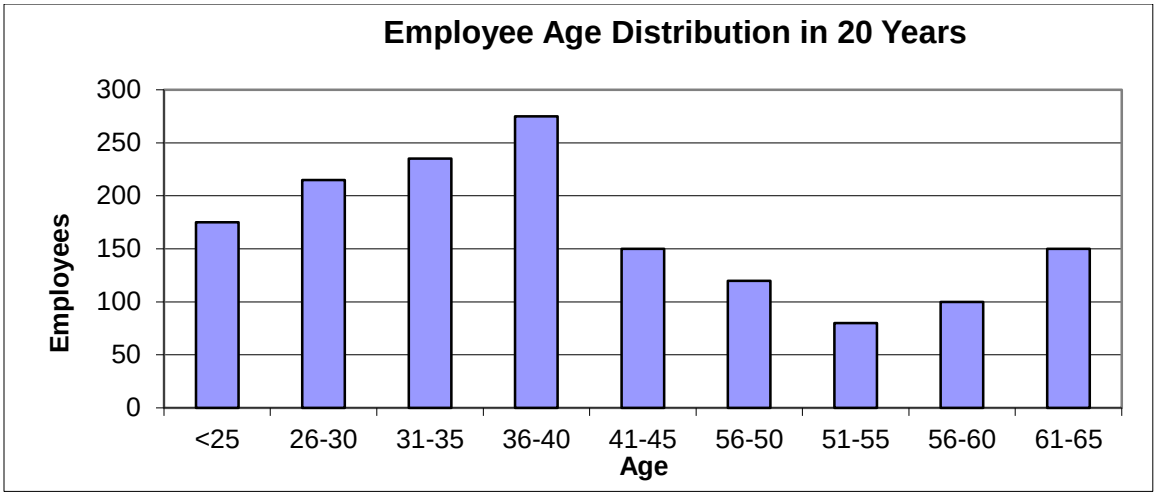


Figure 1-2: Projected Employee Age Distribution in 20 years -Example

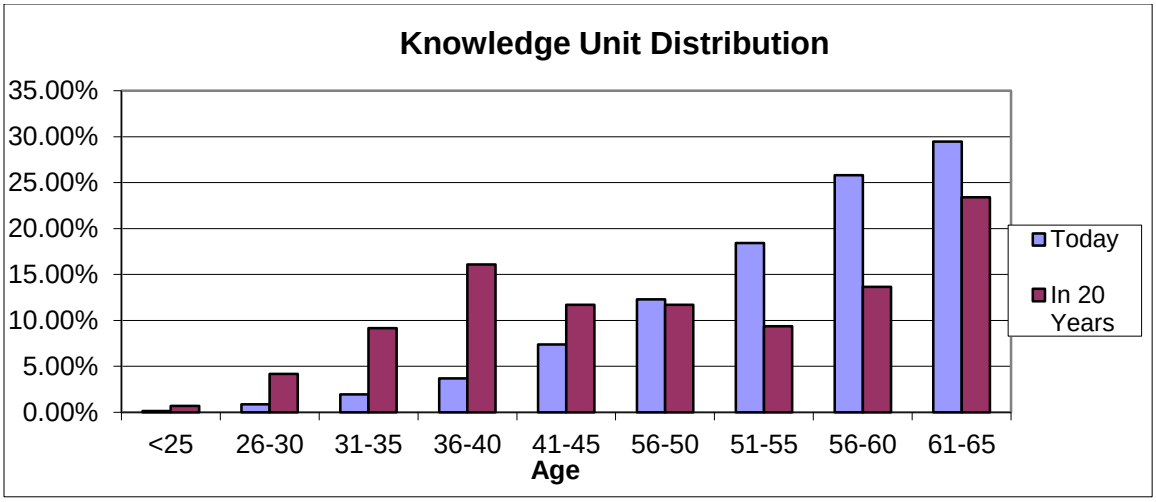


Figure 1-3: Distribution of Knowledge Units - Example

Based on the age distribution shown in Figure 1-1 and a linear correlation of knowledge units to years, the current state of knowledge is described by the distribution shown in Figure 1-3. After 20 years of maintaining a constant head count and using the hiring practices outlined above, the company's age distribution begins to look like that in Figure 1-2, shown above, with the knowledge distribution shown in Figure 1-3. The most prominent contrast between Figure 1-1 and Figure 1-2 is the demographic shift from right to left. The implication of this difference becomes evident when analyzing both the organization's present and future knowledge inventory, Figure 1-4, and noting that in 20 years the organizational knowledge will have been reduced by close to 40%. Clearly a shift in corporate knowledge management strategy is necessary to maintain corporate operability.

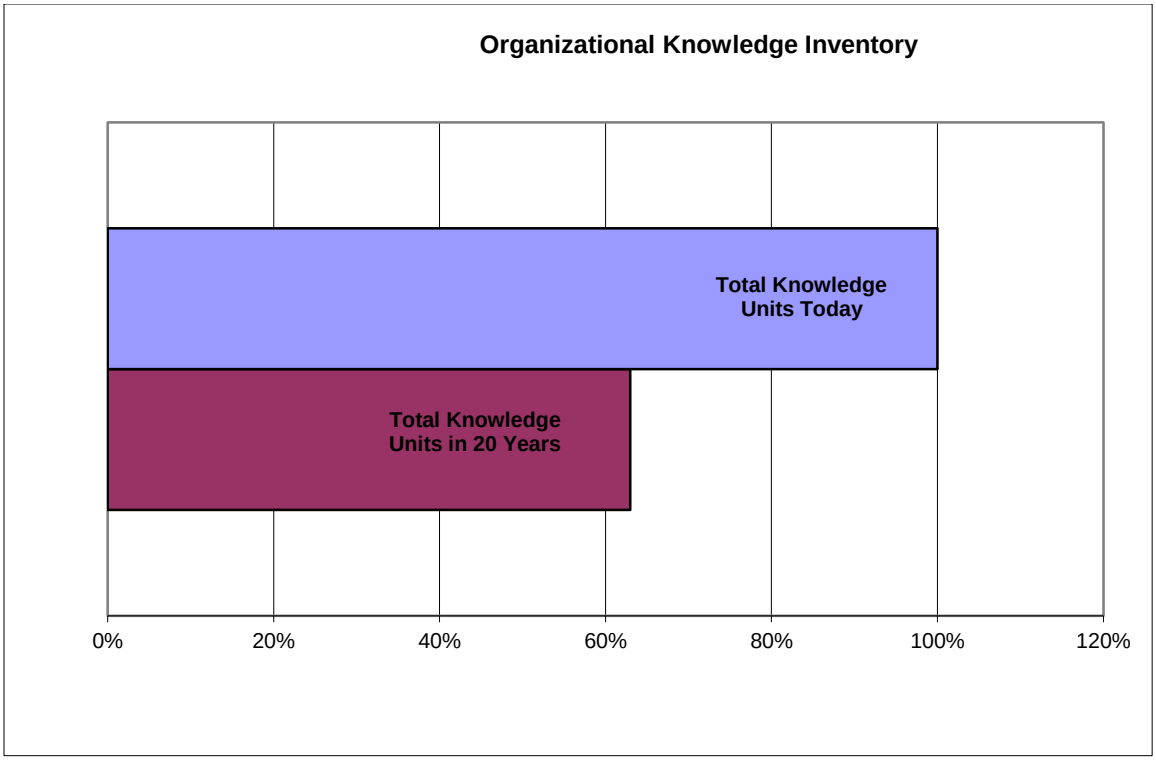


Figure 1-4: Total Knowledge Inventory (Present and Future Case) - Example

To address the increased rate of loss of experiential knowledge in the capital projects industry, the focus should not be on managing the number of employees but on managing the loss of knowledge, specifically experiential knowledge. Shifting organizational focus from replacement to retention presents an opportunity for companies to maintain their collective knowledge. With these challenges facing the industry, organizations should evolve their knowledge management strategies and methods. RT-292 aims to address this by identifying the most effective methods for transferring experiential knowledge within an organization such that the effect of knowledge loss has a minimal impact from both an economical and operational standpoint.

1.2 Research Objectives

The primary purpose of this research project was to provide definitive recommendations, guidelines, and tools for the Capital Projects Industry to effectively transfer experiential knowledge of its employees nearing retirement to the people who remain on the job. Effective knowledge transfer and management practices as well as technologies were identified and analyzed. Interviews and case studies were conducted. Particular attention was given to specific actions needed or being taken by organizations to transfer near-retirees' knowledge, and how companies integrate this information for the benefit of succeeding generations.

In the context of capital projects, the specific research objectives were:

- Understand the experiential knowledge transfer problem, including its magnitude and dynamics.
- Investigate the knowledge transfer value proposition.
- Provide definitions of terms related to the research topic.
- Assess and deliver techniques to measure the extent and nature of an organization's knowledge loss risk.
- Define and assess methods to effectively transfer knowledge and mitigate knowledge loss risks.
- Understand the barriers to knowledge transfer methods, as well as their implementation success factors.

This research employed an extensive review of current knowledge transfer and management practices, interviews with both CII and non-CII organizations, case studies, and surveys. Organizations of different sizes were included in the investigation.

The research is focused on transferring ***Experiential*** **Knowledge** rather than procedural, or explicit, knowledge.

The knowledge retention process developed herein has been developed specifically for the transfer of experiential knowledge from individuals nearing retirement to their successors; however, the process may be applicable in other scenarios.

1.3 Limitations & Assumptions

The researchers assume that the organizations participating in the data collection efforts are a fair representation of the capital projects industry. All participants were approached as volunteers in the study.

1.4 Organization of Thesis

Following this introductory chapter, Chapter 2 presents the research methodology. Chapter 3 focuses on providing a review of various elements of knowledge transfer/management including the nature of experiential knowledge, typical elements of a knowledge retention program, quantification and assessment of knowledge, a review of knowledge sharing strategies, knowledge sharing environments, gaps in existing research, and finally concludes with four case studies of industry KM leaders. Chapters 4 and 5 present the results from the interviews, and surveys. Chapter 6 presents the validation technique used by the research team and Chapter 7 outlines the knowledge retention process. Chapter 8 outlines conclusions and recommendations from the research.

Chapter 2 Research Methodology

This research was initiated by the Construction Industry Institute (CII), a consortium of more than 100 leading Owner, EPC, and Supplier organizations. CII's mission is "to enhance business effectiveness and sustainability of the capital facility life cycle in the construction industry through research, related initiatives, and industry alliances."

Research was conducted by CII project team RT-292. The research team was made up of 18 industry experts from both owner and contractor organizations in addition to academic support. The author of this thesis was among the key researchers on this project.

The research methodology used by RT-292 is outlined in Figure 2-1, shown below. The methodology was established early in the research to guide latter efforts.

Research within the team was conducted in parallel by two sub-committees that continually conferred with one another. This ensured continuity and alignment. The sub-committees were focused on knowledge loss risk assessment and knowledge loss risk mitigation respectively.

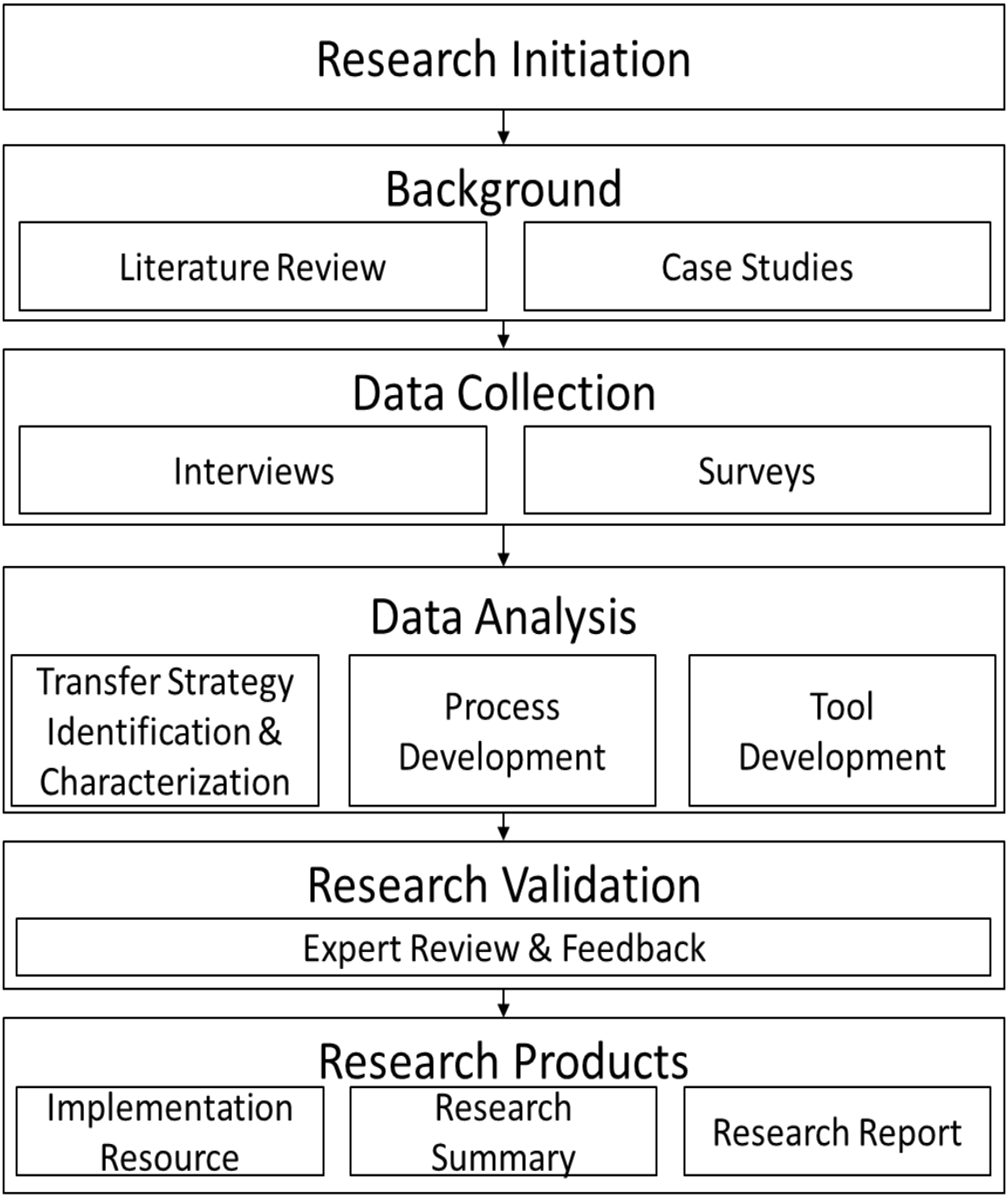


Figure 2-1: Research Methodology

2.1 Literature Review

Following initiation, the research conducted an extensive literature review of current knowledge transfer and management practices. The review covered various journal articles, industry best practice reports, knowledge management books, and various web sources. The results will be covered in greater detail in Chapter 3.

2.2 Data Collection

2.2.1 Case Studies

The initial data collection effort performed by RT-292 was to perform case studies with industry leaders in experiential knowledge management. The purpose of the case studies was to gain insight into: what the knowledge management leaders within the industry do to mitigate their experiential knowledge loss risks, what steps are taken to manage a knowledge retention program, how knowledge criticality is assessed and prioritized, how individual retention cases are planned, implemented and monitored, and finally how to assess the efficacy of the program as a whole and understand the value added by pursuing experiential knowledge retention. RT 292 performed four case studies two with Owner organizations, and two with Contractor organizations. All organizations are considered to be leaders within the knowledge management community.

The case studies helped to guide the development of the Experiential Knowledge Retention Management Model. These will be covered in greater detail in section 3.9.

2.2.2 Interviews

The second data collection effort consisted of a series of interviews with both CII and Non-CII organizations within the capital projects industry. Knowledge

management and human resources experts were interviewed. The interviews were focused on assessing the current state of industry experiential knowledge management practices, gauging industry awareness of the problem under investigation, understanding how organizations structure their knowledge resources, and to gain insight into how organizations addressed knowledge criticality. The interviews also served to confirm that the knowledge management techniques proposed by RT 292 for retaining experiential knowledge were being used in industry, and helped to identify what many of the success factors and barriers to success were for each strategy. Interviews will be covered in greater detail in Chapter 4.

2.2.3 Surveys

The next phase of the data collection effort was administered in the form of a survey, which was used as a means for understanding workplace environmental characteristics that affect the applicability and the efficiency of various commonplace knowledge retention and transfer practices. The results of this data collection were used to confirm that the list of experiential knowledge transfer techniques compiled by RT 292 were applicable for experiential knowledge from retiree's to the next generation, and were also used to populate the environmental characterization tool produced by RT292. Survey results will be covered in greater detail in Chapter 5.

2.3 Data Analysis & Process Development

Following the data collection efforts, the research team analyzed the data and refined the original process map to reflect the findings. Process development and refinement was conducted within the sub-committees via webinars.

The focus of the model development efforts were to ensure a thorough definition of each model step and sub-step to make sure that the research findings and the collective team experience were leveraged in developing the process.

After having drafted an initial Experiential Knowledge Retention Management Model, based on the best practices, the team worked at refining the model to address specific research objectives. Specifically, how to isolate and target experiential knowledge within the context of an organization within the capital projects industry. Process development was primarily driven by the sub-committees during face-to-face meetings and team webinars.

In establishing the sub-committees, the team employed a risk management perspective for dealing with experiential knowledge management. This allowed the initial process model to be separated into two primary functions; Knowledge Loss Risk Assessment, and Knowledge Loss Risk Mitigation. These served as the titles for the respective sub-committees. Sub-committees were designed to include approximately equal representation by both Owner organizations as well as Contractor organizations. Furthermore, sub-committee membership was distributed to include approximately equal representation from both operations management as well as human resources/knowledge management representation.

The Knowledge Loss Risk Assessment sub-committee focused primarily on preliminary steps leading into implementation of a knowledge loss mitigation strategy. The goal was to provide a means to establish adequate support for a knowledge management effort from a leadership and support infrastructure perspective, as well as to provide decision support tools for the actual transfer of knowledge. When investigating the types of information required for decision support the team looked at: what knowledge exists, where this knowledge exists, what knowledge is critical, and what type of commitment is necessary for transferring this knowledge.

The Knowledge Loss Risk Mitigation sub-committee was focused on how to mitigate the risk of losing experiential knowledge once it has been identified. The primary obstacles addressed by this sub-committee had to do with, selecting an

appropriate receiver or receivers for a knowledge transfer, selecting an effective knowledge transfer strategy for the knowledge at risk and the individuals involved, and how best to implement the knowledge transfer strategy.

Having defined the roles of the sub-committees and identifying specific sub-committee goals/obstacles based on the process model draft, the teams were able to systematically address the problems within their respective interests to further develop and refine the process. In developing the process model, decisions/developments typically followed the following format: Identification of challenge, Solution Development, Solution Evaluation, Solution Refinement, and Solution Re-evaluation. Details of each are included in Figure 2-2, shown below.

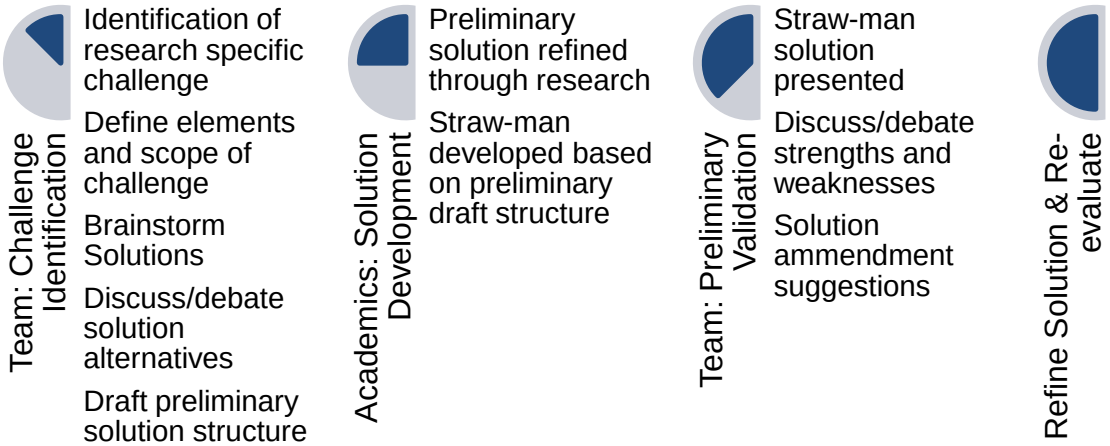


Figure 2-2: RT-292 Decision Making Framework

Challenges were identified during team meetings and webinars. Following the identification of a specific challenge, the sub-committee would typically work to

properly define the challenge and identify how it fits within the scope of the research. Following scope definition the sub-committee would brainstorm solutions. Based on the solution alternatives the sub-committee would discuss, debate, and refine the initial solution and draft the framework for how the solution would be developed. Following the meeting/webinar, the academic sub-committee would work to develop the proposed solution and to identify any issues or alternatives based on further research. After developing a preliminary solution, the academic sub-committee would report back to the sub-committee to validate the solution direction, and further refine the solution. This process is repeated until a satisfactory solution is achieved for the challenge in question. During this process there were periodic report outs to the other sub-committee to ensure alignment, and agreement within the team.

As the model steps and sub-steps were refined the team was able to outline and develop software tools to facilitate aspects of the Experiential Knowledge Retention Management Model. The tools were developed to reduce the end user's computational requirements, consolidate data from multiple assessments, and to ensure consistent step outputs to help maintain model continuity. Chapter 6 covers an overview of the model and the validation process. A detailed guide to implementing the Experiential Knowledge Retention Management Model can be found in CII IR 292-2.

2.4 Validation of Model

Validation of the knowledge retention model developed by RT-292 occurred in two parts: internal validation and external validation. Internal validation was an ongoing process by the research team, external validation was performed by a group of industry experts upon the conclusion of the research project.

The validation process will be covered in greater detail in Chapter 6.

2.5 Recommendations & Conclusions

Following the literature review, data collection and analysis, model development and validation processes, RT 292 was able to confidently provide recommendations and conclusions regarding experiential knowledge transfer from the near retirement generation to the next generation for the capital projects industry.

Chapter 3 Literature Review

This section provides an overview of published material related to **Knowledge Management** (KM) and how it impacts the capital projects industry. Included within this review is an exploration of: industry demographics, the nature of experiential knowledge, the steps, strategies, and challenges of establishing an effective knowledge management program, as well as a commentary on current gaps within the existing body of knowledge.

There exist many sources related to knowledge management, the impending mass retirement of the baby boomer generation, and how both of these topics relate to the capital projects industry. The types of sources that are considered to be the most reliable, and used most in this review, include technical reports, books, journal articles, magazine articles, theses, and conference proceedings. Other sources include corporate implementation plans, and presentations from industry leaders.

3.1 Definitions

During the course of this research, it was important to define some of the relevant terms that were to be used in the investigation.

Subject Matter Expert (SME): "An individual who, by virtue of position, education, training, or experience, is expected to have greater-than-normal expertise or insight relative to a particular technical or operational discipline, system, or process." (Pace & Sheehan, 2002)

Tacit Knowledge: "knowledge which is used by all people but not easily articulated." Tacit Knowledge is difficult to articulate because of the accumulated knowledge necessary to make circumstantial connections and interpretations for a given scenario or context. (Busch & Richards, 2000)

Explicit Knowledge: Knowledge which can be articulated into formal language, mathematical expressions, specifications, procedures, etc. Explicit Knowledge is easily transferred to others and is context independent.

Experiential Knowledge: Experiential knowledge is the dimension of tacit knowledge which constitutes the insight, wisdom, and good judgment gained through experience (Leach, 2011), it is often characterized as “know-how,” and is developed more through ‘doing’ than other forms of learning.

Knowledge Management: Knowledge Management (KM) is the “integrated, systematic approach to the identification, acquisition, transformation, development, dissemination, use, sharing, and preservation of knowledge relevant to achievement of specified objectives. KM helps an organization to gain insight and understanding from its own experience” (International Atomic Energy Agency, 2006).

Attrition: “A decrease in the number of employees in an organization as a result of retirement, other termination, or transfer to other organizations” (International Atomic Energy Agency, 2006).

Institutional Knowledge: “The collective knowledge, skills, and competencies of the people in an organization” (International Atomic Energy Agency, 2006).

3.2 Demographic Analysis

Following the end of the Second World War an unprecedented population expansion took place in North America. This phenomenon was called the baby boom and the individuals of that generation called Baby Boomers. There were approximately 76 million Baby Boomers born between 1946 and 1964 (Ball & Gotsill, 2011). This group currently represents a significant proportion of the labour market, roughly 37% (United States Department of Labor, 2012). The eldest of the group have already reached the traditional retirement age of 65; those who have not already retired are amongst the most experienced and

knowledgeable individuals in the workforce yet are not far from retirement themselves. The Pew Research Center stipulates that as of January 1st, 2011, 10,000 baby boomers will reach retirement age every single day for the next 19 years (Pew Research Center, 2010). Compounding this issue many capital projects sectors tend to have lower average retirement ages; for example the Interstate Oil & Gas Commission reports that the average retirement age in the oil and gas industry is 55 rather than 65[1] years old.

Figure 3-1 and Figure 3-2, shown below, illustrate some examples of the demographic distribution within the capital projects industry. Data used to compile Figure 3-1 and Figure 3-2 was obtained through the United States Department of Labour – Bureau of Labour Statistics. The primary data source was the Current Population Survey (CPS) which is a monthly household survey that provides data regarding both the employed, and unemployed population. Data examples include, age, race, occupation, and various other metrics.

Figure 3-1 shows that, for the most part, although individuals within management positions tend to be older there is a healthy distribution of younger individuals who are developing and will act as replacements for future retirees.

[1] (Interstate Oil & Gas Compact Commision)

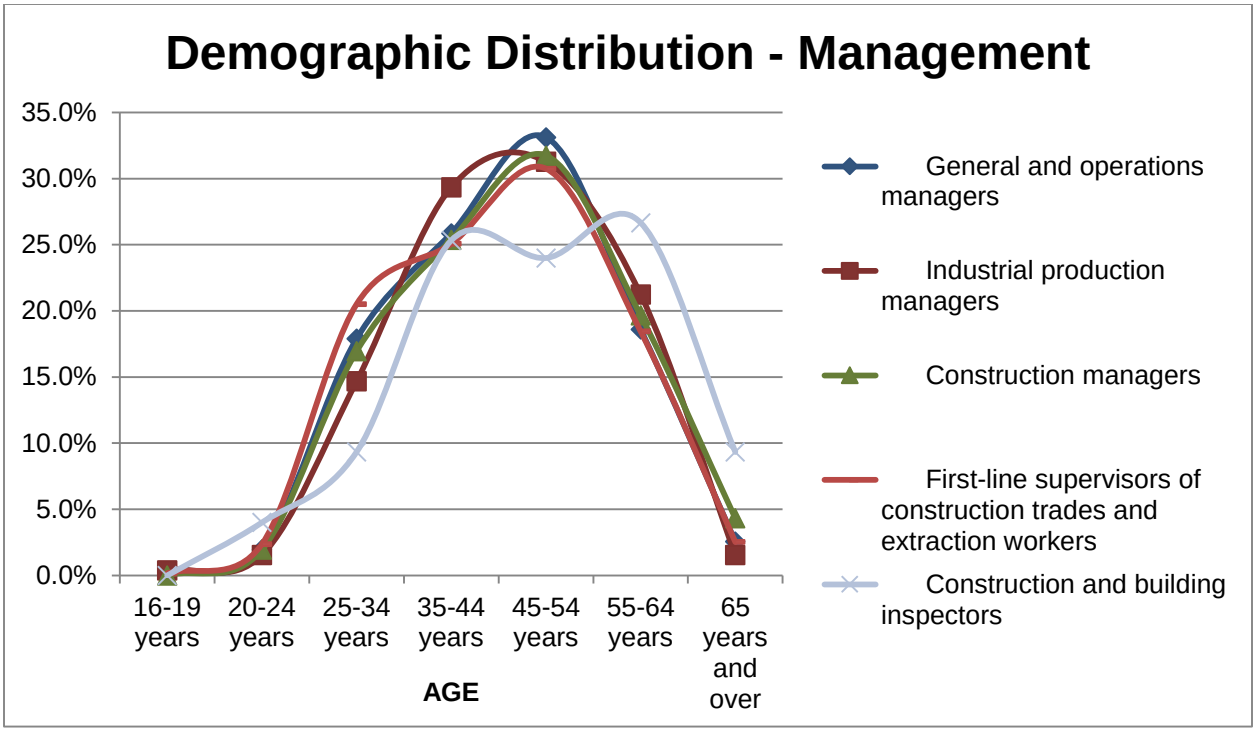


Figure 3-1: Demographic Distribution - Management (Source: BLS Current Population Survey)

Figure 3-2 shows the demographic distribution for a selection of engineering disciplines. The general shapes of the curves illustrate that there is an inconsistency within the distribution, namely a lack of incumbent senior engineers to replace retiring individuals. This lack of replacements causes a knowledge gap that is not easily filled by new-hires fresh from college (Harrison, 2008).

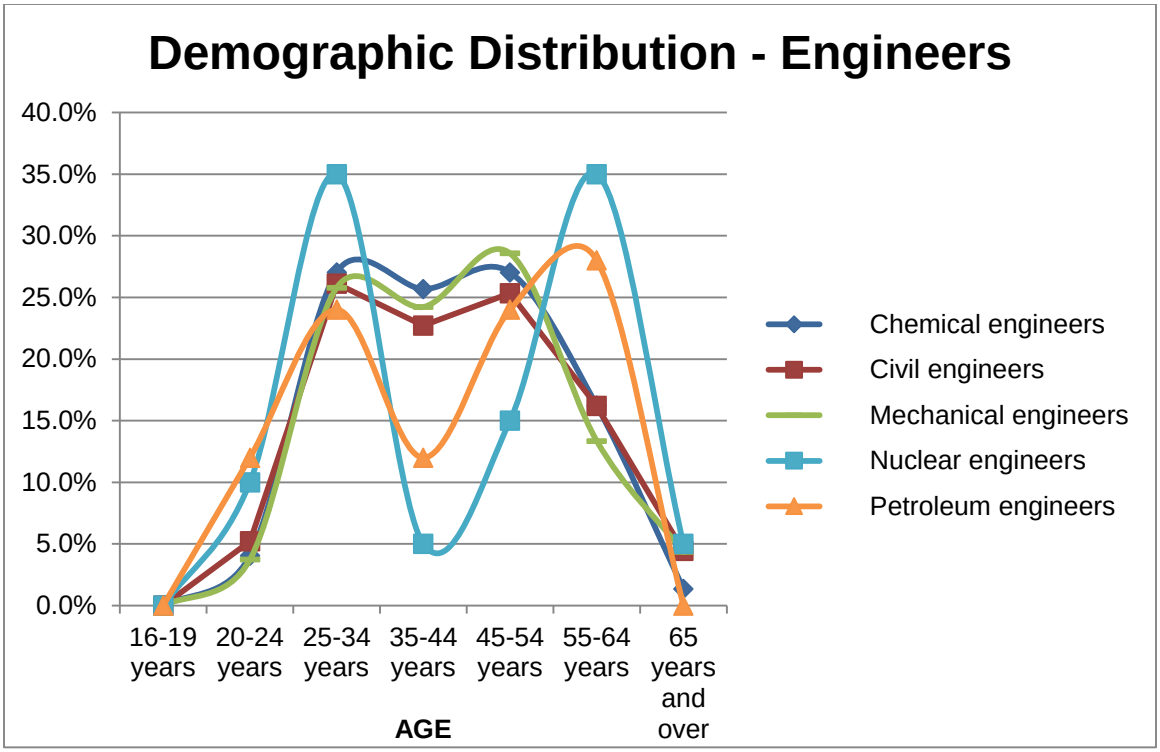


Figure 3-2: Demographic Distribution Engineering (Source: BLS Current Population Survey)

Other factors which affect the outlook of the demographic balance within the capital projects industry include industry growth and a reduced number of entrants into the industry. The construction and engineering industry has a projected five year growth rate of 26.6% from 2010 to 2015 (Marketline, 2011) (see Figure 3-3, below). The industry will be required to fill employment needs generated by industry growth, as well as being able to replace the 250,000 construction workers that leave the industry each year (Spillane, 2004).

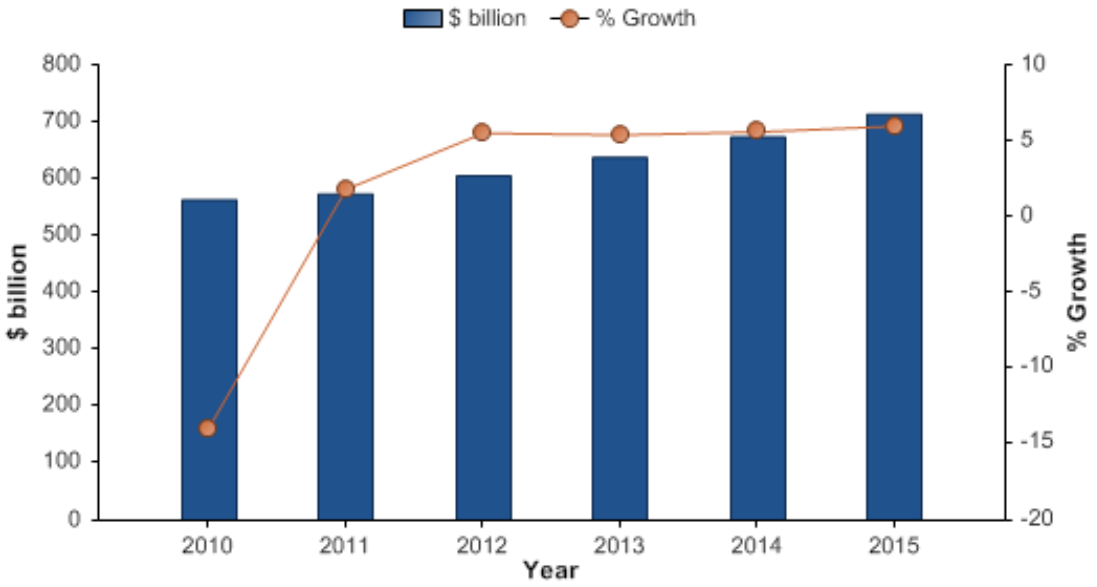


Figure 3-3: United States Construction & Engineering Industry Value Forecast (Source: MarketLine)

A demographic shift within the United States will see a reduced number of 18-24 year olds entering the workforce in years to come. The Construction Industry Institute states that this age group is the primary source of entrants into the industry and will lead to a scarcity of human resources. (Construction Industry Institute, 2012)

When considered together, the graying of the capital projects industry, industry growth, and reduced entrants into the workforce create a “perfect storm” that requires effective planning to mitigate the appearance of knowledge gaps and the problems associated therewith (Spillane, 2004).

3.3 The Nature of Experiential Knowledge

In considering the nature of experiential knowledge it is important to understand that knowledge is a multi-dimensional concept with no universally accepted definition. Plato is credited with one of the earliest attempts to define knowledge; in his work Theaetetus (~369BC) he defined knowledge as being “a justified

truth" (Chappell, 2011). Bearing that simple definition in mind, throughout the duration of this project it has become clear that many expanded definitions have emerged with many and more interpretations. *The focus of this research will be on experiential knowledge considered as an element of tacit knowledge*.

Cowan et alt. (1999) states that "the terminology of tacitness now in circulation, having drifted away from its original epistemological and psychological moorings, has become increasingly amorphous; indeed that it now obscures more than it clarifies" he goes on to state that "tacitness has become an increasingly 'loaded' buzzword" (Cowan, David, & Foray, 1999). For this reason, tacit knowledge will be briefly presented and the subset of tacit knowledge under consideration, experiential knowledge, will be defined in order to provide clarity to the scope of knowledge being investigated.

Micheal Polyani is recognized with introducing the concept of tacit knowledge in his 1958 work *magnum opus Personal Knowledge.* In introducing tacit knowledge, Polyani recognizes that knowledge is multidimensional and not wholly explicit (Zhenhua, 2004). Since the publication of *Personal Knowledge,* the concept of tacit knowledge has been subject to many interpretations with respect to the breadth of applicability of the term. Busch suggests that a common, generally accepted, definition of Tacit knowledge is "that knowledge which is not easily articulated"; however, a definition more in line with the spirit of Polyani's meaning is "knowledge which is used by all people but not easily articulated" (Busch & Richards, 2000).

In highlighting this distinction Busch suggests that tacit knowledge lies on a spectrum of articulability. The spectrum ranges from sensory-motor knowledge (such as perception, recognizing a friend's face for example) to capabilities and skills accrued which are not easily articulated because of the accumulated knowledge necessary to make circumstantial connections and interpretations (Busch & Richards, 2000). The latter part of this spectrum encompasses the tacit

knowledge gained through on the job experience and is a large part of what organizations look to capture when managing an individual's knowledge. The term that RT-292 uses to address this type of knowledge is experiential knowledge; it has been defined as follows:

Experiential knowledge is the dimension of tacit knowledge which constitutes the insight, wisdom, and good judgment gained through experience (Leach, 2011), it is often characterized as "know-how," and is developed more through 'doing' than other forms of learning.

3.4 Elements of a Knowledge Loss Risk Mitigation Program

Demographics are not the sole contributor to the knowledge management difficulties of the capital projects industry. Project based organizations, especially organizations with short project cycles, see knowledge generated, re-invented, and lost as teams are formed and later broken up to work on new projects (Will, 2008). This is an additional challenge that must be overcome, and provides motivation for project based organizations to develop strong knowledge sharing cultures. This section will provide an overview of the elements of a knowledge management program followed by a review of critical success factors in knowledge management programs.

Figure 3-4, shown below, outlines typical elements of a **Knowledge Management Systems** (**KMS**) (Tennessee Valley Authority) (International Atomic Energy Agency, 2006) (Dataware Technologies, 1998) (Tiwana, 1999).

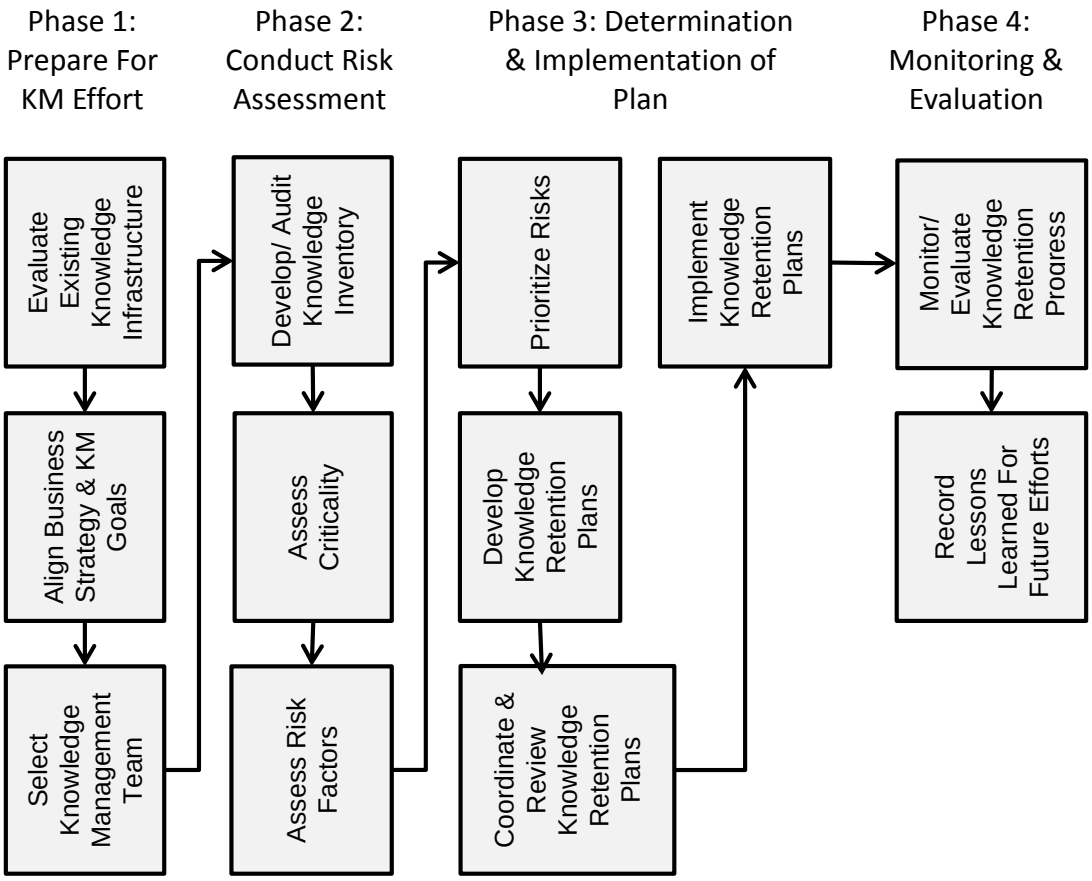


Figure 3-4: Summary of Typical Elements of a Knowledge Management Program

Phase 1: Preparation

Phase 1 of a knowledge management program is typically focused on preparing for the upcoming KM effort.

The first step for an organization is to evaluate their existing knowledge infrastructure. This includes investigating initiatives already in place, considering the knowledge sharing culture at the organization, identifying gaps in the existing system, and any other problems that may exist. A thorough understanding of existing infrastructure will allow the organization to leverage existing initiatives where appropriate and maintain existing investments (Tiwana, 1999).

The second step is to consider the corporate business strategy and how a knowledge management program can be developed to support these goals. This

step is important as it ensures that the KM initiative has direction and is not viewed an imposition that distracts employees from other responsibilities. An added benefit is that this step helps to garner broader executive buy in (Dataware Technologies, 1998).

The final step of phase 1 is to select a knowledge management team. The team should be composed of individuals who have a broad understanding of the company and its structure as well as exceptional people skills. Team members must also have the capacity to promote the program within the company to raise awareness, and garner the buy-in required to instigate cultural changes.

Phase 2: Risk Assessment

Phase 2 of a KMS involves assessing the risk associated with knowledge loss. The fundamental components involve conducting a knowledge inventory audit, and conducting a risk assessment based on the knowledge inventory. Elements of a risk assessment are covered in Section 3.5

Phase 3: Knowledge Management Plan Development & Implementation

Phase 3 of a KMS require the development and implementation of the KM initiatives. Some of the initiatives will be perpetual efforts designed to be proactive knowledge retention aids, while others will be case specific efforts related to critical knowledge loss risks. Methods for transferring knowledge are elaborated upon in Section 3.6

When developing individual knowledge retention plans the Tennessee Valley Authority (TVA), a KM leader, includes the following elements in their plans:

- Employee position risk factor, retirement factor, and attrition factor. (See TVA case study for further details)
- Summary of critical skills/value added
- Potential for a new-grad, or mid-career transfer, to replace these skills and estimated time-frame to achieve mastery

- Identified/potential protégées or replacements
- Existing training efforts to mitigate loss of knowledge under consideration (individual or corporate)
- A critical knowledge matrix that includes a list of the critical skills, the associated criticality of each skill, actions planned to mitigate the risk (see knowledge sharing strategies for examples), as well as target completion dates and status updates.
- An annual review schedule for the plan

Phase 4: Monitor & Evaluate

Phase 4 requires an evaluation of the KMS as a whole. This step is focused on collecting feedback that will allow the KMS to improve as well look at metrics that evaluate the success of the initiative and the return on the investment (Tiwana, 1999).

For organizations with little, or no, formal KMS in place, it is suggested that the KMS be tested on a narrow audience (ex. isolated silos) and slowly implemented throughout the organization as the system is refined (Dataware Technologies, 1998).

The following discussion focuses on the article “Critical Success Factors for Implementing Knowledge Management in Small & Medium Enterprises” written by Kuan Yew Wong (2005). The article is focused on **Critical Success Factors** (CSF) for implementing KM in an organization. The result is a comprehensive set of 11 CSF. They are:

- Management leadership and support
- Culture
- Information technology
- Strategy and purpose
- Measurement
- Organizational infrastructure
- Processes and activities
- Motivational aids
- Resources

- Training and education
- Human Resources Management

Management Leadership & Support: Yew Wong (2005) cites Holsapple and Joshi (2000) in stating that “In essence leaders establish the necessary conditions for effective KM.” It is the responsibility of the leaders to provide support and act as role models within a KMS; in so doing they will be able to drive cultural change and enhance employee buy-in.

Culture: Yew Wong (2005) defines culture as “[the] core beliefs, values, norms, and social customs that govern the way individuals act and behave in an organization.” As such, incorporating culture into the KMS effort is paramount to its success. Yew Wong (2005) states that “The biggest challenge for most KM efforts actually lies in developing [the] culture.”

Information Technology: IT provides the means and method to support a KMS. Effective, efficient IT encourages users to utilize the infrastructure, and to rely upon it. Critical IT components include effective search/query options, accessibility, speed, ease of use, quality and relevance of content, person to person connectivity, and document management.

Strategy & Purpose: Related to both business strategy integration and KMS strategy. A generally agreed upon KM CSF is that a KMS must support business strategy. KMS strategy addresses the scope of application, allocation of resources, and schedule required/available to achieve the KM goals. KM goals must be clearly defined, understood and relevant.

Measurement: Provides feedback metrics for KMS. Metrics enable a review of system effectiveness and opportunities for improvement. In addition, metrics provide a means for justifying the investment by quantifying the benefits of the

program. Measuring the success/impact of a KMS is critical at the outset as it motivates the improvement and continuity of the effort. No standardized KM metric is currently available.

Organizational Infrastructure: This is about the team that manages KM effort and its resources. The KM team can be supported or integrated with HR and/or IT but is wholly responsible for managing the KM effort. This often requires individuals whose job is entirely or partially KM related.

Process & Activities: Knowledge sharing mechanisms within a company must be well developed and tested prior to implementation. Numerous options are available for knowledge transfer; however, refining a select few with broad applicability will ensure the systems are used effectively.

Motivational Aids: Yew Wong (2005) cites Hauschild et al. (2001) stating that "successful KM requires the development of a "grass root" desire among employees to tap into their company's intellectual resources." In considering what criteria to review for providing motivational aids Yew Wong suggests looking at knowledge sharing, contribution, teamwork and creativity as criteria. These criteria reward group achievement and can be influenced by individuals but not achieved was an individual.

Resources: Money, time, people, and attention require consideration, coordination, and budgeting within a KMS. They must be managed to ensure that KM does not become a runaway expense item, unattainable, understaffed, or unattended.

Training & Education: Training and education is required for both KM team and general staff. For the KM team this is required to competency as knowledge managers. For staff, training and education are required to inform them of the importance of KM, teach KM terminology, inform them of the KMS goals, and to develop the soft skills necessary to promote a KM culture.

Human Resources Management (HRM): Addresses employee recruitment, development, and retention. These elements of HRM ensure that knowledge is sustainable, knowledge gaps filled, knowledge is developed and that current knowledge assets do not leave the organization.

3.5 Quantifying Knowledge Volume & Critically

One of the chief difficulties in managing experiential knowledge is that it is difficult to identify/quantify the extent of an individual's or firm's knowledge. Tseng & Huang (2005) suggest a five step process for knowledge capitalization, as shown in Figure 3-5.

The first step listed is to locate knowledge; this is often viewed as the most difficult step in the process because experiential knowledge is often segmented, and scattered within an individual's mind (Tseng & Huang, 2005). The importance of locating this knowledge, however, is emphasized by Stewart (2001) in stating "one flaw in knowledge management is that it often neglects to ask what knowledge to manage and to what end."

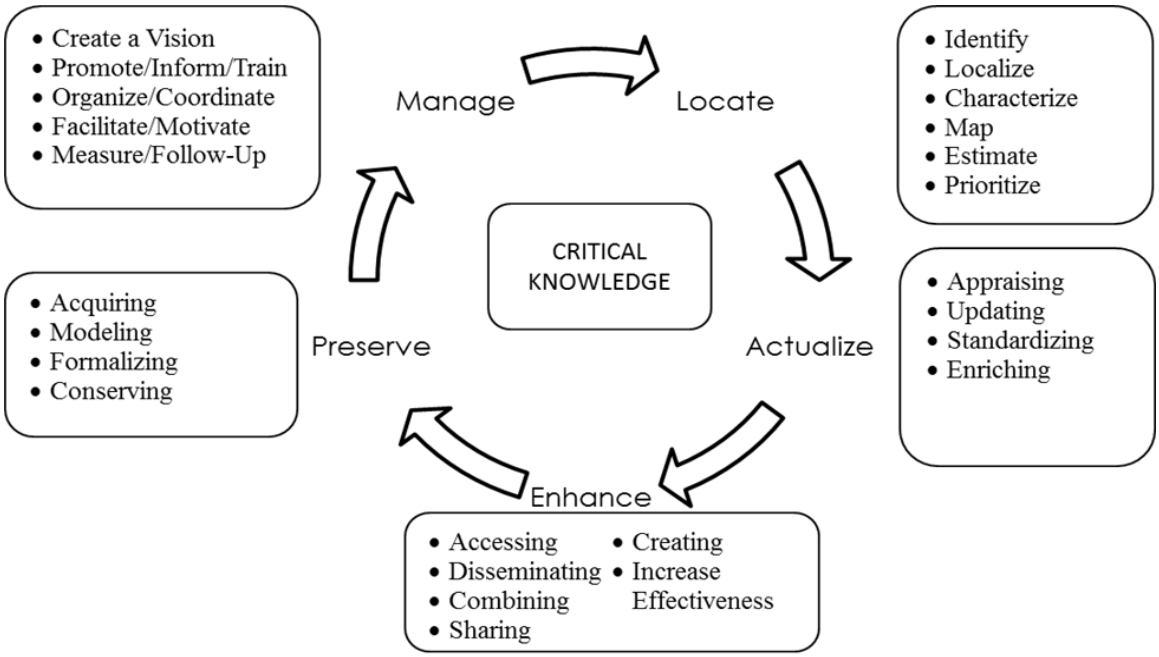


Figure 3-5: Knowledge Capitalization Cycle (Adapted from Tseng & Huang, 2005)

When considering “what knowledge” most organizations use the term critical, or crucial, knowledge. Common criteria when considering what constitutes critical knowledge are included in Table 3-1: Critical Knowledge Factor Grid (Adapted from Ermine, 2006), shown below.

Table 3-1: Critical Knowledge Factor Grid (Adapted from Ermine, 2006)

Thematic Axis	Criteria
Rarity	Number & Availability of experts Externalization Leadership Originality Confidentiality
Utility	Corresponding to strategic objectives Value Creation Emergence Adaptability Frequency of Use
Difficulty to Capture Knowledge	Identification of Knowledge Sources Mobilization of Networks Importance of Tangible Sources Rapidity of Obsolescence
Nature of Knowledge	Depth Complexity Difficulty in appropriation Importance of past experiences Environment dependency Time required to develop

In identifying knowledge resources one of the leading methods in the field of epistemology is knowledge cartography. Ermine et alt. (2006), cite Pachulski et alt. (2000), in stating that “knowledge cartography (or knowledge mapping) allows [a] firm’s critical knowledge to be enhanced” furthermore they cite the definition of knowledge cartography defined by Speel et alt. (1999) as “the process, methods, and tools for analyzing knowledge areas in order to discover

the features or meaning and to visualize them in a comprehensive, transparent form such that the business relevant features are clearly highlighted." Most importantly knowledge mapping helps to identify the location and value of knowledge. In identifying and determining the value of knowledge, a company can determine what knowledge to preserve, develop, or abandon, and who within the organization holds critical knowledge; in this respect knowledge cartography methods can be considered as decision support tools.

Knowledge cartography can be approached in two ways, process oriented, or domain oriented. Process oriented approaches consider business functions and use modeling and analysis to identify critical knowledge. Domain oriented approaches look at a collection of information and attempts to organize it logically based on an item's knowledge domain while attempting to remain independent of its functional application (Ermine, Boughzala, & Tounkara, 2006).

The following methods are considered to be leading cartography methods:

Global Analysis METHodology (GAMETH) is a process oriented approach that connects knowledge to action. GAMETH is driven by three primary steps, identifying sensitive processes, identifying the determining problems, and identifying critical knowledge (Grundstein & Rosenthal-Sabroux, 2008).

Step 1) Identifying Sensitive Processes:

A *Sensitive Process* is a process, which represents the important issues, which are collectively acknowledged.

These issues concern weaknesses in the process presenting a risk of:

- Not being able to meet cost or time objectives
- Failing to provide required quality for the goods or services produced
- Negative effects on goods and services that are strategic assets of the company

Step 2) Identify the Determining Problems of the Identified Processes

Determining Problems are problems which are related to or encountered in the processes and activities identified as sensitive.

A determining problem is identified by modeling the sensitive process. This involves assessing the risks to which it is exposed, determining key activities/drivers, defining constraints that affect these activities, and finally distinguishing the determining problems.

Step 3) Identify the Critical Knowledge

In the GAMETH approach, criticality is assessed relative to vulnerability (scarcity, accessibility, cost, and delay of acquisition) as well as its influence on the organizations longevity, market share, and corporate strategy.

Those determining problems which cannot be easily solved often lead to the identification of critical knowledge

The suggested deliverables of a GAMETH evaluation include, as listed by Grundstein (2008):

- Explicit Knowledge Inventory
- Index of bearers of critical tacit knowledge that is not easily articulable
- Index of bearers of critical knowledge that has potential to be codified

Tseng & Huang (2005) suggest the use of the Crucial-Knowledge Determination Method (CKD) to address the difficulty in locating critical knowledge. The process is summarized as follows:

Step 0) Initialization: List all knowledge requirements from the knowledge inventory (Requires existing knowledge inventory)

Step 1) Categories identification: Generate a list of categories on the basis of topic similarity of knowledge items

Step 2) Importance Rating: Multiple Experts within the organization rate the importance (weight, 1.0 to 5.0) of each knowledge requirement

Step 3) Calculate the average importance rating of each knowledge requirement and the variance in the weights supplied for each knowledge item

Step 4) Representation: Use the final outcomes from step 3 to plot the average weight against the variance from the expert weightings. See figure 5, below. The figure shows knowledge items (i,n) where i represents the knowledge category, and n the knowledge item. Zones I through IV are classified as follows:

Zone i: Vital Knowledge: This type of knowledge is very important and should be located and preserved.

Zone ii: Prompt Acquisition Set: This knowledge set is important for some problems.

Zone iii: Seasonal Knowledge: Not important for the majority of problems encountered.

Zone iv: Insignificant Knowledge: This set does not require any collection of knowledge and no further action is required when dealing with set iv knowledge.

The zone limits should be drawn according to resource availability.

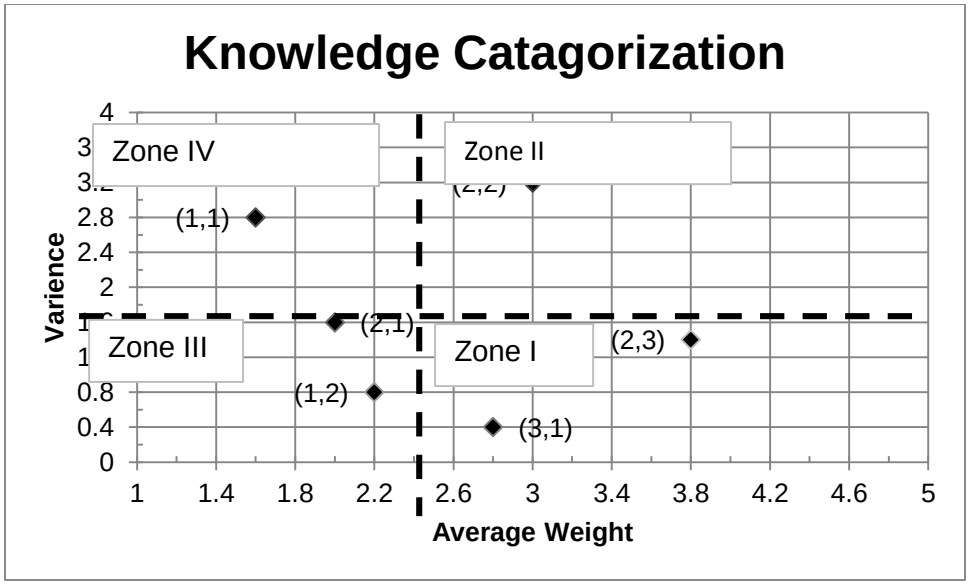


Figure 3-6: CKD Knowledge Categorization Diagram (Adapted from Tseng & Huang, 2005)

Although the CKD method is simple, the utility of the method is dependent on the preexistence of a knowledge inventory; establishing such an inventory is among the most daunting tasks of locating organizational knowledge (Tseng & Huang, 2005).

Ermine et alt. (2006) also suggest the use of knowledge trees to help guide and sustain knowledge transfer. A knowledge tree is intended to provide a graphical, or cartographic, representation of an organization's knowledge distribution by individual. A convenient feature of knowledge trees is that they are "living" in that they can be updated in real time to represent an organization's current state of knowledge. A drawback of this methodology is that for large organizations, or departments multiple trees may be necessary and this can result in a loss of some connections. (Ermine, Boughzala, & Tounkara, 2006)

All of the aforementioned cartography methods require a degree of subjectivity when considering criticality of knowledge as well as a thorough understanding of the knowledge being sought.

The international Atomic Energy Association (IAEA) present a number of resources to help elicit critical knowledge from individuals and to help establish a corporate knowledge inventory. The resources are summarized below but can be found in their entirety in IAEA's 2006 publication *Risk Management of Knowledge Loss in Nuclear Organizations*.

IAEA ANNEX II-1: Introductory annex used to align participants. The focus is on defining the type of knowledge that is being sought.

IAEA ANNEX II-2: These are general questions to provide context for the following sections. They also ask the respondent specifically what skills will be most missed upon their departure, what resources enable them to do their job, what knowledge the respondent has that will take a particularly long time to re-create, and how did the respondent learn their skills.

IAEA ANNEX II-3: Task specific questions such as how to use special tools, operation of specialty equipment, and operation of system devices.

IAEA ANNEX II-4: Questions pertaining to facts and/or information that facilitates the respondents job. This includes geographic layout knowledge for efficient transportation and movement on the job, inventory or warehouse locations of special parts or equipment, facts about people and contacts that facilitate the respondent's job, facts about systems equipment and vendors.

IAEA ANNEX II-5: Questions regarding pattern recognition for complex trouble shooting and diagnostics. Diagnostics short cuts, predictive patterns, failure patterns, and knowledge related to past failures that may help mitigate their repetition.

3.6 Knowledge Sharing Strategies

Experiential knowledge is by nature difficult to articulate. The process of transferring experiential knowledge can be facilitated by understanding the channels through which knowledge is codified and transferred; this

understanding can then be used to leverage knowledge sharing within an organization (Kleinman, Quandt, Turbek, & Wehrle, 2000). Nonaka (1997) suggests that knowledge can be transferred via any four primary mechanisms, as shown in Figure 3-7, below. The processes shown are socialization, externalization, combination, and internalization. Nonaka refers to the model, shown in the figure, as a spiral rather than a cycle because as one learns via these mechanisms their understanding becomes deeper.

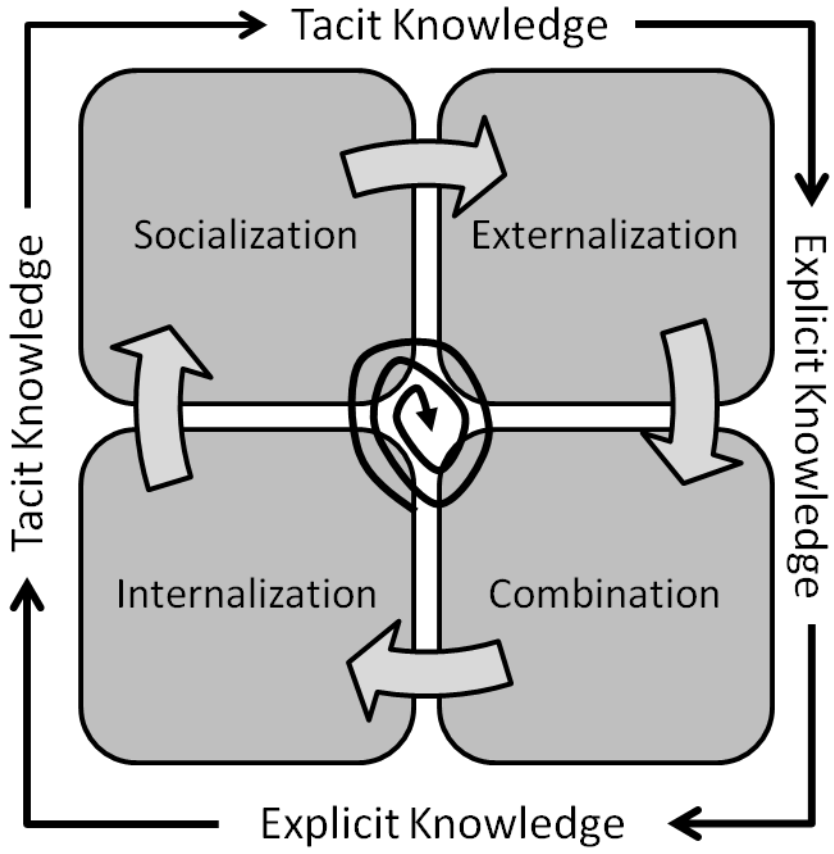


Figure 3-7: Adaptation of Nonaka's Knowledge Creation Spiral

Nonaka describes the process of transferring tacit knowledge in one person to tacit knowledge in another person as socialization. This process is characterized as being “experiential”, and requires active participation/interaction to stimulate

learning. Socialization depends on shared experiences and results in “acquired skills and mental models” between individuals.

Externalization is the process of making tacit knowledge explicit. Externalization is accomplished through articulation and elicitation. Articulation requires an individual to share their tacit knowledge through ideas, images, metaphors, analogies, or anecdotes. Elicitation requires a facilitator to elicit and translate the ideas, images, metaphors, analogies, or anecdotes into a codified format that is distributable. Translation and interpretation of externalized knowledge is an important step because the intent and essence of the tacit knowledge must not be diluted in this process. Nonanka (1997) states that externalization occurs “amongst individuals within groups.”

Combination is the process of sharing explicit knowledge. Important considerations for this step include monitoring content quality, and making end users aware of the location and accessibility of this knowledge.

Internalization is the process of understanding and interpreting explicit knowledge, thereby making it tacit. Internalization is facilitated by experience and stems from a larger group but is ultimately accomplished on an individual level. (Nonaka, 1997)

The following table includes a list of the most common knowledge transfer mechanisms within the capital projects industry; each of these strategies fall into at least one of Nonaka’s four knowledge sharing mechanisms:

Table 3-2: Knowledge Sharing Strategies

	Knowledge Transfer Mechanism	Description
1	Best Practices	Documentation of an existing process or combination of existing processes which delivers the lowest cost, highest quality, or shortest cycle time for the required task or deliverable. Best Practices document decision points and criteria used to make decisions with processes that are well defined. The intent is to facilitate repeatable, quality, results.[2]
2	Lessons Learned	Knowledge gained from experience, successful or otherwise, documented and made widely available for the purpose of improving future performance.[3] Lessons learned are documented, screened, and shared within an organization
3	Communities of Practice (CoP)	A community that shares practices. Defined by Lave & Wenger (1991) "as the process of knowledge generation, application, and reproduction" within a community of practice through "a constant process of legitimate peripheral participation. Through legitimate peripheral participation, learners enter a community and gradually take up its practice. Initially, people may participate in tangential ways, but over time, they take up more and more of the identity of group membership and centrality and more and more of the central practices of the group."[4]

[2] (Wisler, 2005)
[3] (Construction Industry Institute, 2007)
[4] (Hoadley, 2012)

Table 3-2 Continued: Knowledge Sharing Strategies

	Knowledge Transfer Mechanism	Description
4	Facilitate master classes	An experienced individual uses a series of questions regarding challenges encountered by less experienced employees in order to indirectly guide them to a solution by facilitating their learning.[5]The facilitator can instigate discussions, engage groups and ask leading questions to help guide less experienced employees.
5	Lunchtime seminars	Strategy wherein an idea can be introduced/presented to the target audience in a less formal context (i.e. over lunch). This KTS is best suited to items which are expected to be brief discussion topics or provide an introductory or overview of the concept in question.
6	Narrative databases/ storytelling	"The use of stories as a way of sharing knowledge and helping learning in an organization. Stories can describe complicated issues, explain events, communicate lessons, and/or bring about cultural change."[6] Storytellers are often soon-to-be retirees but can also be individuals who were a part of a significant event within the organization

[5] (McDermott, 2007)
[6] (Serrat, 2009)

Table 3-2 Continued: Knowledge Sharing Strategies

	Knowledge Transfer Mechanism	Description
7	Standardized college program/ course	Work with different companies within the industry to create a program or course that not only ensures a steady stream of well-trained workers to replace retirees, but also since it is designed by industry for industry, it can serve as a way to transfer knowledge from experienced workers to new hires.[7]
8	IT Collaboration/ Communication	IT Collaboration gives individuals immediate access to information and encourages sharing with a broad network. Encourages learners to produce content, and facilitates networking[8]. Because IT solutions are very dynamic, this solution is very customizable and limited only by the resources an organization has for its development.
9	Outsourcing/ Acquisition	Applicable in scenarios where required knowledge cannot be developed organically within an organization due to either an unacceptable timeframe or at an unreasonable cost to develop the required knowledge.
10	Deskside reviews	Strategy wherein a peer or a supervisor exchanges information and tools pertinent to an employee's job; The review takes place in an informal setting (i.e. at the employees desk) or at the workface where the tools are used. The intent of using the source's workspace is that the source will have all of their typical resources at their disposal.[9]

[7] (Ball & Gotsill, 2011)
[8] (Ball & Gotsill, 2011)
[9] (Tennessee Valley Authority)

Table 3-2 Continued: Knowledge Sharing Strategies

	Knowledge Transfer Mechanism	Description
11	Job Shadow	An experienced individual is shadowed by a protégée in professional settings that require the experienced individual to use the targeted experiential knowledge. Shadowing can be extensive or occasional depending on the quantity, complexity, and frequency of use of the target knowledge.[10]
12	Mentoring/ Coaching	"A one-to-one learning relationship in which a senior staff member of an organization is assigned to support the development of a newer or more junior staff member by sharing his or her knowledge and wisdom"[11]
13	Simulations & Case Studies	An opportunity for participants to develop a skill by considering multiple scenarios and developing multiple solutions. A benefit of simulations is that they allow the learner to stop, review, and re-evaluate situations. Post simulation involves a worked solution supplied by an expert; this allows the learner to evaluate their own performance, and compare their thought process to that of the expert.[12]
14	Job Rotation	A less experienced employee is put in a rotation program of multiple short-term (ex. 6 to 12 month) assignments to gain broader experience within the organization.

[10] (McDermott, 2007)
[11] (Serrat, 2009)
[12] (McDermott, 2007)

Table 3-2 Continued: Knowledge Sharing Strategies

	Knowledge Transfer Mechanism	Description
15	Participating in meetings as an observer	A less experienced employee attends meetings with no commitment to participate. The intent being that the employee has the benefit of absorbing the experiences of multiple sources through the discourse and proceeding s of the meeting. An added benefit may be that the employees takes minutes or notes.
16	Grooming Assignment	An employee is moved into a position that will facilitate the transfer of required knowledge for a future position. The grooming assignment is meant to expose the employee to a different network, work environment, or help them to develop a skill set needed for their future position.
17	Keep Retired Connected	Engages retired employees in various capacities (ex. flexible work schedules, or monthly lunches at the office) with the intent of continuing to benefit/learn from their experience.[13]

3.7 Knowledge Sharing Environments

This section outlines characteristics of common knowledge sharing environments. Included is a description of how generational differences, individual networking capacity, personality type, and geographic constraints affect knowledge sharing environments.

[13] (Ball & Gotsill, 2011)

***Generational Considerations*:**

The workforce is currently dominated by three different generational groups, Baby Boomers, Generation Xers, and Generation Y (also called Millennial). The groups all have distinct characteristics, learning styles, and cross generational dynamics. Table 3-, shown below, outlines these characteristics. This table was compiled based on information found in Ball & Gotsill (2011) and is representative of generalizations, not rules.

Table 3-3: Generational Characteristics

Generation		Baby Boomers	Generation X	Generation Y
Years		1946-1964	1965-1979	1980-1995
Workplace Distribution	**2007**	38%	27%	28%
	2014	29%	25%	39%
Defining Characteristics		• Known to have a strong work ethic • Company loyalty	• Independent Workers • Career Loyalty	• Digital natives • Energetic Multitaskers • Impatient
Viewpoints		• Focus on society	• Focus on community	• Focus on individual
Communication Preference		• Face-to-face • Asking questions • Look for Agreement	• Be concise – avoid jargon • Openness • Use technology	• Be positive and goal oriented • Use technology • Fast paces
Learning Preference		• Highly structured • Lectures • Hands-on learning with feedback • Demonstrations	• Action learning – Learning by doing, finding real solutions to real problems • Prefers self directed learning	• Hands-on • Learns best with combination face-to-face and technology • Needs fast, unrestrained access to resources • Need dynamic & multifaceted techniques to hold their attention

Table 3- shows generalizations. These characteristics are important to consider when working in a cross-generational environment; however, the most important factor is to consider the source and the recipient and how they behave as an individuals (Ball & Gotsill, 2011).

***Networking Considerations*:**

Parise et alt. (2006) suggest that knowledge retention efforts are focused too often on knowledge content and act independently of the network in which that knowledge was developed. They go on to postulate that in the modern work environment, little work is truly done independently; rather it is accomplished in groups using both internal and external networks. To that effect Parise et alt. (2006) suggest that not only should critical experiential knowledge be investigated and transferred, but critical knowledge of whom the departing individual knows. Using organizational network theory (ONA) they present the following ideas:

There are three significant types of interactions/roles that individuals fill within a network; Central connectors, brokers, and peripherals (see **Error! Reference source not found.**, below).

Central connectors are those individuals who have a high number of direct relationships, this can be because of an expertise level or hierarchal position; they are imperative for helping other employees gain the information necessary to do their jobs. An example of a central connector is a subject matter expert.

Brokers are individuals who have connections across sub-networks within the larger network; they have a broad understanding of company structure and help identify opportunities for sub-networks to integrate/collaborate. An example of a broker is a strategy executive who liaises between engineering and marketing.

Peripherals have few connections within the internal network; however, they are they have forged the links to external networks through trust and familiarity. An example of a peripheral is a sales associate.

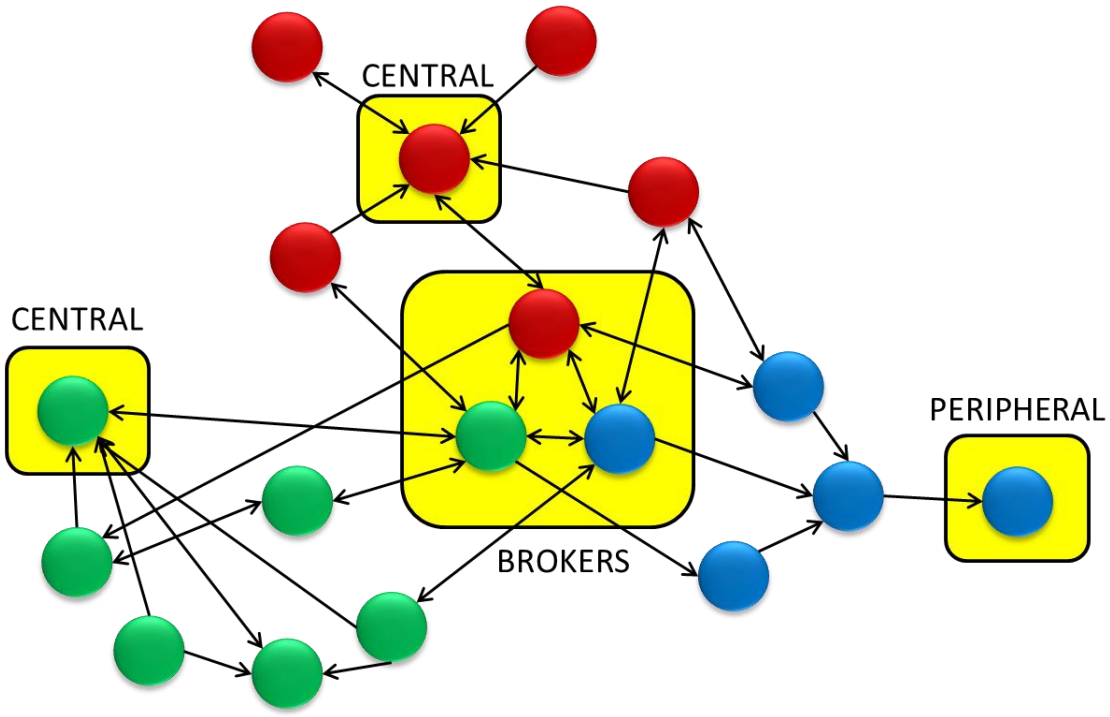


Figure 3-8: Networking Connections (Adapted from Parise et alt., 2006)

The loss of a central connector means that not only will expertise be lost, but also that those individuals who relied on the connector for information, must find it somewhere else, which can often be a time consuming task. The loss of a broker may not directly affect as many employees as the loss of a central connector; however there will be missed opportunities for collaboration that may result in non-ideal solutions, and translation/communication breakdowns amongst business units. The loss of peripheral players is often overlooked within companies because they are tangential within the network; however, their loss may result in the loss of niche expertise and outside knowledge that would take a long time to redevelop (Parise, Cross, & Davenport, 2006).

Parise et alt. (2006) suggest that effective KMS make an effort to identify each of the three components and to develop their protégées early.

***Personality Considerations*:**

The big 5 factors of personality are generally agreed upon dimensions of human personality that affect how individuals interact in their environment and amongst their peers (Hsieh, Hsieh, & Wang, 2011). Table 3-4, shown below, lists and describes the big five personality traits (adapted from Psychometric Success (2012)) and pairs them with the four facets of knowledge management as described by Hsieh et alt. (2011); which are, ability to acquire knowledge, ability to accumulate knowledge, ability to share knowledge, and ability to apply knowledge.

Table 3-4: Personality factors and their affect on knowledge management

Personality Trait	**Facet**	**Knowledge Management Strengths**
Extraversion	Friendliness Gregariousness Assertiveness Activity Level Excitement-Seeking Cheerfulness	Accumulation Application Acquisition
Agreeableness	Trust Morality Altruism Cooperation Modesty Sympathy	Accumulation Sharing

Table 3-4 Continued: Personality factors and their affect on knowledge management

Personality Trait	Facet	Knowledge Management Strengths
Conscientiousness	Self-Efficacy Orderliness Dutifulness Achievement-Striving Self-Discipline Cautiousness	Accumulation Sharing
Neuroticism	Anxiety Anger Depression Self-Consciousness Immoderation Vulnerability	* NOTE: Not considered in Hsieh et alt. (2011)
Openness to Experience	Imagination Artistic Interests Emotionality Adventurousness Intellect Liberalism	Application
Emotional Stability*	Make others feel at ease	Accumulation Sharing Application Acquisition

Note: Hsieh et alt. do not consider neuroticism in their study, rather they consider a non-standard personality trait that they call Emotional stability.

***Geographic Considerations*:**

When considering geographical constraints on knowledge sharing, most obstacles can be overcome through the use of IT solutions. When implementing these techniques however, the users' willingness to utilize these solutions must be considered.

An issue related to geography that is less readily surmountable with existing tools is culture. Throughout this review culture has referred to organizational culture, for the following section, culture will refer to national culture.

Kivrak et alt. (2008) found that there was mixed feelings amongst construction professionals on the effects culture on knowledge management. They also provide further evidence in a later work (2009) that provide several examples where research has found no influence of culture on KM (Jensen & Szulanski, 2004; Gupta & Govindarajan, 2000; Simonin, 1999) as well as several studies supporting the paradigm that culture does affect KM(Voel & Han, 2005; Ford & Chan, 2003; Finestone & Synman, 2005;Sackmann & Friesl, 2007). Kivrak et alt. found in both studies (2008 & 2009) that culture does affect knowledge sharing if not the whole knowledge management process (Kivrak, Ross, & Arslan, 2008) (Kivark, Ross, & Arslan, 2009).

Kivrak et alt. (2009) found that while geographic and cultural changes provided an opportunity for learning and innovation, they also found that it introduced new challenges. The most prevalent challenges listed were communication and trust related. Communication issues present an opportunity for knowledge to become lost in translation, while trust issues can lead to knowledge not being shared at all (Kivark, Ross, & Arslan, 2009).

Selection of an appropriate knowledge transfer strategy can help to effectively mitigate these issues.

3.8 Gaps in Existing Research

This literature review serves to provide a summary of many of the elements that influence the transfer of experiential knowledge and tacit knowledge management; they are, however, not exhaustive in detail as there is considerable published work on the subjects, much of which is subjective and context specific. Existing material on the subject of experiential knowledge transfer for the near-retirement generation in the context of the capital projects industry is not extensive. Furthermore, existing research lacks standard/reliable metrics for evaluating the effectiveness of a knowledge management program.

3.9 Case Studies

Four case studies were conducted in this research. Two were with large Owner organizations, the other two with large Contractor organizations. All are considered to be innovators within the KM community and all have been decorated as leaders by various international KM award committees. The case studies were conducted early in the data collection process and were used to help guide development of the Experiential Knowledge Retention Management Model. The case studies were conducted primarily through a review of the published material regarding their respective programs. The case studies were further supplemented through interviews with knowledge management leaders at the respective organizations. After analyzing the knowledge management programs of each organization, generalizations are drawn and commonalities of these successful programs are highlighted.

The first case study is an example of an effective response to a knowledge gap created due to retirements. The three that follow are examples of proactive approaches that have been effective at mitigating the development of a similar knowledge gap.

3.10 Owner Case Studies

3.10.1 Owner A

Owner A is among the largest energy providers in the United States providing power to over 9 million people in seven states. Their output capacity is approximately 31,000 MW provided by the following corporate infrastructure:

- 4 Nuclear power plants
- 4 Combustion turbine plants
- 1 Coal fired generating stations
- 29 Hydroelectric dams & 1 Pumped storage facility
- 15,900 Miles of transmission lines

They employ approximately 12,600 peoples with a wide breadth of knowledge and skill sets. Until 1998, most of this institutional knowledge was, at best, only marginally documented or proceduralized for in-house distribution. (Tennessee Valley Authority, n.d.)

3.10.1.1 Employee Demographic Problem

To effectively operate their vast network the Owner requires many management, technical, and trade experts; however, due to a 15-year downsizing effort intended to make the organization more lean the Owner was faced with a demographic distribution that would see 30% to 40% of their remaining work force retire. This downsizing initiative presented a serious operational after effect: the company would be subject to a significant “brain drain” that would leave a significant knowledge gap in the company and could potentially affect operational effectiveness and service quality. Furthermore, the company practiced limited entry level recruiting, and those who were potential candidates for replacing the retiring experts required two to four years of training. (Tennessee Valley Authority, 2012)

3.10.1.2 Addressing the Problem

The Owner recognized the problem that was developing within their organization and the adverse effects that would result if it was not addressed. To mitigate these problems the Owner implemented a knowledge retention program designed to capture the extensive experiential knowledge resources within the company. The program is made up of three steps that address the following questions:

1. What knowledge is being lost, and what positions require this knowledge?
2. What are the operational effects of losing this knowledge?
3. What can be done to mitigate the loss of the critical knowledge items?

In addressing these questions the Owner developed a three step program. The steps are outlined below.

Step 1: Knowledge Identification & Assessment

This initial step is to provide focus for the effort and to ensure that key knowledge is targeted. The primary mechanism that makes this program successful is a voluntary employee survey conducted through HR. The survey asks employees when they will retire, what their position is, and to provide a brief list of key knowledge items they possess that enables them to do their job. The survey also asks managers to assess the criticality of the employee's position and knowledge. Although the survey is voluntary, there is an 80% participation rate as employees understand that the effort is not intended to affect decisions regarding personnel but to help the company to plan for the future and to ensure that it is able to operate as effectively as possible. (Blankenship, Brueck, Rettie, O'Berry, & Lee, 2007)

The employee survey yields two key metrics, a retirement factor and a position factor, which are used to calculate the individual's attrition. The attrition factor drives mitigation planning for individual cases.

Attrition factor = Retirement Factor x Position Risk Factor

Retirement Factor	Position Risk Factor 1	2	3	4	5
5	5	10	15	20	25
4	4	8	12	16	20
3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5

- Total Attrition Factor: An estimate of the effort and urgency necessary to effectively manage attrition.
  - 20-25 *High Priority* – Immediate Action Required. Detailed plan of action with milestone dates required.
  - 16-19 *Priority* – Establish staffing plan, transfer method, and timing for replacement.
  - 10-15 *High Importance* – Look head for how the position will be filled in the future.
  - 1-9 *Important* – Recognize critical position functions and how they may be addressed in future
- Retirement Factor: The projected retirement dates in the work force planning system (whether based upon employee estimates or calculated based on age and tenure data) will be assigned a retirement factor as follows:
  - 5 - Projected retirement date within current or next fiscal year
  - 4 - Projected retirement date within 3rd fiscal year
  - 3 - Projected retirement date within 4th fiscal year
  - 2 - Projected retirement date within 5th fiscal year
  - 1 - Projected retirement date within or greater than 6th fiscal year
- Position Risk Factor: An estimate of the difficulty or level of effort required to replace the position incumbent. Managers/supervisors are responsible for making these ratings based upon the following criteria:
  - 5 - *Critical and unique knowledge and skills*. Knowledge is undocumented and requires 3-5 years of training and experience. No ready replacements available.
  - 4 - *Critical knowledge and skills*. Limited duplication exists at other plans/sites and/or some documentation exists. Requires 2-4 years of focused training and experience.

- 3 - *Important, systematized knowledge and skills.* Documentation exists Recruits generally available and can be trained in 1 to 2 years.
- 2 - *Proceduralized or non-mission critical knowledge and skills*. Clear, up-to-date procedures exist.
- 1 - *Common knowledge and skills*. External hires possessing the knowledge/skill are readily available and require little additional training. (Wright, 2006)

Step 2: Determining the Best Approach to Capture Critical Knowledge

The attrition factor provides insight regarding what individuals present the greatest risk and what knowledge they possess. Step two focuses on prioritizing which cases need to be mitigated and how best to do so considering the resources available. This process is the responsibility of the line managers, but is facilitated by HR and the tools they provide.

The step is driven by interviews with individuals at risk and their managers. The interview is used to identify potential knowledge loss areas, the organizational consequences of losing their specific critical skills, and to define a corporate knowledge inventory for each job. The interview questions are standardized and categorized as follows

- General Questions (what knowledge will be missed when you leave)
- Task Questions (how to do x?)
- Fact/information Questions (used to generate contact lists and manuals)
- Pattern Recognition Questions (what are some lessons learned and insights for your position)

Once the interviews have been conducted and a knowledge inventory has been established, the inventory is screened for criticality and prioritized. To ensure consistency and to facilitate the process, each knowledge item is considered as follows:

- What is the relative importance of this knowledge?
- What is the relative immediacy of knowledge loss?
- What is the cost and feasibility of recovering this knowledge if lost?
- How difficult is it to transfer this knowledge?

This process identifies what must be addressed immediately to mitigate potential business impacts, what knowledge is subject to accelerated attrition, and what items can be addressed with smaller effort.

Line managers can then create individualized knowledge retention plans that include the following elements:

- Brief scenario summary
- Outlines what an individual's most critical knowledge areas/skills are and assigns mitigation action items for each (if criticality is ranked as 5 or higher)
- Action Items: Each action item has a target completion date and status monitoring columns
- Plan is updated annually

The mitigation strategies that this Owner considers when creating knowledge retention plans include:

- Documentation (procedures, checklists, manuals, etc.)
- Engineer it out (change out a process, update equipment, eliminate an archaic task with technology)
- Education & Training (Shadowing, cross-training, classroom, simulations, coaching, mentoring)
- Establish alternative resources (outside contractors, retirees, CoPs etc)

(Wright, 2006)

Step 3: Monitoring Effectiveness

Once a knowledge retention plan has been established and implemented for an individual the plan is reviewed and updated on an annual basis. Reviews of knowledge retention plans are conducted with line managers and individuals and are used to increase the effectiveness of current plans and to help improve future applications.

On a broader spectrum, HR monitors the effectiveness of the work force planning data and uses it to coordinate future plans and assess overall program effectiveness. The program is monitored via a dashboard that addresses the following items:

- Headcount vs. Business Plan
- Attrition & Replacements
- Problem Areas and Actions Planned
- Knowledge Retention Status (High priority & Position Criticality)

(Wright, 2006)

3.10.1.3 Lessons Learned

Owner A's program is successful because it is not an initiative that is owned by HR, line managers are responsible for the perpetuity of their department and are given tools by HR to support their efforts. Furthermore employees are concerned about the company and this process enables them to self-identify their skills and to mitigate their attrition in a non-threatening way.

After having implemented this program the Owner's primary lessons learned are as follows:

- Less at-risk knowledge than suspected
- Risk greatest in specialized technical positions and in problem solving strategies

- Wider range of options to mitigate knowledge loss than is typically considered
- Process and procedures often weak – An overreliance on “tribal knowledge” and individual expertise
- Pockets, or Functional Areas, of risk
- Line Managers must own the solutions

(Wright, 2006)

3.10.2 Owner B

Owner B is among the largest Owner groups in the Oil & Gas industry. They are an amalgamation of a number of organizations with 100+ years of experience in Oil and Gas with roots tracing back in excess of 130 years. Operating in 30 countries worldwide, with over 16,000 employees, the Owner provides a full range of oil and gas services from exploration and production through to transportation and marketing. Their production streams include light and heavy oil, oil sands, natural gas liquids, conventional natural gas, coal-bed methane, shale gas and oil, and liquefied natural gas (LNG). (ConocoPhillips, 2013)

The Owner has been recognized globally for their knowledge sharing initiatives and has been among the winners of the Most Admired Knowledge Enterprises four times. Their knowledge sharing program has also been featured in the Harvard Business Review.

3.10.2.1 Motivation

As the organization continued to grow into a more geographically and operationally diverse corporation, continuity and quality of service across the company became more and more difficult to achieve. Recognizing this, the executive leadership team pushed to restructure the knowledge management practices of the company. In the past decade, knowledge sharing at this organization has transformed from a disjointed, ad-hoc, informal process into a robust institutionalized cornerstone of day-to-day operations (Teleos, 2010).

In restructuring the knowledge management processes of the organization the goal was to facilitate horizontal workflows and sharing while discouraging silo based thinking and exclusive knowledge retention. This goal developed into the following vision: A workplace where employees continuously deliver additional value through global collaboration and expertise sharing (Hubert, 2012).

The re-vamped knowledge management system that resulted from this push has resulted in an estimated savings in the hundreds of millions of dollars. At the outset of the program, management focused on tracking costs as well as the monetary value of knowledge shared. As the program matured the focus on monetary tracking faded away because the knowledge sharing culture had become so robust that it was simply engrained into daily workflows (Teleos, 2010).

3.10.2.2 Addressing the Problem

The knowledge management system at this organization is based on breaking down hierarchical, geographical, and operational boundaries to enable effective knowledge sharing. This is achieved by facilitating communication and collaboration amongst and between operational and technical personnel.

The knowledge sharing model is tied together by the following elements:

- Find Content
- Ask Colleagues
- Share with Experts
- Trust Driven

These elements are supported through the use of advanced communities of practice. Every community of practice is directly linked to key organizational priorities and is supported by the knowledge sharing management team. The communities are largely based on IT infrastructure to accommodate geographic constraints and to facilitate knowledge capture and access, however the system

is not seen as a technology driven. Internally the system is about adapting the workforce to a sharing culture by breaking down barriers and facilitating solution seeking. Technology is seen as a means of support. (Teleos, 2010)

Within each community there is designated leadership responsible for stewarding the community and the content captured therein. In addition to supporting day-to-day requirements of the community, leadership is tasked with driving the community towards a specified, measurable, end goal. These goals are often related to improving overall organizational performance rather than a specific project related issue. Working towards these goals is seen as a contributing factor of community success as it adds a common goal within the community and adds a team element to a largely virtual interface. (McDermott & Archibald, 2010)

In supporting day-to-day project related objectives, communities utilize a three tiered structure to meet the community needs. To find content, each community has a knowledge library. These repositories are available throughout the organization but community libraries are filtered to include relevant content. All knowledge is stewarded by leadership that is required to review, revise, and retire the content as required. In connecting and collaborating with peers and SMEs community members can access online Q & A boards which allow employees access to SMEs for help with problem solving, and risk mitigation as well as simply seek advice or support. Threads within each board are able to be shared with other communities where appropriate. Another tool available to employees is a wiki-site that provides context for information and provides links to supporting documentation within the knowledge infrastructure. Anyone is able to contribute to these wikis, and all content is moderated as well to ensure that it is trustworthy. (Hubert, 2012)

3.10.2.3 Lessons Learned

An interview with a community leader at this organization cited the following elements as success factors for the knowledge sharing system in place:

- Adequate leadership and sponsorship to support and sustain the implementation, utilization, and growth of the community
- Alignment with business strategy/drivers to ensure that communities develop to support existing business drivers
- Adequate resources and defined roles
- Members are engaged with the community and therefore become committed to the community and to maintaining it.
- Clear deliverables and activities.
- Development of trusted relationships.
- Support technology is universal and easy to use.
- Motivation to participate is high and participants are publically recognized.
- Network activity is measurable.

3.11 Contractor Case Studies

3.11.1 Contractor A

Contractor A is one of the world's largest EPCM and Project Management organizations. Operating in 60 network offices across 6 continents, they employ around 43,000 individuals; their expertise span over 100 engineering fields and 60 scientific fields. They offer services in a variety of industries including: chemicals, petrochemicals, commercial & institutional, government services, life sciences, manufacturing, power, renewable energy, telecommunications, and transportation infrastructure.

The Contractor has been recognized as a leader within the Knowledge Management community by a number of organizations. They have been recognized 6 times as a Global Most Admired Knowledge Enterprise (MAKE) which identifies organizations which are using knowledge driven strategies to

out-perform their peers by able average growth of intellectual capital and wealth creation. They have also been recognized 4 times by the American Productivity & Quality Center (APQC) for Knowledge Management Capabilities and Excellence. (Fluor Corporation, 2012)

3.11.1.1 Contractor History of Knowledge Management

Management as well as organizational SMEs recognized that in a project based environment at the end of each project, when a team disbanded, many key lessons and team interactions were lost. When individuals were re-mobilized they brought to the new project an incomplete repertoire of the success factors of their past projects, this resulted in a tendency to need to re-invent the wheel, as well as a delay in the optimization of solutions for clients. Furthermore, disciplines tended to operate in silos, so that knowledge which was maintained was often disjointed, difficult to locate, and of unknown quality. In 1999 the contractor committed to addressing this problem. (Will, 2008)

3.11.1.2 Addressing the Problem

Once committed to solving the problem at hand, Contractor A established a goal to link people within communities and to provide timely solutions to project and customer demands. The global reach of the organization necessitated technology to support the effort, however, they did not want to lose the people-to-people interaction.

Their goals included:

- Leveraging collective knowledge to create value for clients, the company, and shareholders
- Increase the corporate knowledge base in order to achieve organizational effectiveness

- Provide a work environment to attract, retain, develop and motivate top quality, knowledgeable staff
- Identify, nurture, grow and apply the collective employee knowledge and expertise required to achieve business and strategic goals
- Leverage knowledge from global sources to produce and apply rapid innovations anywhere in the world
- Improve the company's flexibility to rapidly shift resources, including expertise and knowledge, to help it make the most of cyclical markets and the global economy
- Learn more about clients, industries and markets and to increase capabilities to help clients find better solutions, apply technological advancements and meet changing market conditions
- Use and improve knowledge to refine corporate expertise worldwide in core competencies (Koene, 2005)

The principals of knowledge sharing upon which this system is built include:

- Knowledge is an intangible asset
- Knowledge Management is 90% connecting people; 10% tool
- New knowledge is generated through sharing
- Knowledge must be sustained through stewardship
- The system must be globally accessible (Koene, 2005)

The contractor soon discovered that there was no "off-the-shelf" product that could suit their needs or that fit well with their organizational structure. They decided to develop a solution in-house.

The solution developed by the Knowledge Management team was an online product that integrates elements of social networking and document management. The product is in the form of a website that supports knowledge communities as well as a global knowledge search function.

The knowledge communities were established around existing business and functional lines. In addition to the primary knowledge website, each knowledge community has its own site which includes a directory of SMEs and community leaders, discussion forums where technical questions can be asked by anyone and answered by SMEs, and also features relevant news stories related to the community subject area.

The search function offered through the primary website allows users to search for information in a variety of formats, including: knowledge objects, groups of knowledge objects, people (SMEs), forum topics, news, resources, or all of these at once. Furthermore there is accountability of all posted content in which the user can see the knowledge source, their community activity, as well as peer-to-peer recognition rating.

This system serves as the backbone for this Contractor's Knowledge Management Program. Content is monitored through a rigorous stewardship program wherein all knowledge objects, forum topics, and other elements of the site are reviewed, have defined review dates, and expiration dates. In addition to this, each community undergoes audits to ensure content is on par, leadership is enthusiastic and involved, and that there is value being added through the community. This degree of stewardship and commitment to the program aims to ensure that users can rely on the quality of the content and use it as a tool to facilitate their work. (Will, 2008)

3.11.1.3 Lessons Learned

After more than a decade of using this Knowledge Management system, the Contractor has identified a number of critical success factors. These include:

- Alignment of the program with corporate culture and corporate structure. The tool improves existing communities and functional lines.

- Consistency and maintenance of the program. The stewardship and auditing process increase user confidence in content quality, increasing the tendency to use the program.
- Enthusiasm of community leadership. Community leadership enthusiasm and activity have been found to have a direct correlation with community activity. Keeping an active leader is so important that it is among the criteria evaluated in the community audits (Will, 2008).
- The Knowledge Management system provides a means to *guide* individuals to effective solutions, it does not provide solutions to the user. (Koene, 2005)

3.11.2 Contractor B

Contractor B is a world leader in Oilfield Services with a corporate history in excess of 90 years. They are currently operating in approximately 85 countries, with over 118,000 employees from 140 countries. Their services offer complete upstream lifecycle services from reservoir exploration and characterization all the way though to decommissioning and abandonment. In order to leverage their extensive historic and globally dispersed experience base embracing a collaborative, sharing culture has been at the fore front of this organization's corporate strategy.

This contractor has been inaugurated into the Most Admired Knowledge Enterprises (MAKE) hall of fame in recognition of their ten times on the global MAKE list. Seven of ten years they were ranked as the overall global award winner. Other accolades include first place in the 2012 Knowledge-Intensive Sector Leaders Report in the Oil & Gas Sector. (Schlumberger, 2013)

3.11.2.1 Motivation for Implementing Knowledge Management

Prior to implementing their knowledge management initiatives, remote offices (in excess of 100) were run semi-autonomously while still reporting to the corporate

headquarters. The organizational structure and geographic diversity of this company required standardized procedures in order to maintain operational continuity worldwide. When faced with a technical obstacle at the field or operational level the process in place called for queries to be submitted through a pipeline containing seven bureaucratic links and a similar reverse flow for the solution (Braganza, Hackney, & Tanudjojo, 2009). Ultimately this resulted in a sluggish bureaucratic problem solving system that caused significant delays (anywhere from 2 to 16 weeks turnaround) to resolutions required at the operations end. Furthermore, due to the slow turnaround time in responding to queries, the lessons learned repository was reportedly out of date by as much as two years and therefore seldom accessed. The result was that experts were spending their time repeatedly solving problems of a similar nature and at the same time tackling the new and unique issues that were submitted to them (Schlumberger Marketing Communications, 2004).

Recognizing this issue and the performance impact it was having on the company the organization launched a knowledge management pilot in 1999 focused on connecting people through collaboration in order to build a sharing culture (Schlumberger Marketing Communications, 2004). The end goal of the program was to improve the ability of it's people to provide the best quality service to the customer by offering the *entire* collective organizational know-how of the organization to the client. (Finding Petroleum, 2006)

The benefits of the program quickly became evident. Savings to the company were reportedly as high as $200 million within the first two years, and in one case as much as $14.3 million on a single project. Downtime associated with operational problem solving was reduced by 95%.These benefits were realized by effectively reducing job downtime associated with waiting on information through building and institutionalizing a sharing culture (Schlumberger Marketing Communications, 2004).

3.11.2.2 Addressing the problem

The backbone of the knowledge management program is based on connecting people with their needs. There are four primary support mechanisms that help support this end, they are designed to:

- Connect People to People
- Connect People to Solutions
- Connect People to Communities
- Connect People to Information (Finding Petroleum, 2006)

These four points are treated independently within the IT infrastructure that supports the knowledge sharing program, however, they act in parallel with some overlap and are institutionalized into everyday work practice. All are supported via the corporate intranet.

People to people connections are supported via a corporate directory that resembles a social media outlet as much as it does a standard corporate directory. Personal profiles include standard information such as name, title, location, as well as a career networking profile detailing their history with the company. The profile also includes information pertinent to problem solving and knowledge sharing, such as specific areas of expertise and which communities of practice they are active in. When people to people interaction is required, this level of detail ensures that the right connections are made the first time and that the most direct channels of communication are used to communicate (as opposed to through an intermediary or bureaucratic links). (Finding Petroleum, 2006)

People to solution connections are focused specifically on connecting field level personnel with the experts they need, wherever they may be in the world. This effort was one of the earliest innovations of the knowledge management program and has been extremely successful at expediting field level problem solving. The

IT infrastructure supporting this effort is focused on operational support rather than technical support amongst experts. (Braganza, Hackney, & Tanudjojo, 2009)

People to community connections are focused on connecting experts with one another via communities of practice. Due to the global nature of this business the communities are supported online. Technical practitioners within the company are able to pose open questions to the community via threads or forum discussions. Their questions are answered within the community by SMEs. The SMEs are responsible for ensuring timely responses as well as for knowledge quality stewardship. Other resources within the communities include publication of relevant articles, chats, collaboration workspaces, whiteboards, and cross threading of with other communities. For technical practioners participating within the communities of practice has become engrained with their workflow. (Smith, 2004)

Connecting people to information is supported via knowledge repositories. The libraries are highly searchable and each community has a virtual library full of relevant to their subject. Knowledge stewardship is at the forefront of this effort. Capturing the knowledge shared via the above mechanisms is also an important aspect of this effort. Appropriately managing corporate knowledge through expert and practical validation, as well as staying abreast of what knowledge resources are still relevant and retiring those that are no longer accurate. (Finding Petroleum, 2006)

3.11.2.3 Lessons learned

This knowledge management program is successful because it is an intuitive process that has been institutionalized into corporate culture and day to day workflow. Program leadership cites passionate leaders, and a dynamic approach

to managing the program that allowed it to evolve alongside the company's cultural shift toward a knowledge sharing organization. Other success factors include strong alignment throughout the organizational hierarchy, and a focus on key indicators that are in line with business needs. (Newhouse & Smith, 2001)

3.12 Case Study Findings

The organizations studied in these case studies are all large organizations with sophisticated knowledge management programs. With the exception of the first Owner, the knowledge management programs were all pro-active programs designed to mitigate the issue of brain drain associated with a increased rate of retirements. For these three organizations the push for a more mature knowledge management program was motivated by the desire to provide a continuous level of service across geographic boundaries.

All of the knowledge management programs studied here have a strong knowledge sharing culture which has led to knowledge management and sharing becoming a cornerstone of organizational culture, this in turn has led to the institutionalization of knowledge management into every day work-flow.

The knowledge management programs studied here are people centric. The focus is on connecting people to people and people to information. The intent is to break down bureaucratic barriers to streamline the flow of information between experts and users.

Experiential knowledge is often contextual, having a means to facilitate communication via direct people-to-people interaction during problem solving is an effective way to capture and transfer understanding and experiential knowledge.

All programs have passionate leadership which is an important element of a successful knowledge management program. Another commonality is the

alignment of business strategy and knowledge management goals. This helps the program to gain support from executives and users while ensuring that it is relevant to organizational needs

All of the programs studied have a means of knowledge stewardship. Knowledge stewardship drives trust in the knowledge management programs; this in turn drives the use of the program.

Having the program driven by functional group users rather than HR is important in ensuring that functional group managers feel responsible for the perpetuity of their department and involve their employees in the program

Chapter 4 Interviews

4.1 Introduction

Upon completion of the literature review and case studies, interviews were conducted within the industry to gauge the actual state of knowledge management within the capital projects industry. The interviews probed both large and small Owner and Contractor organizations. While the interviews were focused on those organizations with established, recognized, knowledge management practices, organizations in the process of developing their knowledge management infrastructure and organizations with no knowledge management infrastructure were also included.

The interviews were conducted via telephone, where schedule conflicts existed, the interviewee participated via email. Interviewees were provided with an interview guide (included in Appendix F: Interview Guide) in advance of the interview. The guide includes an overview of the research project and objectives, four questions, as well as an appendix including a list of common Knowledge Transfer Strategies used in industry.

Interviewees were contacted via CII liaisons, RT 292 Industry contacts, and by reaching out to the organizations themselves. After making initial contact, the primary obstacle became scheduling an available time for the interviewee.

The questions were structured to probe the state of knowledge management within an organization, determine whether or not they make an attempt to differentiate between *experiential* knowledge versus procedural knowledge, investigate the organizational knowledge structure, and to determine which KTS are used most often, why, and what contributes to the success of a particular KTS and an Knowledge Management program as a whole. The questions were intended to guide a conversation rather than to establish a rigid interview format.

This process was preferred as it would allow the interviewee to surface relevant information which may have been outside of the bounds of the questions or not been identified in prior investigation.

The results of the interviews are covered in the following section.

4.2 Results

The interview process resulted in 24 interviews with 17 selected organizations. The interviews took place from May, 2012 through August, 2012. The interviewees consisted of 13 owner representatives and 11 contractor representatives. Of the 17 organizations interviewed 15 were CII member organizations, 2 were Non-CII EPC contractors. Interview summaries are included in Appendix G.

The interviews indicated that while many organizations practice knowledge management, few have a formal knowledge management program. Most of the participants indicated that knowledge management, both explicit and experiential, is conducted informally at a local level with little to no effort to distinguish between experiential and explicit knowledge. When a statement to this effect was made, further effort by the interviewer was made to distinguish how both types of knowledge were handled within the program. In these circumstances, the results were generally that the program was heavily focused on explicit knowledge while neglecting experiential knowledge by comparison.

Many organizations indicated that it is the retiree's supervisor who is generally in charge of ensuring that the individual's knowledge is retained. While the supervisor should be involved in the transfer of their employee's experiential knowledge, the organizations with the most sophisticated knowledge management programs indicated that the individual was often intimately involved

in their knowledge management. As a result they also indicated that this fostered a sharing culture and led to proactive solutions to experiential knowledge loss prior to retirement.

Others indicated that a challenge in implementing formal knowledge management has to do with legal concerns related to inquiries regarding anticipated retirement dates. To overcome this obstacle, many established knowledge management initiatives are operated on a voluntary basis wherein participants are motivated by their desire to see the company continue to operate effectively upon their departure, and feel pride in their position/knowledge and how it contributes to the value of the organization.

Knowledge transfer strategies were typically selected based on existing company knowledge management infrastructure, but variables such as departure timeframe, knowledge criticality and geographic constraints were often cited as drivers for selecting specific transfer mechanisms. Departure timeframes tended to range from two weeks to two years with some programs including a transfer program as long as five years.

Although the majority of interviewees indicated that organizations used multiple knowledge transfer strategies, no single strategy was most prevalent. When asked which knowledge transfer strategies, from the list provided, were employed respondents often indicated that elements of all were applied. Further questioning revealed that these strategies were primarily ad-hoc and inconsistent across the organization.

The interviews indicated that the following items were considered to be general success factors for experiential knowledge retention:

- KM oriented company culture: This was among one of the most repeated success factors within the interviews. Whether a KM oriented culture existed or not, the interviewees indicated that working towards this end

was among their primary objectives to ensure the knowledge management initiatives continued through implementation and became institutionalized in the day-to-day work flow.

- Executive support: This was another of the most prevalent success factors. Those organizations with mature knowledge management programs often attributed the success of their programs to passionate leadership. Those organizations developing their knowledge management programs cited lack of executive support as the primary deterrent for knowledge management programs in moving from a silo based initiative or HR based initiative to an organizational initiative.
- KM objectives oriented with business objectives: Aligning knowledge management objectives helps to build support for the program at all levels of the organization. For executives it helps to justify their investment and for employees it helps in recognizing the effect of their efforts.
- Integration of new initiatives with existing processes: Integrating knowledge management tools into existing tools and processes was cited as a success factor as users were more likely to trust and utilize new features in familiar tools rather than utilize brand new tools that they are not in the habit of accessing. In cases where grass roots tools were required to be implemented, using a format consistent with existing infrastructure was said to important to contribute to a feeling of familiarity.
- Content accountability and reliability: Providing tools which users can easily interact with and trust in terms of performance and content was extremely important to many respondents.
- Awareness and consistency of KM tools: Providing tools which are familiar in layout and user interface makes utilization simple and encourages employees to participate.
- Ease of accessibility of KM databases and tools (“in the flow” with immediate access): The ability to easily access the knowledge

management databases was often cited as an important factor in the success of the knowledge management program. Being able to easily access and search available resources was often cited as a contributing factor to the success of a knowledge management program.

- Maintenance of KM content: Content stewardship was among the most important success factors. Capturing knowledge was often said to be step one, reviewing, revising and retiring as required was said to be equally important in providing reliable access to organizational experiential knowledge repositories.
- Individualized attention: Treating unique cases, particularly retirements, individually as unique cases is important in ensuring that the transfer of pertinent experiential knowledge is maximized in each case.
- Dedicated knowledge manager: Assigning an individual as knowledge manager or knowledge steward ensures accountability within the program and helps to build in reliability and trust for the program.
- Assigning a project manager to individualized cases: Treating unique cases like projects with a project manager helps ensure effective planning will take place and carried out in order to maximize the capture of experiential knowledge management.
- Recognition of contributors to KM efforts: Recognition of participants, innovators, and leaders within the knowledge management program was often listed as a success factor. Recognizing individuals increases participation as well as enthusiasm. Some of the most robust knowledge management programs have a tiered recognition program that lend prestige to the individual as well as their technical community.
- Proactive KM planning to identify individuals with sufficient time to transfer knowledge: When dealing with retiree's that have a lifetime of experience to share, ensuring sufficient time to identify and share critical knowledge is important in ensuring a successful transfer effort.

- Identification of future SMEs and managers for development: Knowing who is interested, capable, passionate, and loyal is important when considering transfer candidates for knowledge transfer. A parallel consideration, when dealing with an individual retirement case, is to ensure the participants work well together.
- Using after action reviews to evaluate KT success/failure for continuous improvement: Helps ensure the knowledge management process is continually refined and improved.

Some of the barriers to success indicated in the interviews were as follows:

- Time constraints and existing workloads: The most commonly cited problem was that individuals did not prioritize their knowledge management obligations, they are often pushed aside to deal with more immediate obligations.
- No executive buy-in: Building a knowledge management program from within HR or a particular business unit can sometimes be successful, however rolling the program out throughout the company without an enthusiastic executive to support the program often leads to the programs simply fading away after a short period.
- Lack of leadership: Not identifying leaders within the knowledge management program leads to a program with little direction, reliability, or utility.
- No formalized process (efforts are ad-hoc and inconsistent): No formal process for knowledge management was often cited as a barrier and often the case for many organizations. This barrier leads to a lot of gaps in the knowledge management efforts and accessible knowledge. When knowledge is captured there are often inconsistent results of inconsistent quality and formatting.

- Lack of resource allocation: Program is unable to develop or plan without required resources.
- No culture of knowledge sharing: Hoarding knowledge is an “old-school” mentality that many associate with job security. Getting past this and institutionalizing a knowledge sharing culture is paramount to launching an effective knowledge management program.
- Introduction of new tools often meets resistance: Individuals are often hesitant to try new things, introducing systems that are too different can often lead to resistance.
- Garnering buy in from individuals can be difficult: Overcoming an individual’s resistance to knowledge sharing can be difficult and sometimes not possible.
- Lack of awareness of systems in place: Having systems in place without potential users aware of their existence is a waste of the knowledge management effort and easily remedied.

The products and tools developed by RT 292 address these barriers.

4.3 Findings

The interviews provided a good deal of insight into the current state of knowledge management within the capital projects industry. With the exception of a few outliers, all of the organizations practiced knowledge management to various degrees.

The level of development and sophistication varied amongst the interviewees, those programs that were the most sophisticated tended to be among the most mature and have been institutionalized into the day-to-day workflow of the organization. Conversely, those organizations with developing knowledge management programs were typically developing them in response to an immediate issue related to increased retirement rates. Within these organizations the programs included brand new in-house programs, formalizations of existing

ad-hoc programs (the majority of the time this was the case) and adaptations of existing, well respected programs. Those fledgling programs often cited lack of executive leadership as the primary barrier to success in program implementation and perpetuation. Adapting the organizational culture to a sharing/learning culture was cited as being one of the primary drivers of a successful program.

No single knowledge transfer strategy prevailed as the most commonly employed KTS amongst the interviewees; rather, the results indicated that in most cases organizations used one or two strategies to mitigate their knowledge loss risks regardless of the particular circumstances of the knowledge transfer case and employed other knowledge transfer strategies in an ad-hoc fashion within different organizational silos.

A final generalization regarding the state of knowledge management within the capital projects industry, based on the results of the interviews, is that little effort is made to distinguish between experiential knowledge and explicit knowledge. When asked, the interviewees said that their programs covered both types of knowledge; however, in those cases the program tended to focus heavily on explicit knowledge heavy. Without committing to differentiating knowledge types within a knowledge management program often results in an explicit heavy program.

Chapter 5 Surveys

5.1 Introduction

The survey was used to confirm the applicability of the selected knowledge transfer strategies specifically when considering experiential knowledge. The data also serves as the backbone for one of the analysis tools developed for the knowledge retention process. The tool provides an environmental assessment questionnaire that is designed to characterize the transfer environment. Based on the user input the tool suggests various knowledge transfer strategies that would be applicable and effective for the condition under consideration.

The survey was administered online via the CII survey platform SelectSurvey.net. The survey was administered in two parts, Internal and External. Both surveys are available in Appendix H: Survey Forms. The intent of providing the survey in two parts was to reduce the burden asked of the respondents as the survey was expected to be quite long. Questions included within the Internal survey were items which typically had concurrence within the team but for which external input was asked to reinforce the conclusions drawn by the team. Consensus was generally uniform in cases where the nature of the knowledge transfer strategy made the effectiveness impact of a variable obvious. The external survey included questions for which there was not uniform consensus amongst team members or for which the team felt further industry input would benefit the results.

The Internal Survey was given distributed by members of the research team to other employees with relevant expertise within their organization. Internal surveys focused on addressing the effectiveness of knowledge transfer for different transfer ratios (i.e. the number of people each knowledge source would transfer to), the effect of source availability on transfer effectiveness and the availability of IT infrastructure to support transfer efforts. External surveys were

distributed to all CII organizations via the CII data liaisons. The external survey focused on addressing the effectiveness impact associated with geographic constraints of participants as well as the time available for the transfer to take place.

5.2 Results

Based on the results of the interviews and further development of the knowledge retention program, a survey was developed to gauge the efficacy and applicability of various knowledge transfer strategies under various scenarios. The scenarios covered instances with varying departure timeframes, varying number of receivers, issues related to co-location and geographic constraints, IT based challenges, and subject availability. The survey questions asked respondents to consider a number of statements and to relate how the effectiveness of a KTS is affected given the scenario described. The statements are shown in Table 5-2. Table 5-1 shows a list of the KTS considered in the survey, a full definition of each KTS can be found in Appendix D.

The survey was issued in October, 2012 and resulted in 44 respondents from 38 CII organizations. Survey results can be found in Appendix I: Survey Results. Appendix I also includes a comment log that includes comments from survey respondents.

Table 5-2, shown below, indicates the effectiveness as ranked by the respondents as well as the proportion of respondents who selected this level of effectiveness. In the table: H indicates High effectiveness for the scenario presented, M indicates Medium effectiveness, L indicates Low effectiveness. In some instances a D is shown, meaning Don't Know. With respect to instances where Don't Know was prevalent, for the purposes of populating the tool intelligence, the research team was consulted to determine which effectiveness best represented the KTS under consideration for the scenario. There were also some instances of a tie. In such cases the research team decided that, for the

purpose of populating the tool intelligence, the effectiveness would tend toward Medium. An explanation of how this decision was made follows the tabular results of the survey.

Table 5-1: Knowledge Transfer Strategy Listing

KTS Index	KTS Name
KTS-01	Lessons Learned & Best Practices
KTS-02	Community of Practice
KTS-03	Facilitated Masters Classes
KTS-04	Lunchtime Seminar
KTS-05	Narrative Database/Storytelling
KTS-06	Standardized College Program/course
KTS-07	IT Collaboration/Communication
KTS-08	Outsourcing/Acquisition
KTS-09	Desk Side Review
KTS-10	Job Shadow
KTS-11	Mentoring/Coaching
KTS-12	Simulations
KTS-13	Job Rotation
KTS-14	Attend Meetings as an Observer/Learner
KTS-15	Grooming Assignment
KTS-16	Keep Retired Connected

Table 5-2: RT 292 Survey Data Summary (n=44)

RT 292 Survey Data Summary	KTS-01	KTS-02	KTS-03	KTS-04	KTS-05	KTS-06	KTS-07	KTS-08	KTS-09	KTS-10	KTS-11	KTS-12	KTS-13	KTS-14	KTS-15	KTS-16
When there is only one knowledge source and one knowledge receiver	M,64%	M,45%	M,36%	L,55%	H,73%	L,73%	M,60%	L,33%	H,60%	H,90%	H,90%	M,60%	H,56%	M,70%	H,80%	H,80%
When there is only one knowledge source and many knowledge receivers	M,64%	M,55%	H,64%	M,55%	H,45%	L,45%	M,50%	L,44%	M,60%	M,55%	M,40%	M,50%	H,50%	M,50%	M,40%	M,60%
When the knowledge source is available less than 5 hours a week	L,55%	L,55%	L,55%	L,45%	M,36%	L,64%	L,50%	L,56%	M,60%	L,70%	L,50%	L,60%	L,50%	L,50%	L,60%	H,40%
When the knowledge source is available between 5 and 20 hours a week	M,55%	M,45%	M,55%	M,45%	H,64%	L,45%	M,60%	M,56%	M,60%	M,60%	H,50%	M,60%	M,60%	M,70%	M,50%	M,80%
When the knowledge source is available between 20 and 40 hours a week	H,55%	H,73%	H,64%	H,45%	H,73%	L,45%	M,70%	L,44%	M,70%	H,80%	H,90%	M,50%	H,60%	M,60%	H,80%	H,60%
When IT infrastructure to support/distribute knowledge is available	M,82%	H,55%	M,45%	M,55%	H,45%	L,36%	M,50%	L,56%	M,60%	M,60%	M,50%	M,60%	M,50%	M,50%	M,50%	H,40%
When IT infrastructure to support/distribute knowledge is not available	L,82%	L,73%	M,150%	M,150%	M,36%	L,73%	L,89%	L,67%	L,40%	M,50%	M,50%	L,70%	M,50%	L,50%	L,40%	L,40%
When the knowledge source and knowledge receiver are co-located	H,56%	M,50%	H,44%	M,41%	H,48%	M,41%	M,59%	M,41%	H,63%	H,69%	H,65%	H,33%	H,50%	M,50%	H,62%	M,42%
When the knowledge source and knowledge receiver are not co-located	L,44%	L,55%	M,52%	L,48%	M,41%	M,37%	M,56%	L,41%	M,46%	L,52%	M,62%	L,25%	M,38%	L,60%	M,46%	L,38%
When there is less than 3 months for the knowledge transfer to take place	M,38%	M,41%	D,36%	M,39%	M,41%	M,44%	M,48%	L,33%	M,36%	M,37%	M,50%	H,25%	M,33%	L,54%	L,38%	L,27%
When there is 3 to 6 months for the knowledge transfer to take place	M,59%	M,55%	M,40%	L,33%	M,48%	M,44%	M,61%	M,41%	M,44%	M,58%	M,58%	L,25%	M,50%	L,46%	M,62%	M,50%
When there is more than 6 months for the knowledge transfer to take place	L,39%	M,31%	D,40%	L,37%	H,33%	L,37%	L,43%	L,46%	H,48%	H,38%	H,42%	L,35%	H,42%	L,48%	H,50%	L,31%

The only instances of “don’t know” responses were related to KTS-03, Facilitated Masters Class. The effectiveness impact questions that yielded this result had to do with the time available for the knowledge transfer to take place. In the instance where there was less than three months for the transfer to take place 36% of respondents indicated “don’t know”. Upon discussion with the research team it was decided that an effectiveness of medium is acceptable as these classes would be sufficient at transferring some experiential knowledge in this time frame if the facilitator were well prepared.

Instances of a tie are summarized below:

- KTS-01 – Lessons Learned & Best Practices
    - Tie between Low & Medium when source and receiver are not co-located. Team decision was to select Medium effectiveness over low as team members felt that this strategy is effective at overcoming geographic constraints when effectively managed and supported with appropriate IT infrastructure.
- KTS-02 – Communities of Practice
    - Tie between Medium & High in scenarios when there is 6 or more months available for the transfer effort. The team selected medium effectiveness as a conservative choice.
- KTS-04 – Lunchtime Seminars
    - Tie between Low & Medium when there is between 3-6 months available for transfer. Team chose medium as it was decided that a focused, well developed, seminar series would be able to transfer pertinent experiential knowledge in this time frame.
- KTS-08 – Outsourcing & Acquisition
    - Tie between Low & Medium when there is less than three months available for knowledge transfer. Selected medium as this time

frame would allow time to find a suitable alternative knowledge source and to contract their expertise to fill an immediate need.

- KTS-12 – Simulations
    - Tie between Low & Medium when there is no co-location. The team selected medium in this instance as it was decided that a properly developed simulation should be able to administered by a competent facilitator to achieve the experience simulation desired.
- KTS-16 – Keep Retired Connected
    - Tie between Low & Medium when there is no-colocation. The team selected medium in this instance as it was thought that the retiree would be brought back to fill an immediate knowledge need and to transfer this knowledge would be among their primary objectives.
    - Tie between Low & Medium when there is less than three months available for transfer. Medium was selected as the retiree would likely be focusing solely on transferring their knowledge in this scenario.

The surveys resulted in 44 respondents from 38 CII organizations addressing issues related to the impact of environmental circumstances on the effectiveness of the transfer strategies considered in this research. The results of the surveys are used to populate the intelligence of the Step 5 tool (Knowledge Transfer Environment Characterization) which aids the user in selecting an appropriate choice of KTS alternatives based on the circumstances of the knowledge transfer in question. Although there were instances of tie's or respondents unfamiliar with the effectiveness impact of a circumstance the research team was able to suggest an impact based on their collective expertise.

Chapter 6 Model Validation

Validation of the research and the model developed was conducted in two parts, first internally by members of RT-292 and then externally by experts in the fields of knowledge management and human resources. Target end users were also asked to review the process.

Internal validation was performed by members of Research Team 292. The research team was made up of 16 individuals with cumulative industry experience in excess of 380 years, and an average of more than 20 years industry experience per member. The project team, in addition to the academic members, was made up of operations managers, project managers, human resource professionals, training specialists, knowledge management professionals, and returning retired consultants. Team members were from both Owner & Contractor organizations located in four countries on three continents. The diversity of expertise within this team ensure that comprehensive consideration of the scope and types of implementations and applications were investigated.

The technique used to advance and refine the knowledge retention model required input from all members of a sub-committee prior to progressing with development. The evaluation and re-evaluation of each development by team members ensured that the process was applicable, and complete. Furthermore, presenting research advances to the other sub-committee ensured that a sober set of eyes had to understand and approve each process development prior to broad acceptance.

External validation was performed by a panel of industry experts outside of RT-292. Experts were selected for their expertise in: knowledge management, human resources management, training, and management. Target end users

were also asked to review the process. The reviewers are listed by job title and years of experience in Table 6-1, shown below.

Table 6-1: Expert Review Panel

Reviewer Job Title	Years of Industry Experience
Director Global Learning, Employee Development, Diversity and Inclusion	35
Competency Lead - R&M Projects, TAR & Maintenance	23
Mechanical Department Manager and Global Excellence Leader	25
PhD Pedagogy	30
VP Project Execution	38
Technical Knowledge & Training Manager	14
Director of Talent Management	34
Retired VP Geotech Eng.	55
Human Resources Director	20
Human Resources Manager	20
Senior Process Engineer	7
Cumulative	301

Experts were given a copy of the completed implementation resource and asked to review the entire document. The focus of their review was to be on clarity of content, continuity of process, and applicability within their organization. A total of 11 reviews were conducted by industry experts with cumulative industry experience in excess of 300 years, or an average of approximately 27 years per reviewer. The reviews resulted in 78 comments. The comments were reviewed by the research team and categorized as follows:

- Category A comments are deemed as non-contributive, not applicable, or out of the scope of the research project. These comments do not impact the research products. There were 41 category A comments.
- Category B comments are related to grammar and formatting issues within the document. These comments did not need to be discussed with the

entire team. Changes were made where appropriate. There were 3 category B comments.

- Category C comments are comments related to a content oversight by the reviewer. Typically the reviewer mentioned a missing element that was covered in another section of the implementation resource. The research team reviewed these comments to ensure that the content was in fact in the document and clearly presented. These comments do not impact the research products. There were 17 category C comments.
- Category D comments are comments that provide an opportunity for enhancing the research product. These comments were reviewed by the research team and suggestions for how to address these comments were given. Category D comments typically called for clarification of an item, or small content inclusions. These comments affect the final research product. There were 17 category D comments.
- Category E comments have identify substantive gaps in the research or initiate a substantive change in the research product. There were no category E comments.

The lack of Category E comments is a strong indicator that the research was thorough and applicable.

The reviewer comment log can be found in Appendix D.

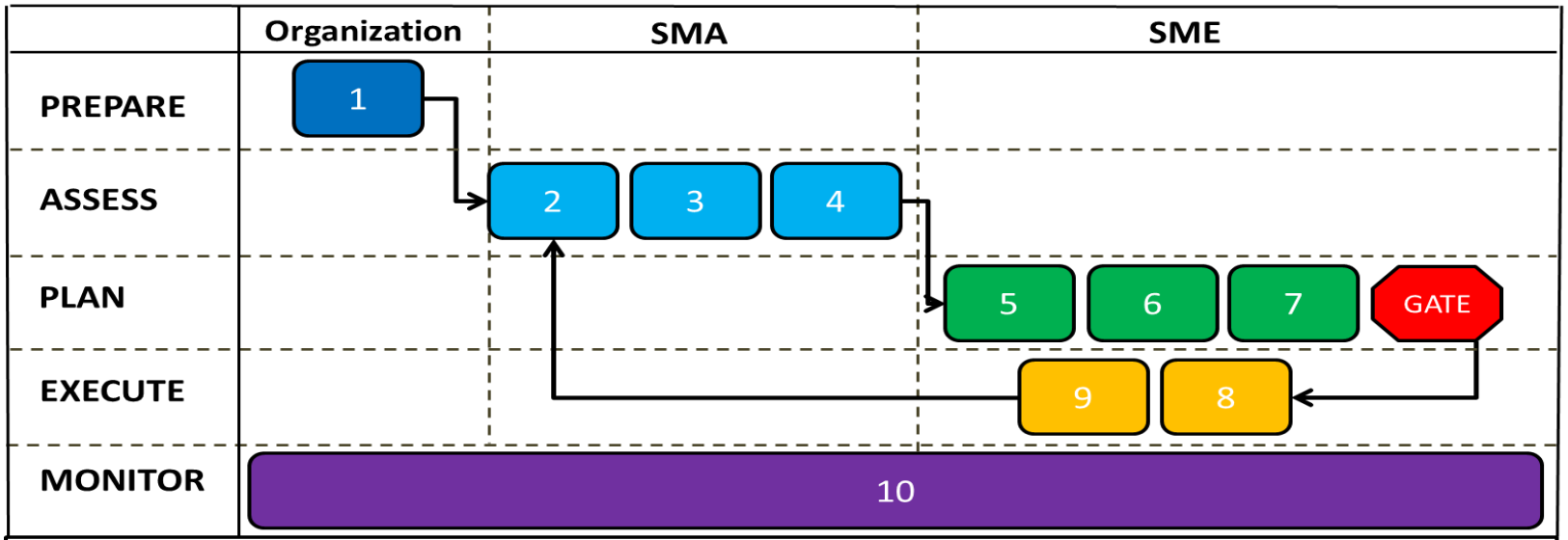
In addition to the expert review, the Experiential Knowledge Retention Management Model was presented to the CII Next Generation Leaders Community of Practice in the February 26, 2013 CoP webinar . The research team leaders presented the experiential knowledge retention management model to over 15 community members and solicited feedback from them. Community members were also invited to participate in the expert review panel. Feedback from community members was positive. Questions focused on scope of

applicability, details on sub steps not covered in the presentation, and when the research products would become available.

Chapter 7 Experiential Knowledge Retention Management Model

Section 7.1 provides a high level overview of the **Experiential Knowledge Retention Management Model** (**EKRMM**) and its major components. Figure 7-1, shown on page 91, illustrates the Experiential Knowledge Retention Management Model.

Section 7.2 provides a more detailed look into each of the steps and sub-steps of the model. For complete details regarding the model, tools and it's application please refer to *CII IR 292-2*.



PROCESS FLOW STEP LEGEND

1	Prepare for Knowledge Retention Management Process	7	Prepare Business Case for Each SME and Confirm Priorities
2	Target SMEs & SMAs through Business Unit Demographic Analysis	8	Develop SME Knowledge Retention Implementation Plan
3	Confirm Feasibility of Effort for Knowledge Retention Planning	9	Implement & Monitor Knowledge Retention
4	Prioritization of SMAs & SMEs for Knowledge Retention	10	Monitor Effectiveness of Knowledge Retention Process (Steps 1-9)
5	Characterize Knowledge Transfer Environment	GATE	Approval Gate for Execution
6	Select Knowledge Transfer Strategy for Case		

Figure 7-1: Experiential Knowledge Retention Management Model

7.1 Model Overview

The EKRM model developed by RT-292 was designed to address the practical implications facing the capital projects industry when attempting to mitigate the risks associated with experiential knowledge loss.

The model serves as a guide to help an organization structure an experiential knowledge management retention program. The model will help the user to assess the experiential knowledge loss risks within their organization, guide user(s) in effectively selecting a **Knowledge Transfer Strategy** (**KTS**), and help the user(s) to overcome the obstacles that one often encounters when implementing an experimental knowledge retention program. In referring to Experiential Knowledge Retention the scope is at the organizational level and is made possible through individual-to-individual experiential knowledge transfer.

The model is composed of five phases applied across three levels of organizational granularity. The five phases are as follow:

1. **Prepare:** The preparation phase is a high level initialization of the overall knowledge retention program. The intent is that, at this stage, the program will be formalized and applied across the organization. Establishing leadership, goals, and metrics are the primary outcomes of this phase.

   Effective preparation helps to establish the infrastructure and authority necessary to overcome many of the most common barriers to success. The preparation stage reduces the inconsistent, ad-hoc, methodology often encountered in experiential knowledge management. Furthermore, establishing strong leadership and support infrastructure early enables a cultural shift towards becoming a proactive, learning organization.

2. **Assess:** The assessment stage is applied across the organization but looks at SMAs specifically. This stage is used to help identify where risks exist within the company (SMAs) and within those SMAs which individuals present the greatest risk. During assessment a demographic analysis is conducted to help to identify where risks may exist, and a criticality assessment is conducted to aid in the prioritization of the identified risks. This phase also includes an approval estimate for continued funding through the planning stage.

   At the assessment phase, the potential business impacts of losing an organization's experiential knowledge become evident. Identifying which SMAs and which SMEs hold critical knowledge and identifying their departure risk allows a shift towards proactive experiential knowledge management.

3. **Plan:** The planning stage looks specifically at subject matter experts identified in the assessment stage and looks to maximize the effectiveness of knowledge retention efforts through effective planning of the transfer case. This stage involves characterizing the transfer environment, and selecting a knowledge transfer strategy that will be effective based on the environmental characterization in conjunction with the SME's personal attributes. The planning stage also looks at specific business related objectives involved with a transfer case and requires approval at a stop gate prior to continuation to execution.

4. **Execute:** The execution phase requires completion of the execution plan and finally implementation and monitoring of the plan.

5. **Monitor:** This phase provides a means to review the efficacy of the whole program and to identify opportunities for improvement. It is ongoing.

7.2 Step by Step Walkthrough

This section provides a brief overview of each step within the EKRMM as well as the sub-steps and output of each step. Full details are available in CII IR 292-2

Step 1: Prepare for Knowledge Retention Management - The only step included in the Preparation phase. Step 1 is intended as a preparatory first-step upon initialization of a Knowledge Retention Program and serves to establish the required program support and infrastructure necessary to enable a successful experiential knowledge retention effort.

Upon completion of Step 1, there should exist both a Program Charter that identifies objectives, scope, priorities, and authorizations for the program, as well as a Program Plan that defines the executive sponsor(s), program manager(s), program resources, constraints, boundaries, and metrics to achieve success.

Step 1 is driven by seven sub-steps:

1.1 Recognize the *current state* of corporate knowledge retention
1.2 Gain *executive sponsorship* for the Program
1.3 Establish *program leadership*
1.4 Establish *program goals, program plan, and management supports*
1.5 Acquire, train, and align program staff
1.6 Anticipate and assess *barriers to program success*
1.7 Initiate program operations

Step 2: Target SMEs & SMAs through Business Unit Demographic Analysis - The demographic analysis of the assessment phase and serves to identify those SMAs and SMEs who deserve more in depth consideration. This step is intended to increase awareness of near-term and intermediate-term risks of expertise loss in order to initiate plans for needed knowledge retention efforts.

Step 2 results in a screened listing of SMAs-at-risk that are recommended for further analysis as retention candidates.

Step 2 is driven by four sub-steps:

2.1 Frame the problem: Recognize the many challenges in estimating individuals' timing of retirement
2.2 Review recent historic retirement departure parameters to help establish recommended screening criterion
2.3 Conduct the business unit demographic analysis with the selected adjusted screening age or years of experience
2.4 Formally select those potentially high-risk SMAs that warrant further analysis.

Step 3: Confirm Feasibility of Effort for Retention Planning - Confirms the feasibility of required efforts for SMA-at-risk assessment efforts relative to available staff support and schedule duration. Step 3 helps ensure feasibility of continued funding of knowledge retention management efforts and serves as a reality check for the number of SMA cases proceeding through steps 4, 5, and 6.

Step 3 results in an order-of-magnitude estimate of effort needed to complete Steps 4 through 7, along with any needed governance approval of the path-forward plan.

Step 3 is driven by four sub-steps:

3.1 Recognize SMA case complexity
3.2 Assess each SMA case for ***relative complexity***
3.3 Estimate analysis efforts hours
3.4 Compare the cumulative effort estimate with the time and staff resources available for actual analysis.

Step 4: Prioritization of SMAs & SMEs for Knowledge Retention - Conducts an in-depth bench-strength and knowledge criticality analyses of at-risk SMAs and

at-risk SMEs in order to establish priorities for knowledge retention efforts. This step helps to determine which knowledge loss cases are most critical and helps to prioritize mitigation efforts accordingly.

Step 4 results in a listing and relative prioritization of SMAs & SMEs at risk. This knowledge facilitates the selection of which SMEs will be selected for transfer.

Step 4 is driven by nine sub-steps and is supported by two spreadsheet tools. The first spreadsheet tool, Tool 4A, focuses on assessing individual SMAs. Tool 4B provides a means for comparing the knowledge criticality of each SMA and serves as the grounds for decision support.

The nine sub-steps for Step 4 are:

4.1 Establish file directory for Tool 4A SMA assessments.
4.2 For the SMA under consideration; Initialize assessment
4.3 Input SME Departure Risk Index
4.4 Conduct the SMA Knowledge Criticality Questionnaire
4.5 SMA Prioritization Output
4.6 Repeat steps 4.2 through 4.5 for each SMA considered
4.7 Initialize Tool 4B: Multi-SMA Aggregation and Prioritization Tool
4.8 Aggregate prioritization data
4.9 Based on aggregated SMA priority listing, establish priority cut-off for continued consideration

Step 5: Characterize Knowledge Transfer Environment - Characterizes the environment under which the knowledge transfer will take place for a *targeted individual* and helps to understand the transfer environment in order to maximize the effectiveness of the KTS.

Step 5 results in a selection of SMEs and their paired SMEs-in-development for transfer efforts. Step five also results in a list of applicable KTS ordered by effectiveness given the risk environment for the SME under consideration.

Step 5 is driven by four sub-steps and is supported by a spreadsheet tool. The tool uses data gathered in the surveys to match KTS with a scenario with the intent of maximizing effectiveness.

The sub-steps for Step 5 are:

5.1 Identify the individual at-risk and the SME(s)-in-development who will engage in the retention effort
5.2 Initialize Tool 5A: SME Risk Environment Characterization Tool
5.3 Complete the Environment Characterization Questionnaire included in the tool
5.4 Review KTS effectiveness output data

Step 6: Select Knowledge Transfer for Case - The stakeholders for the case under consideration will select the Knowledge Transfer Strategy that they feel will yield the best results for the SME under consideration. The goal is to maximize the effectiveness of the knowledge transfer program case by evaluating the top ranked Knowledge Transfer Strategies alternatives based on the environment characterized in Step 5.

Step 6 considers the output form Tool 5A, and helps to maximize transfer effectiveness by considering in detail qualitative “soft” variables involved in a transfer case. Tool 5A suggested possible strategies but did not consider either the SME or the recipient’s interpersonal skills, personality type, and other individual characteristics that will further influence the applicability and effectiveness of each KTS alternative.

Some of the considerations included in this step include:

- The type of knowledge to be transferred

- Why it needs to be transferred
- The SME-in-development's level of expertise
- The SME-in-development's learning styles and preferences
- Where the transferred knowledge will be applied
- Timing required/available
- Retirees commitment and desires
- Interpersonal Skills
- Teaching abilities

Step 6 will result in the final selection of KTS for the retiring SME.

Step 6 is driven by four sub-steps. Unlike other steps these steps do not occur in series, rather they occur sub-steps 6.1 through 6.3 occur in parallel and converge in sub-step 6.4. The sub-steps are:

6.1 Evaluate the soft traits of the individuals involved in the transfer effort
6.2 Evaluate the potential effectiveness impact of personality and cultural traits
6.3 Special considerations
6.4 Select the KTS for the knowledge transfer case.

Step 7: Prepare Business Case for Each SME and Confirm Priorities - Develops a business case for the mitigation effort. The focus is on quantifying the effort, benefits, and cost of the transfer effort in an effort to gain approval for the mitigation case. Step 7 is necessary to ensure feasibility and approval for continued funding through steps 8 and 9 for of each at-risk SME.

Step 7 is driven by two sub steps:

7.1 Prepare a Business Case

Elements included in the business case include:

- Stakeholders Roles

- Risk Identification:
- Case Goals
- Benefits
- Schedule
- Budget.
- Frame the decision

7.2 Submit Business Case for Approval

Gate: Approval Gate for Execution – This gate serves as a screen to determine which SME transfer cases will proceed to implementation.

Step 8: Develop SME Knowledge Retention Implementation Plan -develops a detailed case execution plan for use in implementation, execution, and monitoring of the experiential knowledge loss mitigation effort. This step considers the logistical and planning requirements necessary to enable an effective *experiential knowledge* transfer case.

Step 8 is driven by two sub-steps. These sub-steps expand on the business case developed in Step 7:

8.1 Refine the details of the preliminary case execution plan developed in step 7

8.2 Implement the plan

Step 9: Implement & Monitor Knowledge Retention Case - Implements and executes the case as planned in Step 8, and continues to monitor the case as it progresses. Ensure that the whole team is aligned with the goals and focus of the transfer effort and that the distinction between experiential and explicit knowledge is clear.

Once implemented it is important to periodically revisit the case goals and adapt the case as required.

See Appendix E for critical success factors pertaining to each Knowledge Transfer Strategy.

Step 10: Monitor Effectiveness of Knowledge Retention Model -Monitors the effectiveness of the whole process (steps 1-9) and is an opportunity to note any potential areas for improvement and designing a methodology to implement the improvements. Continued monitoring and improvement is important in ensuring program goals are being attained and that the KM effort is sustained.

Chapter 8 Conclusions & Recommendations

8.1 Research Summary

Over the past two years, RT 292 has investigated many elements of the experiential knowledge drain that is occurring around the world. The focus has been on:

- Recognizing the magnitude of the demographic shift occurring;
- Differentiating tacit and experiential knowledge;
- Understanding the nature of experiential knowledge and the challenges in capturing/transferring this knowledge;
- The value proposition for experiential knowledge management and the monetary and operational costs associated therewith;
- Mechanisms for transferring experiential knowledge;
- Methods for maximizing the effectiveness of transfer efforts;

The bulk of the research has gone into driving the development of the Experiential Knowledge Retention Management Model, which seeks to maximize the effectiveness of experiential knowledge transfer for retirees.

In conducting this research the expertise of the research team was a major contributing factor in the overall success of the project. In all the research team was made up of 14 industry experts from CII member companies and supported by an academic team from The University of Texas at Austin.

The data collection efforts of the team included case studies of four organizations considered to be leaders within both the capital projects industry and the knowledge management community. The research team conducted 24 interviews with 17 organizations in the capital projects industry, the majority of whom were considered to have advanced knowledge management programs. Surveys conducted by the team resulted in 44 responses from 38 CII organizations.

Development of the Experiential Knowledge Retention Management Model was driven by the expertise of the research team and supported through the use of the data.

8.2 Conclusions

RT 292 has found that effectively managing and retaining an organization's experiential knowledge in the face of increased retirement rates has the potential to optimize an organization's means to maintain their collective knowledge. Some of the benefits to retaining this knowledge include maintaining or increasing operational efficiency, reducing the occurrence of critical errors, encouraging innovation, and enabling the pursuit of growth strategies.

Having an effective experiential knowledge retention plan is important now, more than ever, as the number of baby boomers at or approaching retirement age is increasing every day. Furthermore, as the economy begins to recover, those individuals who have put off retirement due to economic hardships will again be looking to retire in the near future.

RT 292 has found that although many organizations address knowledge transfer and succession in an informal manner, there is generally no standard practice against which to benchmark success. Implementing a formal knowledge retention model, such as that recommended by RT 292, has the potential to increase the efficiency and effectiveness of experiential knowledge retention within an organization.

While the intangible, situational, and personal nature of experiential knowledge makes it extremely difficult to provide a black and white solution for retention; the model developed by RT 292 has been developed such that it can be customized at the corporate, business unit, and personal levels. This open-endedness enables the users to tailor the solution to meet their needs.

RT 292 has found that the reason most organizations fail to implement effective knowledge retention was attributable to lack of executive leadership and difficulty in determining value. At a local level, supervisors implementing experiential knowledge retention plans found that the largest barrier was that the effort was not a priority for the retiree and as such is often put aside in the interest of moving forward with day-to-day obligations. Another barrier is that many organizations do not embrace a sharing or learning culture, as a result potential retirees are often in the habit of protecting their knowledge. By committing to a formal knowledge retention plan, organizations inherently overcome many of these obstacles. Implementation of the model outlined above, and detailed in CII Implementation Resource IR 292-2, will help organizations to shift from a reactive response to experiential knowledge loss due to retirement to a proactive knowledge sharing culture that minimizes the impact of retirements by institutionalizing knowledge sharing in day-to-day work flows.

In summary, organizations should move forward in developing or improving a Knowledge Retention Program. Based on the research gathered in this investigation, the reader should consider the following tenets of success:

- Use Implementation Resource 292-2, Implementing an Experiential Knowledge Retention Management Model, to help to implement/improve an experiential knowledge retention program.
- Remember that leadership is the most important pre-requisite for success of Experiential Knowledge Retention Programs. Experiential Knowledge Retention Programs can attain some success when originating from the bottom-up; however, the overarching success of the program cannot be achieved without top-level leadership support, and good leadership at the tactical level.
- Organizations should become “sharing” organizations, rather than organizations that only collect or learn from the past in an ad hoc manner. Embracing a sharing culture implies an active and broad-based

implementation strategy rather than passively assuming that individuals will participate in the program.

- Organizations should adopt an active implementation strategy for ensuring that the program is applied across the board.
- The importance of culture should not be underestimated. Whether it is intra-organization cultural differences such as those between engineering, construction or operations, or differences caused by different geographical locations or languages, culture should be addressed when transferring, retaining, and sharing experiential knowledge.
- Recognition of quality and criticality of knowledge is paramount to success. Recognizing that not all knowledge will be or should be retained is important in ensuring that resources are used efficiently and that critical knowledge is retained.
- Both owners and contractors can benefit from Experiential Knowledge Retention Programs.

8.3 Recommendations for Future Research

Research conducted by RT-292 has been primarily focused on addressing the issues associated with the loss of experiential knowledge in the face of increased retirement rates in western economies that experienced a post-war baby-boom. Although the findings of this research may be applicable in other scenarios, further research into how best to share experiential knowledge from an individual expert to a group of developing experts would be beneficial to organizations in growing economies or to organizations expanding geographically. In both scenarios managing expertise effectively may help to ensure a more consistent level of service provided.

Other recommendations for further research would be to establish a reliable, and consistent, metric for measuring experiential knowledge in terms of both quantity

and value. At this point quantification of experiential knowledge is subjective, a more robust metric could help to improve measurement of experiential knowledge and drive the development of more accurate assessments of experiential knowledge for knowledge management, risk management, and intellectual capital accounting. Furthermore it would help in tracking of ongoing knowledge management efforts and could lead to new more effective knowledge management methods.

Appendices

Appendix A: Team Members

Ted Andrus – Day & Zimmerman

Carlos Caldas – The University of Texas at Austin

Mathew Carter - Worley Parsons

Dennis Chastain – WoodGroup-Mustang

Jason Crain – Hargrove Engineers & Constructors

Nancy Cundiff – Dow Chemical

Richard Elkington – The University of Texas at Austin

Jeremiah Evans – Abbott

Mark Fox – ConocoPhillips

Melvyn Hizon – BP America, Inc.

John Hope – Tenova Bateman

Jeff Joyce (Vice Chair) – Air Products and Chemicals Inc.

Kevin Kaczmarczyk – Ontario Power Generation

Elizabeth Kincaid – The University of Texas at Austin

Mellissa Kosobud – Abbott

John Larussa - ConocoPhillips

Fernanda Lino – Petrobras

John McQuary (Chair) – Fluor Corporation

James O'Connor – The University of Texas at Austin

Antonio Oliveira – Petrobras

Kevin Porter – Lauren Engineers & Constructors

Larry Stevens – Alstrom Power Inc.

Robert Tabor – URS Corporation

Appendix B: Participating Organizations

Air Products & Chemicals Inc.

Alstrom Power Inc.

Anheuser-Busch

BP America, Inc.

Cargill, Inc.

CH2M Hill

ConocoPhillips

Day & Zimmermann

Eastman Chemical Company

Fluor Corporation

General Electric

Hargrove Engineers & Constructors

Hensel Phelps

Lauren Engineers & Constructors

Ontario Power Generation

Petrobras

Proctor & Gamble

Schlumberger

ShawGroup

Technip USA

Tenova-Bateman

The University of Texas at Austin

URS Corporation

Wood Group Mustang

Worely Parsons

Appendix C: Glossary of Terms

Term	Ref. Step	Definition
Bench Strength	4	Bench strength is the measure of individuals currently practicing within a specific technical area and serves as an indicator of potential loss in capacity to execute should an SME depart
Comfort Zone	4	SMA is adequately staffed with SMEs
Concern Zone	4	SMA is adequately staffed with SMEs; however, due to criticality of SMA knowledge proactive steps should be taken to ensure SMA knowledge is sustained
Distress Zone	4	SMA has a disproportionate number of at-risk SMEs relative to SMEs-in-development. Steps should be taken to transfer experiential knowledge and expedite SME development
Experiential Knowledge	All	Experiential knowledge is that knowledge which constitutes the insight, wisdom, and good judgment gained through experience; is often characterized as “know-how;” and is developed more through ‘doing’ than other forms of learning.
High Distress Zone	4	SMA has a disproportionate number of at-risk SMEs relative to SMEs-in-development; furthermore this SMA has highly critical knowledge.
Knowledge Criticality	4	Knowledge which is crucial to the functionality of the SMA and/or the organization. See tool 4A
Knowledge Retention Program	All	Encompasses the entirety of the knowledge retention process from Organization level assessment to individual cases. The knowledge retention program should be designed to run in perpetuity and to support organizational business strategy.
Knowledge Transfer Case	All	Knowledge transfer efforts focused on an individual and their experiential knowledge. Every knowledge transfer case is unique and has a definite duration.

Term	Ref. Step	Definition
Knowledge Transfer Strategy (KTS)	ALL	Mechanism for retaining experiential knowledge by transferring from one individual to another.
SME Availability Index	4	A ratio that describes the bench strength of SMEs with respect to at-risk SMEs and no-risk SMEs
SME Competency Level	4	A scale that describes an individual's progression towards becoming an SME
Subject Matter Area (SMA)	All	Technical field within an organization whose expertise are required across projects and sometimes business units, indicates that the knowledge retention focus is on SMAs
Subject Matter Expert (SME)	All	An individual who is formally deemed by his/her supervisors, peers, and technical community at large as being amongst the leaders within their field
Subject Matter Expert In Development (SME-in-development)	All	An individual who has been identified within the organization as having the potential to become an SME in their field.

Appendix D: Expert Review & Feedback

Expert Profiles

Reviewer Job Title	Years of Industry Experience
Director Global Learning, Employee Development, Diversity and Inclusion	35
Competency Lead - R&M Projects, TAR & Maintenance	23
Mechanical Department Manager and Global Excellence Leader	25
PhD Pedagogy	30
VP Project Execution	38
Technical Knowledge & Training Manager	14
Director of Talent Management	34
Retired VP Geotech Eng.	55
Human Resources Director	20
Human Ressources Maager	20
Senior Process Engineer	7
Cumulative	301

Comment Categorization

Comment ID	Comment Classification
A	Non Contributive, Not Applicable, or Out of Scope
B	Grammar/Formatting Related
C	Content is present, reviewer missed it
D	Quick Fix
E	Substantive

Expert Comments/Feedback

No	Page	Line	Category	Comments
1	1		A	Many are starting to leave at age 55. Also with the shift to defined contribution pension plans there is less incentive to stay at the same company.
2	10		A	Table 2 might lead the reader to believe KT only needs to focus on those older than 60. This is a big misunderstanding.
3			A	Documenting what the SME-in–Development learns.(I've seen a lot of our up-in-comers become up-in-leavers)
4			A	Validation of what they learn?
5		General	A	There are some SME's that will be less experienced people but have much needed expertise such as automation, programming, etc, that will need to mentor up to more experienced people
6		General	A	Something to consider is that market conditions and a persons financial situation will help determine how much longer they are interested in working, as markets recover more people may choose to retire early.
7		Fig1	A	Add step or sub step to determine the quantity of SME's that are needed in

No	Page	Line	Category	Comments
				each SMA
8		7	A	Replace age with Remaining work years
9		7	A	Add sub step to determine quantity of SME's needed in each SMA
10		17	A	Include number of SME's needed in SMA
11		57	A	Include SP3D
12		67	A	Include the number of situations they are able to work together
13		1-10	A	I would promote that a required role is interpreter (age to age, generation to generation) as the people with the knowledge do not communicate in the same fashion as the generation acquiring the knowledge. For example, the generation with the knowledge tends to focus on written report, verbal discussion, meetings, …, while the recipients (often two generations difference in age) communicate via social media and are not overly responsive to e-mails, meetings, or face to face discussion.
14		4	A	Process targets an individual. Was consideration given on how to transfer

No	Page	Line	Category	Comments
				the knowledge to a group or transform the knowledge into a process?
15			A	KTS's – any consideration given to aligning these with CII best practices?
16			A	Appendix D – SMA Structures Perhaps another good place to inject CII Best Practices
17			A	I like the KTS names, definitions, but would still recommend alignment with CII Best Practices or other CII material
18	66	10	A	The years listed for Generation X are different than most research. A more common definition is 1965-1982 or 1965 to 1983. The years listed for Generation Y/Millennial are also different than most accepted research. A more common definition is 1982 to 2000 or 1983 to 2000.
19			A	The Model speaks to taking a proactive approach to KM, however I did not see that in the stepped approach. It was targeted towards retires primarily (see comments re: integrated approach below).
20			A	There are a lot of steps for managers to follow in this approach. The more

No	Page	Line	Category	Comments
				you can make it easier for them the better.
21			A	The overall process was clearly laid out and easy to understand
22			A	The tools described and worksheets provided were well laid out and will be useful to anyone working on a KT process
23			A	A case study might be extremely useful to gain full understanding of the tools , strategies, and results of implementing this KT process
24			A	Step 2: Motivation – this is probably out of scope but some mention of managing change within the organization may be useful as a program like this is initiated.

No	Page	Line	Category	Comments
25			A	Step 2.2 is classic workforce planning that would drive not only KS, but succession development, and key position assessment. Not sure if you want to make the larger connection here.
26			A	The chart on page 30 Figure 8 is great research. This area could also be expanded. This is the heart of the matter. What are the best methodologies to transfer knowledge? How do we know this? The steps in here regarding the process are very good and outline a useful methodology, but this is the key to the program. Again I think an actual case study (much like a Harvard Business Case Study) would be useful in this area. I think at the very least the top ranked strategies should be further defined and explored with solid examples of utilization.
27			A	Page 41 - 8.1 states that KT metrics cannot be standardized due to intangible nature of experiential knowledge. I would agree with this. That being said a case for building a culture of “Action Learning” could be made as a methodology that is wholly consistent with this process. Again may

No	Page	Line	Category	Comments
				extend beyond the scope of what is intended.
28			A	My main critique would be that there is not enough energy devoted to the actual act of KT. I think most companies understand there is a looming issue and can probably be identified through one process or another where the issue resides. The tools in this area are excellent but most companies can get there. The heart of the matter is the act of transference. The research on methods is really cool. I would just like to see more information (perhaps a case study) on these "successful" techniques to transfer the knowledge.
29			A	Page 20, SMA Criticality Tool/Assessment is very good
30			A	I believe the pairing compatibility is crucial! I would also emphasize the learning styles as another focus (mentioned on page 31, line 13). The SME may have one learning style and may impose his/her style on the SME in-development. There are some very simple, inexpensive learning style type indicators that could be adopted.
31			A	Page 56, SMA that I did not see listed was: Warranty, Sourcing, Contract Management (although, this may be under the Risk Management category)

No	Page	Line	Category	Comments
				and Constructability
32			A	It would be neat if this graphic could be interactive—like, you could click on a specific step and be taken to the page that dives into the details.
33			A	It might be good to explain the "who" of each step. Is this an HR step? Or is it better completed by functional leadership? Does it depend on the scope of the program?
34			A	Overall, this step seems to cater more to the large organizations. Is this going to be too much for a smaller organization? Can it be made "leaner"?
35			A	Instead of redefining terms, maybe have them link back to the original definitions. Or (like with bing…) have the definition pop-up when the cursor hovers over the words.
36			A	This may work for large organizations, but what about smaller organizations? Is there any pool of public data that they could use? [referring to corporate departure data]
37			A	This table [table 7] might be more effective by adding a few levels. Maybe you could rank the impact? Like, willingness has a level 5 impact on keeping

No	Page	Line	Category	Comments
				the retiree connected but a level 3 impact on lunchtime seminars.
38			A	Outlining the roles and responsibilities further would be helpful. Based on our lessons learned, senior management support is important; however KM accountability must be owned by line. HR's role is to facilitate the process and provide support. A team approach worked well and engaging staff in lifecycle of the process and obtain their buy-in increased the success of KM.
39			A	While I was reading the material, I found myself getting lost in the "alphabet soup" of acronyms.
40			A	Is there a need to transfer all of an individuals experiential knowledge? Some processes used to be based purely on intuition, but the development of some new technologies can outperform this intuition. Is this accounted for?
41	4	22	A/C	In addition retirees we are also starting work on knowledge transfer with "senior career" SMEs, not just those who are retiring (as referenced in Appendix C).
42		18	B	"Please" misspelled
43			B	Appendix F – why does 'F' come before 'E' ??

No	Page	Line	Category	Comments
44			B	As above, Appendix E – why does ‘E’ come after ‘F’ ??
45	2		C	Is the model a program or process? It is important for the user to understand whatever the case the outcome needs to create a culture of knowledge transfer that starts with the new hire.
46	35		C	Should include some description of matching the individual's personality style to the right tool.
47			C	General Comment: Need stress that most critical knowledge that needs to be transferred is tacit and is best captured as tacit knowledge.
48			C	Consistent format and repository for gathering knowledge
49		General	C	Would recommend to stay away from categorizing situations based on age, rather “Year Remaining with Company”
50		29	C	Include in top ranked strategies, “Monitoring on the Job” work situations.
51		32	C	Include “cultural differences” in step 6
52		2-9	C	Not only need ‘executive sponsorship,’ but will also need HR / Talent Development sponsorship – having knowledge to transfer only works if you

No	Page	Line	Category	Comments
				have willing recipients.
53			C	General Comment – prior to too much work on SMA's, wouldn't it be prudent to coordinate this with the Business's core / primary practices and processes? (or are core processes and practices another term for your SMA?; based on the sample listing on page 26 there appears to be alignment in these definitions / concepts)
54		21-11	C	Sub-Steps: perhaps the pairing should also include the option for an intermediary to facilitate the differences in generational learning
55		1-10	C	Implement and Monitor – recommend an evaluation at the end of the first task, project, or opportunity, after the Knowledge Transfer to help judge effectiveness of implementation of the 'new' knowledge.
56	4	6	C	In some industries the terms "explicit" and "tacit" knowledge are used instead of "experiential." Might be worth referencing the definitions some place in the document in case questions about terms comes up.
57	65	7	C	Regarding reference to MBTI. Some validation studies have shown that Myers Briggs is not as valid as other similar tools in identify personality preferences. In addition, due to its complexity, it is not as easy to implement

No	Page	Line	Category	Comments
				within an organization as other tools such as Tracom's Social Styles or DiSC. As an MBTI Administrator, I like the MBTI, but also use a variety of other tools in working with companies or departments in helping teams develop better working relationships.
58			C	For the tools, it would be helpful to have more information on the 'how' part of the implementation. What steps do managers take to execute the knowledge transfer tool?
59			C	Communication and change management tools: Information on how to roll out the program to ensure managers are educated on what KM is and how it is implemented is important. Change and communication tools will build awareness and understanding of the KM process and tools. Creating tools to support roll-out to the HR community and resources to support HR/ program owners in their roll-out to Line is integral. Some examples include: 1-page key messages documents, 1-page Job-Aid and FAQ for each group of users.

No	Page	Line	Category	Comments
60			C	A lot of time is spent on describing the issues confronting organizations and the process for analysis on the problem. This is useful but more time should be spent in Step 6: The Strategy describing in detail methodology here. The research presented is fascinating.
61			C	In our meeting, we asked if this model could be expanded beyond our industry. This might be a good opportunity to highlight that this model could be effective to a wider audience and not just in the Owner/Contractor capital projects industry.
62	6		D	Item 1.6 – You should note the root issue of these barriers is poor management practices in place. It is this root issue that needs to addressed and not use KT to treat the symptom.
63			D	Communication Strategy and Plan included in step 1. To ensure that the same message is delivered by all, participants, stakeholders, sponsors, it is a controlled repetitive message. – purpose, deliverables, benefits, etc.
64	5	9-14	D	Wording of the SMA and SME definitions and following sentences are awkward and somewhat unclear. Suggest breaking up into shorter sentences

No	Page	Line	Category	Comments
				to first define the term, then second, discuss application.
65	7	1	D	Suggest including the colored graphic icon shown in Figure 1 on page 7 at the beginning of each step to help the reader connect back to the graphic.
66	10	1	D	Suggest including the colored graphic icon shown in Figure 1 on page 10 at the beginning of each step to help the reader connect back to the graphic
67	16	1	D	Suggest including the colored graphic icon shown in Figure 1 on page 16 at the beginning of each step to help the reader connect back to the graphic
68	19	1	D	Suggest including the colored graphic icon shown in Figure 1 on page 19 at the beginning of each step to help the reader connect back to the graphic Note - I really like the 4A Tool on page 21
69	27	1	D	Suggest including the colored graphic icon shown in Figure 1 on page 27 at the beginning of each step to help the reader connect back to the graphic
70	34	1	D	Suggest including the colored graphic icon shown in Figure 1 on page 34 at the beginning of each step to help the reader connect back to the graphic
71	39	1	D	Suggest including the colored graphic icon shown in Figure 1 on page 39 at

No	Page	Line	Category	Comments
				the beginning of each step to help the reader connect back to the graphic
72	43	1	D	Suggest including the colored graphic icon shown in Figure 1 on page 43 at the beginning of each step to help the reader connect back to the graphic
73	48	1	D	Suggest including the colored graphic icon shown in Figure 1 on page 48 at the beginning of each step to help the reader connect back to the graphic
74	49	1	D	Suggest including the colored graphic icon shown in Figure 1 on page 49 at the beginning of each step to help the reader connect back to the graphic
75			D	The model outlines the importance of getting leadership on board and clear goals and objectives well. My suggestion is to link it to other HR or business programs to create an integrated approach to KM. The amount of time it takes to complete the process and the resulting value added is important to managers and supervisors. If they see the link to other work they are already completing, for example succession planning, performance reviews, development plans, and other related HR processes and business planning activities, building the business case to show why it is important and making it a priority for them gets easier.

No	Page	Line	Category	Comments
76			D	Segment 1.1 says to recognize the “Links between KM and organizational politics”. This is not well defined and probably should be expanded to explain the importance and techniques for addressing this concern.
77			D	Segment 1.4 sample organizational metrics in this section and their tie to KT metrics would be useful to illustrate this process.
78			D	This is the first place that we are introduced to the knowledge transfer strategies [Figure 7]. Suggest you list them out somewhere before with some brief descriptions.

Appendix E: Knowledge Transfer Strategies

General Implementation Requirements
*** The following is a general "Jump-start" Guide for Implementing any of the following KTS**
1. Agree on a roll-out/deployment plan **2. Develop and Implement Testing Plan** **3. Plan and Execute Pilot Effort** **4. Establish Training Plan for Users and SMEs** **5. Revise the System as Required** **6. Organize Full Deployment & User Support** **7. Establish a continuous Improvement Plan** **8. Schedule Periodic Management Review**

General Success Factors & Limitations	
Success Factors	**Barriers to Success**
Executive Support	Day-to-Day Obligations & Time Constraints
Relate business impact to risk under consideration	Lack of awareness of KTS available
Buy-in from all parties involved	Lack of definition/understanding of KT effort
KT effort treated as a project with an assigned project manager	Expense, and expense tracking
Alignment of program goals with transferee's career aspirations	Interference with pension plan
Clear definition of KT effort in terms of roles, goals, expenses, and time frame	

KTS INDEX	KTS-01
KTS NAME	**Lessons Learned & Best Practices**

Definition

A Lesson Learned is knowledge gained from experience, successful or otherwise, for the purpose of improving future performance. In developing Lessons Learned experiential knowledge necessary to respond to, or that lead to, a scenario can be identified, and shared.

Capturing the lesson under consideration should be facilitated by use of pre-established procedures and templates. The lessons, once codified, must be included in a database that is marshaled for relevance, has open accessibility, and has both flexible and effective query options.

Some lessons with broad applicability, frequent occurrences, or significant business impacts should be incorporated into the organizations structure as best practices.

In developing lessons learned, the wisdom, insight, and good judgment necessary to respond to, or that lead to, a scenario is identified, and shared.

Implementation Requirements

In addition to the general implementation requirements specified, the following items are typically required when establishing a Lessons Learned Program:

- Database with following capabilities at a minimum:
  - Remote Access
  - Customizable query fields
  - Screening/marshaling procedure
- Template to facilitate capturing lessons learned
  - Template should prompt for database query fields
- Decision criteria for selecting which lessons could be beneficial as a best practice and a procedure for establishing it as such

Success Factors & Limitations

Success Factors	Barriers to Success
Effective Querying within database	Narrow application within organization
Awareness of Program	Legal considerations
Effective training and templates	Ineffective screening
Accessibility	Ineffective database
Immediacy of post action review	Post action reviews occurring too late

KTS INDEX	KTS-02
KTS NAME	**Community of Practice (CoP)**

Definition

A Community of Practice is a group of individuals who share a common interest and expertise. These individuals work together to discuss, disseminate, and share knowledge; creating an environment of learning and sharing through encouraging discussion and developing intuition based on the experience of others. The CoP is useful for sharing knowledge that it not easily codifiable by encouraging discussion and developing intuition based on the experience of others.

A Community of Practice must have a well-defined scope of interest, frequent meetings, and a facilitator to lead meetings and ensure growth and sustainability of the community.

Communities of Practice can exist as digital communities, face-to-face communities, or a combination thereof and can exist within an organization or amongst organizations. A community of practice requires a support database to house the knowledge shared and a standard format for capturing the different types of knowledge shared.

Implementation Requirements

In addition to the general implementation requirements specified, the following items are typically required when establishing a Community of Practice:

- Database with following capabilities at a minimum:
  - Remote Access
  - Customizable query fields
  - Screening/marshaling procedure
- Template to facilitate codifying learning
  - Template should prompt for database query fields
- Community charter outlining purpose, vision, and goals
- Community contact list to facilitate communication and engagement
- Meetings (web & face to face)

Success Factors & Limitations

Success Factors	Barriers to Success
Strong leadership & community involvement	Limited Interaction & motivation within CoP
Awareness of Program	Poorly defined purpose
Frequency of meetings (web-based or F2F)	No commitment to sustain community past launch
Accessibility	Ineffective database
Effective training & templates	

KTS INDEX	KTS-03
KTS NAME	**Facilitated Masters Classes**

Definition

A facilitated masters class is group problem solving session led by an experienced facilitator. The group works through hypothetical problem scenarios individually with the facilitator guiding the students by sharing his/her wisdom, insight, and experience as it relates to the problem under consideration.

The facilitator should leave the students to work through the scenario solutions on their own, but when necessary ask questions of the students which will provoke consideration of avenues not yet explored leading to a more thorough understanding of the problem at hand.

Implementation Requirements

In addition to the general implementation requirements specified, the following items are typically required when facilitating a masters class:

- Consideration of who the audience will be and what types of scenarios would contribute to their development
- Consideration of who the SME will be and what their preferences are with respect to teaching and interacting with others
- Class schedule notice provided to managers and target audience well in advance of planned class date
- Training for presenters to help them conduct effective classes

Success Factors & Limitations

Success Factors	Barriers to Success
Scenarios relevant to the student and their job	Students or Facilitator do not buy into program
An effective/patient facilitator	Scenarios are not realistic
Scenarios are relevant to the experiential knowledge being shared	Classes are too long or too frequent

KTS INDEX	KTS-04
KTS NAME	**Lunchtime Seminars**

Definition

A lunchtime seminar is a brief presentation, or series of presentations, to a group with the intent of sharing an idea or experience based on experiential knowledge pertinent to the development of the wisdom, insight, or decision making capacity of the audience.

The objective of the timing is to overcome the common obstacle that workers have too many other work requirements/commitments to spend time on knowledge management by running the seminars during their lunch breaks and enticing participation by providing a meal.

Implementation Requirements

In addition to the general implementation requirements specified, the following items are also required when implementing a lunchtime seminar series:

- Facilitator to aid presenters, schedule seminars, and order the meals
- Seminar schedule notice provided to managers and target audience well in advance of planned seminar date
- Training for presenters to help them construct effective, concise seminars

Success Factors & Limitations

Success Factors	Barriers to Success
Sufficient notice of seminar schedule	No/Limited notice of seminar schedule
Effective, concise presentations	Non-engaging presentations
Opportunity for feedback from audience	Bad quality, limited variety, or no food
Good food	

KTS INDEX	KTS-05
KTS NAME	Narrative Database/Storytelling

Definition

Storytelling is the process wherein an experienced individual shares a narrative of a specific experience or experiences that were pertinent to the development of his/her critical wisdom, insight or decision making capacity.

Stories provide a means to illicit causality and meaning by investigating the circumstances surrounding an event from one (or many points) of view. Stories are effective at imparting tacit knowledge because elements which are hard to codify explicitly become clear through the context of the story.

Story telling requires support to help ensure that the story is concise yet not lacking in information. Effective story telling occurs when the story teller is not required to transcribe the event, to maintain the flow of the story the story teller should narrate and review the publication afterward.

Stories are best shared via company publications (newsletters, magazines, departmental emails) and stored for later use

Implementation Requirements

In addition to the general implementation requirements specified, the following items are typically required when practicing Storytelling:

- Audio/video recording equipment
  - Ability to metatag the AV files to facilitate searches
  - Editing software
- Facilitator charged with recording/transcribing the story and ensuring the story is focused on the event of interest
- Topic selection that is relevant to the targeted experiential knowledge

Success Factors & Limitations

Success Factors	Barriers to Success
Willing retirees	Long-winded narratives without clear intent
Awareness of Program	Limited distribution/availability
Quality of production	Non-Engaging story teller

KTS INDEX	KTS-06
KTS NAME	**Standardized College Program/ Course**

Definition

A standardized college program is a method to fill an industry wide experiential knowledge gap by developing pertinent wisdom, insight, and good judgment in a classroom setting prior to entering the workforce.

This strategy requires the development of a committee to address what the industry need is, what experiential knowledge is needed to address this need, how best to deliver it, and who the target audience is. The committee is also responsible for garnering a venue be it an existing institution (university, or college), a professional training service, boardroom, or virtual classroom.

Implementation Requirements

In addition to the general implementation requirements specified, the following items are also required when establishing a standardized college program/course:

- Industry committee with a common goal
  - Committee charter
  - Definition of the scope of work
- Input from an educational institution
- Venue for the program
- Determination of syllabus topics and delivery methods
  - Determine who will facilitate class and who presenter(s) will be

Success Factors & Limitations

Success Factors	Barriers to Success
Buy in from all committee members	Lack of students
Enrollment of receptive students	Ineffective presenters
Effective/Engaging presenters	Irrelevant topics
Buy in from organizations within the industry	Requires too much of the student's time (personal or professional)

KTS INDEX	KTS-07
KTS NAME	IT Collaboration/ Communication

Definition

Web based communication is a means to connect individuals and experts by improving their ability to network, connect, and correspond. Web based communication is highly dynamic, and is often used as a support mechanism for other risk mitigation strategies. Users interact with one another and disseminate knowledge through on-line forums, discussions, networks, or other established communication infrastructure.

Examples include social media networking (LinkedIn, Yellow Pages), Company wikis, discussion forums etc.

Implementation Requirements

In addition to the general implementation requirements specified, the following items are also required when using IT Collaboration/Communication:

- IT infrastructure and user interface that is intuitive and user friendly
  - Must be well organized with effective query options
- Training workshops to help users to effectively utilize the program
- Individual(s) to monitor the content for quality and relevance

Success Factors & Limitations

Success Factors	Barriers to Success
SME Participation	Low participation
Timely Response to questions	Low quality content
Quality of interface and infrastructure	Difficult to search for required information
Incentives for use	

KTS INDEX	KTS-08
KTS NAME	Outsourcing/Acquisition

Definition

Outsourcing or acquisitions are methods for acquiring job specific wisdom, insight, or good judgment when their internal development is either cost or time prohibitive. Examples of outsourcing or acquisition include contracting out job elements, hiring experts, or acquiring specialized firms to fill a knowledge requirement.

This strategy is best suited to scenarios where the knowledge cannot be transferred through in house experts, development or transfer of the knowledge in question is either schedule or cost prohibitive, or the knowledge in question is a unique and non-recurring business need.

Implementation Requirements

In addition to the general implementation requirements specified, the following items are also required when considering outsourcing/acquisition:

- Identification of potential candidates
- Cost/benefit analysis of alternatives (in house vs. various candidates)

Success Factors & Limitations

Success Factors	Barriers to Success

KTS INDEX	KTS-09
KTS NAME	Desk Side Review

Definition

A desk side review is a strategy wherein a peer, or supervisor, exchange information and tools pertinent to an employee's job in an informal setting (i.e. at the employee's desk). The intent of using the retiree's workplace is that it provides insight of what the retiree has in terms of personal resources at their disposal that supports their ability to make decisions.

Implementation Requirements

In addition to the general implementation requirements specified, the following items are also required when conducting a desk side review:

- The interviewer must have an idea of what decision processes are of interest
- The interviewer must schedule a time with the retiree that is convenient for them

Success Factors & Limitations

Success Factors	Barriers to Success
Retiree is not rushed/distracted by other commitments	Retiree is preoccupied or does not wish to have their work monitored
Interviewer and retiree are amicable	Retiree/SME-in-development do not get along
	Review is not focused and results in little outcome

KTS INDEX	KTS-10
KTS NAME	Job Shadowing

Definition

Job shadowing requires the pairing of an experienced individual with a protégée. The intent is to have the protégée observe, internalize, and eventually collaborate with the expert. Shadowing provides a means for the wisdom, insight, and good judgments that is not easily articulated to pass to the protégée through socialization and collaboration with the expert. Shadowing can be extensive or occasional, however should be limited to occasions where the retiree is employing the targeted experiential knowledge rather than simply applying prescriptive, or common knowledge.

The capacities of the retiree/SME-in-development pair can range from collaborative work, to SME-in-development observing or retiree observing the other work.

It is important that the personalities of the retiree and SME-in-development agree as the pair will be working together a great deal.

Implementation Requirements

In addition to the general implementation requirements specified, the following items are also required when conducting job shadowing:

- Definition of what capacity and frequency the SME-in-development will shadow the retiree
- Definition of what knowledge/skill is targeted and how best to transfer this skill
- Consideration of personality compatibility between the retiree and the SME-in-development

Success Factors & Limitations

Success Factors	Barriers to Success
Highly compatible pair	Either retiree or SME-in-development sees the program as a burden
Proximity of retiree and SME-in-development	

KTS INDEX	KTS-11
KTS NAME	**Mentoring/ Coaching**

Definition

Mentoring requires an experienced individual to help their mentee's professional development by being available and approachable for sharing their wisdom and insight and for helping to develop the decision making capacity of their mentees. The scope of a mentor's work is typically focused on career development and organizational structure rather than technical savvy.

In this capacity the mentor/coach can provide career advice, technical advice, and impart their experiential knowledge on the mentee. The intent is that the SME-in-development works independently of the mentor, however, the SME-in-development has access to the mentor when needed or when obstacles are encountered.

This strategy provides the SME-in-development an opportunity to seek wisdom, insight, or decision support based on the experiences of the mentor.

Implementation Requirements

In addition to the general implementation requirements specified, the following items are also required when conducting mentoring/coaching:

- Definition of what capacity and frequency the SME-in-development will meet with the mentor
- Consideration of personality compatibility between the retiree and the SME-in-development

Success Factors & Limitations

Success Factors	Barriers to Success
Highly compatible pair	Either retiree or SME-in-development sees the program as a burden
Proximity of retiree and SME-in-development	Incompatible pair
	Mentor cannot identify with career aspirations of mentoree

KTS INDEX	KTS-12
KTS NAME	**Simulations**

Definition

Simulations simulate experience by providing hypothetical scenarios in problem solving sessions that require participants to think critically and make on-the-spot decisions. These simulations serve to develop the decision making capacity of participants. The intent is to form habits based on the simulations.

Simulations can include worksheets, problems, games, or virtual reality tools. The simulations are intended to make the SME-in-development think critically considering a given situation and to respond accordingly. It is important that the simulation is managed by an expert who will be able to provide constructive criticism to the SME-in-development.

Simulations can be based on events that occur regularly within the organization or industry, events that occur infrequently but have significant repercussions if responded to poorly, or scenarios that are hypothetical yet still grounded in reality.

Implementation Requirements

In addition to the general implementation requirements specified, the following items are also required when conducting simulations:

- Execution plan specifying
  - By what means the simulation will be delivered
  - What topic/events/scenarios will be simulated and in what level of detail
  - Who will be the authority to assess the simulation performance
- Training workshops for how experts can design effective simulation programs

Success Factors & Limitations

Success Factors	Barriers to Success
Engaging simulations	Non constructive feedback
Relevant, constructive feedback	Too many simulations occupying too much time
Incentives for performance	Non-relevant simulation scenarios

KTS INDEX	KTS-13
KTS NAME	**Job Rotation**

Definition

Job Rotations provides an opportunity for the worker to gain a broader experience base with respect to organizational operation and how their work contributes to it. This helps to develop the individual's ability to make well-rounded decisions.

Implementation Requirements

In addition to the general implementation requirements specified, the following items are also required for job rotations:

- Program administrator to facilitate the rotations and monitor the effectiveness
- Defined positions and responsibilities for the employee in each position
- Meaningful/challenging work responsibilities in each position

Success Factors & Limitations

Success Factors	Barriers to Success
Meaningful/Challenging work	Lack of work or responsibility
Smooth Rotations timed with appropriate business cycles	Moves are too frequent to gain an appreciation for the position

KTS INDEX	KTS-14
KTS NAME	**Attend Meeting as an Observer/Learner**

Definition

Knowledge Transfer Strategy wherein a less experienced employee attends meetings in the capacity of an observer. The intent being that the employee has the benefit of absorbing the experiences of multiple retirees through the discourse and proceedings of the meeting.

Implementation Requirements

In addition to the general implementation requirements specified, the following items are also required when participating in meetings:

- Sponsor to plan what meetings will be relevant to the development of the SME-in-development and to ensure that the SME-in-development is:
  - Available
  - Briefed prior to the meeting and made aware of the agenda and informed with respect to any pertinent information that will help to maximize the understanding and proceedings of the meeting
  - Debriefed and given the opportunity to discuss what occurred in the meeting and ensure that conclusions drawn in the meeting are understood

Success Factors & Limitations

Success Factors	Barriers to Success
Attentive SME-in-development	SME-in-development is not interested in meetings
Retiree willing to thoroughly brief/debrief the SME-in-development	Either party does not buy in to process
	SME-in-development dragged to too many meetings

KTS INDEX	KTS-15
KTS NAME	Grooming Assignment

Definition

A grooming assignment is a strategy wherein an employee is put into a position, or given a project, that will facilitate their assent into a specified role (ex. to become an SME). The grooming position is intended to provide increased exposure to their future position, and help the individual to gain a more thorough understanding of the responsibilities, and knowledge necessary for the position and the network that they will become a part of.

Implementation Requirements

In addition to the general implementation requirements specified, the following items are also required when establishing a grooming assignment:

- Defined timeframe that the individual will be in the grooming position
- Pair the individual with a more senior employee in the position of interest to act as a mentor when needed
- Well defined responsibilities for the individual in their new role

Success Factors & Limitations

Success Factors	Barriers to Success
Good relationship with mentor	Position does not allow the SME-in-development to learn their future position
Receptive retiree	
Well defined time frame for advancement	

KTS INDEX	KTS-16
KTS NAME	**Keep Retired Connected**

Definition

Knowledge Transfer Strategy that engages retired employees in various capacities. The intent maintaining a connection with retirees is to continue to benefit/learn from their accrued experiential knowledge and to maximize the dissemination of their wisdom, insight, and good judgment.

Examples include: bringing the retiree back as a consultant, bringing the retiree back with flexible work hours/schedule, occasional seminars or meetings hosted by the retiree

This strategy is typically seen to be a reactive technique that can be avoided through effective knowledge management; however it is common amongst many organizations with budding knowledge management programs.

Implementation Requirements

In addition to the general implementation requirements specified, the following items are also required when engaging retired individuals:

- Understanding of the retiree's wishes and willingness to return to work
- Inventory of what knowledge the retiree has that is of interest
- Scope of work, an execution plan, and a defined schedule to be developed with the retiree that suits him/her and will effectively manage the issue they have been recalled to solve.

Success Factors & Limitations

Success Factors	Barriers to Success
Retiree is eager to return to work	Return to work interferes with pension
Defined time frame for return tenure	Program is not sensitive to wishes of retiree
Support staff to learn from retiree	No effective plan in place for how the retiree will be used

Appendix F: Interview Guide

CII RT 292 Transferring Experiential Knowledge from the Near-retirement Generation to the Next Generation

Phase I Data Collection Plan

Overview of the RT 292 Research Project

In the latter part of the 20th century our industry effectively managed the natural loss of knowledge thru normal attrition. The higher than normal rate of knowledge loss due to the baby-boomer dynamic demands changing our knowledge transfer practices. Increasing the quantity and quality of those activities is required to address the immediate challenge. In so doing, there is a need to develop the next generation of knowledge transfer methods and tools. Such improvements will serve our industry by evolving our knowledge management priorities and strategies well beyond this current problem. This project aims to achieve these goals by identifying the most effective methods for transferring experiential knowledge to the increasingly global replacement generation. The primary purpose is to provide definitive recommendations, guidelines, and tools for the capital projects industry to effectively transfer experiential knowledge of its employees nearing retirement to the people who remain on the job. Effective knowledge transfer management practices and technologies will be identified and analyzed. Interviews and case studies will be conducted. Particular attention will be given to specific actions needed or being taken by organizations to transfer near-retirees knowledge, and how companies integrate this information for the benefit of succeeding generations. In the context of capital projects, the specific research objectives are:

- Understand the knowledge transfer problem, including its magnitude and dynamics.
- Investigate the knowledge transfer value proposition.
- Provide definitions of terms related to the research topic.
- Assess and deliver techniques to measure the extent and nature of an organization's knowledge loss risk.
- Define and assess methods to effectively transfer knowledge and mitigate knowledge loss risks.
- Understand the barriers to knowledge transfer methods, as well as their implementation success factors.

The focus is on transferring experiential knowledge and wisdom from near-retirees, in the capital projects industry considering generational differences and globalization aspects. The research team is not addressing explicit knowledge transfer, that is to say that the team is not dealing with the transfer of general procedural knowledge.

Experiential Knowledge is defined as: Knowledge which constitutes the insight, wisdom, and good judgment gained through experience and is often characterized as "know-how," and is developed more through 'doing' than other forms of learning.

Phase I Data Collection

Methodology: 1-hour phone interviews.

Purpose: Understand the knowledge transfer strategies that your organization uses to ensure that the organizational wisdom, insight and good judgment is being sustained.

Target: Knowledge Management (KM) or Human Resource (HR) professionals, as well as users of KM processes within your organization. In other words, individuals that are better positioned to answer the questions below.

Questions:

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?

    - How?
    - Does your organization have any executive leadership or sponsorship for the corporate response to the situation?
    - When considering expertise transfer, is an effort made to distinguish between experiential knowledge and explicit knowledge?

2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart)

3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise? A list of typical knowledge transfer strategies that can be applied in order to transfer expertise is included on Page 3 for your reference.

    - If so, what are the strategies?
    - How did you select the most appropriate strategy?
    - For each strategy used:
        - What were the implementation requirements?
        - What was the transfer timeline available?
        - How much time per week was required of participating parties?
        - What are some of the success factors and implementation barriers?

4. Are there other methods that you think may have been effective but haven't been used in your organization? Why not?

Knowledge Transfer (KT) Strategies

	KTS	Definition
1	Best-practice Session/ Lessons Learned	KT strategy wherein a database is developed (and updated appropriately) with the intention of capturing and communicating the knowledge from positive and negative experiences. Workshops can also be used to implement this strategy.
2	Communities of Practice (CoP)	KT strategy wherein peers work together to discuss and disseminate knowledge, of a specific nature, by sharing details of the experience and work performed in the subject matter area.
3	Facilitate Master Classes	KT strategy wherein an experienced facilitator engages with less experienced employees to collectively work through hypothetical scenarios wherein some challenge has been encountered.
4	Lunchtime Seminars	KT strategy wherein an idea can be introduced/presented to the target audience in a less formal context (i.e. over lunch). This KTS is best suited to items which are expected to be brief discussion topics or provide an introductory or overview of the concept in question.
5	Narrative Databases/ Storytelling	KT strategy wherein knowledge source(s) narrate events of specific or general interest. The narrative is often recorded and transcribed to make distribution easier.
6	Standardized College Program/ Course	KT strategy wherein a conglomerate of industry partners work together to establish a course that addresses an industry need. The course provides a forum for dissemination of targeted experiential knowledge.
7	IT Collaboration/ Communication	Users interact with one another and disseminate knowledge through on-line forums, discussions, networks, or other established communication infrastructure.
8	Outsourcing/ Acquisition	KT strategy that requires the services of an outside source to fill a knowledge requirement.
9	Desk Side Reviews	KT strategy wherein a peer or a supervisor exchanges information and tools pertinent to an employee's job in an informal setting (i.e. at the employee's desk.) The intent of using the source's workspace is that the source will have all of their typical resources at their disposal
10	Job Shadowing	KT strategy wherein a source is shadowed by a receiver in professional settings that require the source to use the targeted experiential knowledge. Shadowing can be extensive or occasional depending on the quantity of knowledge required.
11	Mentoring/ Coaching	KT strategy wherein an experienced employee is paired with less experienced employees in the capacity of a mentor or coach.
12	Simulations	KT strategy that is designed to simulate experience through games and exercises. The intent is to form habits based on the simulations.
13	Job Rotation	KT strategy wherein a less experienced employee is put in a rotation program of multiple short-term (6 to 12 month) assignments to gain broader experience within the organization.

	KTS	Definition
14	Participating in Meetings without any Commitment	KT strategy wherein a less experienced employee attends meetings with no commitment. The intent being that the employee has the benefit of absorbing the experiences of multiple sources through the discourse and proceeding s of the meeting.
15	Grooming Assignment	KT strategy wherein an employee is moved into a position that will facilitate the transfer of required knowledge for a future position.
16	Keep Retired Connected	KT strategy that engages retired employees in various capacities (ex. flexible work schedules, or monthly lunches at the office) with the intent of continuing to benefit/learn from their experience.

Appendix G: Interview Summaries

CONTRACTOR INTERVIEWS

Interview Summary

Interviewee: Engineering Design & Technology Director, Large Engineering Firm

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?
   YES
   - How? Well defined succession planning, HR tracks age and puts a plan together
   - Does your organization have any executive leadership or sponsorship for the corporate response to the situation? Formal Corporate succession plan supported through HR
   - When considering expertise transfer, is an effort made to distinguish between experiential knowledge and explicit knowledge? Look at higher skill positions and try to encapsulate the whole breadth of knowledge

2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart)
   Structured with design areas (Civil, mechanical, …) discipline best practice lead engineer leads and coordinates within business group. Research area within each SMA to collect relevant publishings.
3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise?

   Strategy when senior individuals are leaving:
   a. COPs
      i. Multiple COPs that are cross discipline
      ii. SMEs are leads of COPs, supported by a team of (4 or five) smes
      iii. Monthly/Weekly phone calls
      iv. Can seek outside support outside of COP
      v. Challenges: Tracking time and funding -> difficult to assign to a project
      vi. Challenges: Day Job
      vii. Challenges: Timing with global communities
      viii. Challenge: When individuals do not have an immediate problem sometime attendance drops off, however the attendance is

driven by passion. SMEs want to see SEM numbers grow within the company

b. Best Practices
c. Lunchtime Seminars
    i. SMEs identified by discipline lead
    ii. Not limited to a single seminar
    iii. Put in searchable database after fact
    iv. Every subject is presented around lunch hours. Often provided, each seminar presented 4 times a day to ensure largest lunch time market
    v. Challenge: Trying to communicate the topics to the enterprise at large, method is to distribute to leads and have them distribute/cascade the document
    vi. Material posted a few days in advance of session for review, often time the verbal Q & A is recorded.
    vii. In the database the powerpoints are all word searchable, very important verbal recordings are out into word documents
    viii. Don't have to deal with many confidentiality issues, occasionally cannot post if related to a client's project.
    ix. Well suited to experiential knowledge when there is the opportunity to discuss the content.
d. Video Instructional
    i. Database Library with thousands of pre-recorded video files. Very searchable. Varies from 30min to 2 min.
    ii. Active Video Screenshots
e. HelpDesk (Forums)
    i. Deals with project delivery issues, (separate from IT)
    ii. Inquiry tickets submitted through a template online
    iii. Past tickets published to a keyword searchable database
    iv. Marketed product (off the shelf)
    v. Challenge – Must be diligent in monitoring what is documented

Dealing with Abrupt Departures:

- IT does data mining
- Try to be proactive with the KM through communities of practice

Interview Summary

Interviewee: VP Enterprise Technology, Large Engineering Firm

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer? ***Yes.***

    - How? Succession planning, by practice or discipline, within each Business Unit (BU).
    - Does your organization have any executive leadership or sponsorship for the corporate response to the situation? Yes; it is lead within each BU by its President and Executive Leadership Team (ELT).
    - When considering expertise transfer, is an effort made to distinguish between experiential knowledge and explicit knowledge? YES

2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart) Yes (Technology Practices, Functions and Services…etc).

3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise? ***Yes*** A list of typical knowledge transfer strategies that can be applied in order to transfer expertise is included on Page 3 for your reference.

    - If so, what are the strategies? Best Practices/Lessons learned, Communities of Practice, Lunchtime Seminars, IT Collaboration, Mentoring/Coaching ,Meeting participation without Commitment, Keeping Retired Connected, Standardized College Program (CH2M University)
    - How did you select the most appropriate strategy? Varies by BU, function and- to a lesser extent- geography.
    - For each strategy used:
    - What were the implementation requirements? Leadership by BU ELT is a major requirement, particularly regarding sustained succession planning and updating. Other career development efforts are a must to underpin maturation and succession.

- What was the transfer timeline available? This varies widely by BU and function.
- How much time per week was required of participating parties? This varies widely by BU and function.
- What are some of the success factors and implementation barriers? Key Success factors include: executive leadership and support, sustained career development programs, training, clear human resources policies and procedures as well as equitable and consistent compensation and performance evaluation processes. Key Barriers: workloads of mentors and mentees, as well as geography sometimes.

4. Are there other methods that you think may have been effective but haven't been used in your organization? Why not? No; your list is very comprehensive; it's a tall order to begin with.

Additional Method Notes:

- Lunchtime Seminars
  - Used extensively, not confined to lunchtime only. Typically conducted in a virtual environment where subjects are in different time zones.
- Communities of Practice
  - Supported through SharePoint sites and monitored by committee members who are technically knowledgeable and identified as "up-and comers" in the specified knowledge area
  - Community sustained through frequent communication
  - Open membership; granted by request
  - Supported by an in house intranet with highly customizable query options
- Mentoring/Coaching
  - Mentoring is the term used for general career and personal development. Coaching has to do with technical affiliation of individual.
  - Individuals often have distinct coach and mentor
  - Mentor is a requirement and serves as the fundamental platform for HR and establishing the career path
  - Mentor generally mentors 3 to 4 individuals but is not restricted to any specified amount.

        - Mentors/mentoree can have as many as three steps within the organizational hierarchy
        - Supervisor helps to match the pair
- Keeping Retired Connected
    - Almost an automatic progression for senior individuals
    - Degree of involvement varies widely dependent on retirees circumstances
    - Retirees stay connected to the contact database and active employees can often times not even identify them as retired
    - Some issues include:
        - Different billing codes required for retired persons
        - Insurance issues when retiree must travel internationally

Interview Summary

Interviewee: Practice Leader & Principal, Small Engineering Firm

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer? No, small enough to know who's who and when they will be retiring
2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart) No
3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise? Documented procedures
4. Additional Notes: Small firm, (10 people) so the organization has a very open culture in terms of sharing. When individuals have retired in the past, the knowledge gap has been very limited as the sharing culture has led to a proactive environment wherein shadowing/mentoring type environments have limited a potential knowledge gap. That said the initiative is not formal and is a product of the company being quite small.

Interview Summary

Interviewee: Leader Corporate University, Large EPC Firm

Notes regarding Corporate University program:

- 30 colleges (30 functions addressed)
- Employees select their program (range from 4hrs to 5 days)
- Online programs Available
- Programs developed in house -> done with a developer & SME
- Needed to address lack of global standardization across business units

Notes Regarding Use of Knowledge Transfer Strategies Employed

- Best Practices
  - Established through online development forums with smes
  - Forums separated between leadership forums and functional (Technical) development
  - Forums meet digitally via tel. video and online
  - Future leaders within a function are identified early (often as much as 15 years)
  - Members invite new members
- Lessons Learned
  - Database maintained for what forums contain what information
  - Subject to evaluation of quantity of knowledge (qualitative)
- Social Networking
  - Called knowledge online in-house
  - Knowledge depository
  - Facebook type application
  - Used to connect experts
  - Helps experts to be identified globally
- Job Shadowing
  - Heavily used within organization
  - Successor teamed with technical expert for as much as 2 years (while the shadower maintains their day job)
  - Shadowee is sometimes asked to extend their retirement date to suite the purposes of this program
- Mentoring/Pairing

        - Mentoring circles; groups wherein everyone mentors everyone with a minimum of 1 senior member
        - Video and distance learning techniques applied to overcome geographic constraints
    - Job Rotation
        - 2 years of shadow event. Used to see senior execs in action - > Protégé exposed to how the exec work

Assessing Effectiveness of the program:

- No formal process, look at capacity of individual cases and plan path forward from there
- Talent management system is used to monitor pool of available resources & bench strength for different SMAs.

No formal pairing strategy for mitigation strategies with individual cases

Interview Summary

Interviewee: Mechanical Engineering Lea, Large EPC Firm

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?
    - How?
        - Assess the retirement rates locally, look at how much time is left in a specific role
            - 8 month transition in role
            - How to assess criticality: look at number of people in SMA (bench strength)
            - Look at high end technical experts
            - SMEs are given fellow, or senior fellow, career paths
            - Often sit on multiple COPs
        - Assess globally-> Begin by identifying experts with a matrix/map for SMAs & SME pairing
            - Try to pair progress to replace-> programs require a formal plan to track success
            - Identification Window: Specialty dependent -> 5 years minimum in highly technical roles
        - Look at what knowledge: Feeder forums -> Try to develop members more quickly
        - Mentors are elected by individuals
        - Functional feeders act quarterly on a global scale through teleconferences
    - When considering expertise transfer, is an effort made to distinguish between experiential knowledge and explicit knowledge?
      Differentiating explicit and tacit knowledge is not done formally
2. Barriers to success
    - Time constraints
        - Taking time to sit with protégée
        - Day job requirement
3. Success factors
    - Attention to individual and align KT program with executives
    - Formal program with executive leadership. Efficient well developed programs
    - Transferring many to many requires networking of SMEs ->formed committees

- Chaired by a senior fellow
- Quarterly committee meetings for addressing problems and networking
- Emphasis is on networking and awareness of resources and talent

Interview Summary

Interviewee: Leader Global Functional Networks, Large EPC Firm

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?

    - Project execution team: provides best practices and lessons learned, protection of copyrights to support Fluor functional groups. Provide tools for operations execution
    1. When considering retirees cannot legally ask peoples ages
        - Use statistic age to manage (managed by HR)
        - Best practices -> knowledge loss assessment process
            - Functional development identifies critical resources, what critical knowledge do they possess, who has it?
            - Is there a succession plan?
            - Criticality is difficult to assess-> will it continue to be critical?
            - Based on SMAs with low bench strength
            - This process is not followed religiously
            - Distinguishing experiential perspective? Yes, prescriptive knowledge is very well established and managed
            - Experiential knowledge stipends provided for developing the dissemination process
2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart)

    Structure of knowledge areas:
    a. 40 areas
    b. Each has a charter
    c. Knowledge manager (full time) ensures reliability of information
    d. SME: General Defn: Community (internal & external) recognize & validate individual as SME (SME->Fellow->Senior fellow)
    e. SMEs have a responsibility to knowledge management & Forum response
    f. SMEs expected to subscribe to certain knowledge objects for response
3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise?
    - Best practices, forums, mentoring, shadowing
        - SMEs required to provide a succession plan with short term & long term considerations
            - Address skill sets needed to be an SME

        - Consider what knowledge might be pertinent in the future and how it might be developed further
        - Facilitators made available & training on how succession planning works
        - Timeline -> as early as possible, reactive right now -> mentoring circles
        - Protégées are difficult to identify; more people are interested in becoming managers because of recognition
        - Difficulty -> remote locations and global market -> need to transfer knowledge remotely
            - -> desire to become SMEs higher in developing countries
- Success Factors
    - Recognition as SME & Compensation
        - Carrere path and planning
    - Knowledge managers to provide leadership
- Barriers to Success
    - Geographical constraints

Interview Summary

Interviewee: Director of Communications for KM, Large EPC Firm

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?
    - Yes, senior fellows and fellows are tracked
        - Also track progress of protégées
    - SME knowledge loss risk assessment based on TVA
        - Look to quantify the risk nit the knowledge lost
    - Knowledge communities led by executive leadership developed within communities
        - Leader-> focuses on people aspect
        - Acts as steward of content
        - Breaking into very specific communities allows for this level of detail
    - Difficult to distinguish EK from TK
        - EK surfaces as required within forums but KM initiative is meant to be comprehensive

2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart)

    - Knowledge communities
        - SMEs recognized within organization
            - SME must have credential on profile to provide users with confidence in answers
        - Unknown experts can be identified organically through responses in forums

3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise?
    - SME Accountability
        - 48 hour response time within forums
        - Quality of content is high
        - High “read” stats within forums
    - SME Protégée development program
        - Partner in content development
        - First pass at answers for protégée then reviewed by SME
    - SES 45+ years old (80%)
        - Protégées typically have around ten years of experience

- Mentoring programs:
  - (1:10) development ratio
  - Monthly lunch seminars
  - Mentees pose questions to experts for general knowledge
- Success factors
  - Accountability of experts
  - Collegiate relationships
  - Community relationships are strong
  - Single Site Communities are integrated
- Barriers:
  - Projects are billable environment -> Creates an issue when considering how to bill time
  - Time
  - Cyclical industry and billing

Interview Summary

Interviewee: Business development Manager, Non-CII Contractor

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?
    - Do not formally track impending retirement, word of mouth. Executives talk about it a year or two out. No specific focus on one element of knowledge, comprehensive approach.
2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart)
    - Different groups, (operations, procurement, etc.)
3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise?
    - Retiree's conduct training in the form of seminars
        - 1 session seminars
        - Vary based on needs, needs identified based on where the company is short on a specific expertise or where there is significant under-developed bench strength
        - Targeted on specific audiences, selected attendees
        - Training manager assists in putting together the seminar
    - Training Library
        - Electronic database containing procedures (field and office guide)
    - Risk Assessment Database, lessons learned program
        - Under-utilized, people forget about it, lack of awareness
    - Informal mentoring
        - Career and technical knowledge
    - Long tenure individuals help to proactively transfer knowledge as there career progresses -> open sharing culture

Interview Summary

Interviewee: Director Knowledge Management, Non-CII Oilfield Contractor

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?
   - Yes, tracked through HR.
   - Executive leader dedicated to KM initiatives.
   - Not distinguished in writing, but KM management team recognizes what transfer mechanisms capture experiential knowledge
2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart)
   - Yes, over 300 recognized technical communities.

3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise?
   - In house community of practice (over 300, some over 2000 people) – Oracle based
     - A lot of senior SMEs enjoy being leaders
     - Discussion forums
     - Career Network Program with people search -> in house resumes -> helps to find mentors/coach
     - Workshops (1 or 2 people) (50-60 people) senior people present stuff, junior people can participate with no commitment, building network
     - 15-20% of population very active, other population are “lurkers”
     - Leaders serve 1 year (can serve multiple)
     - SMEs volunteer to present webinars
   - Technical Webinars – (50 to 70 in Q1)
     - “Grey-Hair Webinar”: Monthly seminar led by more senior individuals, what did I learn and how did I learn it.
     - SMEs put Design books together to
     - Run twice a day to accommodate global network
     - Recorded audio with PowerPoint and put on community website
   - Bulletin Boards – Email based discussion boards, All archived
   - In-Touch – formal database. Expert monitored. Cumulative thread put to this database. Operations support/Knowledge, access for field guys.
   - Master Classes -> *Challenge* It takes time to put together an EFFECTIVE program, including problems for class solving rather than

lecturing -> Outside facilitator helps to guide and develop program, 10-15 years of experience required for invitation.

- Lunch and learns
- Storytelling -> do not use, difficult to put the narrative in a succinct form that people want to sit and listen, even with small chunks
- In house-university run by SMEs(also invite clients at cost)
- Peer reviews/technical (Deskside reviews) reviews
- Mentoring/Coaching – Coach serves multiple (max 4) individuals, individuals select their coach, help with career development
    - Individuals select coach based on People search, look for a mentor whom they respect, whose career path/interests are aligned and whose personalities mesh
- Job Rotations – (18-24 months) not done that often

Other

- Very KM oriented culture
- Very proactive, does not require much more effort before retirement, some shadowing and retirement connections
- High Value High Potential -> Identified for future management development
- High Value Technical Experts ->Identified for future technical development
- High value individuals identified by supervisors, reflagged every year. Very qualitative program

Interview Summary

Interviewee: Manager Organizational Development, Large EPC Firm

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?
We do not have a direct formal process to assess/track the impending near-retirement departure. However, we do have HR processes and information which help identify the near-retirement departure of the workforce talent.

- How? We achieve getting the information mentioned above in several ways:

1. Through our annual Performance Appraisal process - employees & managers discuss the employee's career aspirations. This information is captured in our Talent Management system and available for viewing by Executives, Head of HR Directors, Talent Managers and Organizational Development Managers. Early identification of retirement may be discovered here through the employee career aspirations both short term (2 years or less) or long term (in 5 years).
2. Following the Performance Appraisal, we conduct the People Review process which we take a closer look at our "top performance" population and assess them for performance & potential for the next career move. This process entails a discussion around the table with executives and managers. Enough feedback and insights are discovered at the People Review meetings and those near-retirement departure workforce is realized (if not before), during this process. Comments and relevant action plans are also discussed to ensure expertise transfer. Comments/notes are documented in the Talent Management System. Talent Manager & Organizational Manager are also present at the People Review to make proper Knowledge Transfer recommendation.
3. Lastly, we have the Succession Planning process which serves as another data point to identify the population. Development actions or knowledge transfer to the replacement are also discussed and followed up by the manager & Talent Manager.

- Does your organization have any executive leadership or sponsorship for the corporate response to the situation? We do not have a formal "corporate response". However, our executive leadership is aware of the near-retirement population & the potential knowledge gap through the Performance Appraisal, People Review processes mentioned above. The organization is responding to this situation via the help of Talent Manager & the Organizational Development group. Currently, our Organizational Development group is working to define a Knowledge Transfer strategy.

- When considering expertise transfer, is an effort made to distinguish between experiential knowledge and explicit knowledge? We have training offerings on experiential knowledge or hands-on knowledge, and the distinction is made by the

instructor but we do not have anything formal to set the requirements & standardize the process to make the distinction.

2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart) We do not have an established structure. Instead, we identify knowledge areas or subject matter areas via the establishment of our "Main & General Experts". The members in this group are known to have certain special technical knowledge in which they are the expert.

3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise?

- If so, what are the strategies? Best-practice Session/ Lessons Learned, Lunchtime Seminars, IT Collaboration/ Communication, Mentoring/ Coaching, Grooming Assignment, Job Rotation

- How did you select the most appropriate strategy? Some of the strategies listed above are used worldwide and have been selected/implemented for years. The processes & systems for those strategies proven to be useful for the employees. The other strategies listed such Lunchtime seminars, Mentoring/Coaching, Grooming Assignment, Job Rotation derive from different organization set up. For example, the Organizational Development group in the US administers and facilitates lunchtime seminars per demand from employees/managers. The Grooming Assignment & Job Rotation are part of our Graduate Oriented or GO program where we rotate new graduates for 6 months - 1 year in various departments/functions.

- For each strategy used:

o What were the implementation requirements? I've only been involved in the implementation of the Coaching/Mentoring strategy and do not know about the others. For the Coaching/Mentoring, the requirements include completion of a strategy plan, execution plan, interviews conducted to develop a Knowledge Silo Matrix and interviews conducted with each expert to develop the Skill Development Plan. The implementation also requires a 2 day workshop to teach the experts how to teach others. Tools are provided during the workshop.

o What was the transfer timeline available? Transfer timeline varies on the skill to be taught. The learner is considered "green" or achieved the knowledge when he/she can pass the mentor's test questions.

o How much time per week was required of participating parties? varies per group but for the most part, we require a minimum of 1 hour a week to work on the Skill Development Plan.

o What are some of the success factors and implementation barriers? We measure success a couple of ways but one way is that is apparent is through the use of the Knowledge Silo Matrix. When we have more "green" or "expert" in each area, than "yellow", less experience, we have successfully transfer the knowledge. Implementation barriers - the prioritization of the learner/mentor to include Knowledge Transfer as a high priority on top of a busy schedule. There is just no time to have an extra "add -on".

4. Are there other methods that you think may have been effective but haven't been used in your organization? Why not? I can't think of any at the moment.

Interview Summary

Interviewee: Senior HR director for employee development, EPC Contractor

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?

    - Demographic studies to assess employee departure risk -> do not currently assess KT. No system to back pass experience
        - Leadership is emerging: supporting at the exec level but no systems currently in place
        - Quantifying and if identifying critical knowledge system is developing
            - Plan to use critical knowledge mapping
        - Recognize and differentiate between experiential and prescriptive knowledge

2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart)

    - Formal structure of knowledge areas (functional silos)
        - Experts exist as lead

3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise?

    - SMEs lead following efforts (SMEs not always well definied)
        - Webinar development programs
        - Mentoring
        - COPs online
        - Lessons learned
        - Social media
        - Vocational on the job training under tutelage of other individuals
    - Program is informal at this stage and is based on individual/supervisor determination
    - Currently use a phased retirement program to keep retired connected

    Success Factors

    - Dedicated Knowledge manager in charge of management and capturing
    - LT must be “in the flow”. Immediate access without needing courses etc.

Barriers to implementation

- No culture of sharing knowledge
- Introducing new tools meets with resistance
- Time constraints and quantity of knowledge to manage
- Individual time constraints

OWNER INTERVIEWS

Interview Summary

Interviewee: Human Resources Manager, Healthcare Services

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?

    - No formal process for transferring experiential knowledge
        - Each department manages this effort independently
        - Policy does not allow HR to ask when individuals will retire
        - Approach is to understand senior employees career path (through mapping and interviews) to better understand how experience was developed for use with developing employees/experts

2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart)

    - Engineering hierarchy for disciplines including SME identification and career development documentation
        - Individuals take the initiative to chase a career path -> this tool helps to match people with SMEs in some working relationship to expose them to their desired position to affirm direction prior to development
        - SMEs/Retirees motivated to develop juniors to take over for them, eases their need to travel, attend conferences, etc.
        - Motivation difficulty; SMES don't fully understand importance of KT
        - Transfer technique: Hot seat -> force senior engineer into mentorship role

3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise?

    - White papers and web casts required from SMEs <- concentrated within a single website

Interview Summary

Interviewee: Engineering Knowledge Management Lead, Chemical Production

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?

- Manage knowledge through an HRP (Human Resources Planning) program
- HRP formally addresses individual needs every two years, informally it occurs every year
- Metrics [subjective]
    - Years from retirement
    - Criticality of knowledge
    - Evaluated by global functional managers (i.e. process, design etc.)
- Average age of individuals being addressed is quite high, typically they are on the cusp of or currently in retirement and are brought back as a part time employee
- Team knowledge transfer plans
    - Look at the individual's knowledge and develop a customized KT plan for each individual
    - Most popular technique is/are:
        - Story Telling -> Dialogue/Informal
        - Mentoring
        - "Two-In-A-Box" (analogous with shadowing) -> limited and expensive
        - Decision factors include personality/barriers/talking with managers -> no checklist/formal analysis
        - When receiver is known mentoring is used
- Barriers:
    - Ownership of program and gaining managerial & individual buy in
    - Time requirements & prioritization -> Subjects don't like adding to their job
- Success Factors:
    - Program is integrated with company culture
    - Program is not "incentivized"
    - Leadership and responsibility is well defined
- Addresses SME/Functional Areas

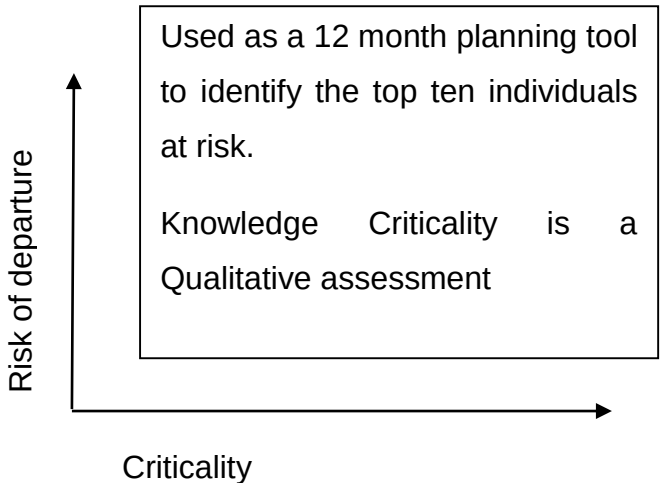
- Management of Implementation: Ownership is on managers and then individual
- Currently trying to come up with metrics

Interview Summary

Interviewee: Recent Retiree. Formerly senior chemical engineering manager. Developed a number of pilot KT applications, Chemical Production

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?

- Difficulty in identifying individuals due to privacy policies. Impending risk identified as follows:
  - 60+ years old, considered critical risk
  - 55-60 years old, put on radar and included in assessment phase
  - Find that people are generally open to helping with KT and their retirement plans
  - Call their RMS strategy planning the HRP or human resources planning
    i. HRP Strives to perform succession planning and to identify up-an-coming experts/replacements
- Identifying Key Skills
  - Managers do a "Key Skills Review" annually with key resources to identify what is the potential talent loss in the specific age ranges. They answer the question "Who has the critical Knowledge that would impact the business?"
  - Use a matrix to identify key skills.



        - After identifying the top ten departing individuals initiate a conversation with them and plan a path forward. This method has been well received in the past.

        - Treat knowledge management as a project with a Project Manager for each individual case

- RMS used
    - Story telling – Talk through particular experiences
    - Lunchtime Seminars
    - Closed Session learning when there is proprietary information being shared
    - “Two in the box” method, like shadowing -> 6 month shadow pairing, 3 months together and then a formal hand off

The retiree’s experiential knowledge retention planning experience was reviewed briefly as follows:

- Short notice provided for retirement due to family reasons (6 months)
- Successor not identified until after departure
- Last two months on the job spent documenting common issues and how he dealt with them
- Helped his successor with new job in the capacity of a consultant as retired individual

- Success Factors

    - Monitoring how time is spent and how to bill appropriately
    - Monitoring success of a given project by after action reviews when individual has departed and the successor has taken their position
- Barriers to success
    - Buy in from individual or supervisor. Mitigated by endorsing the program at a high level and providing high visibility with for the program
    - Lack of time. Minimum of 6 months required and a well laid out schedule

Other considerations when dealing with tacit knowledge:

Due to its elusive nature best to engrain knowledge in individuals through practice rather than trying to document it

Interview Summary

Interviewee: Senior Engineering Manager, Chemical Production

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?
    - Organization has collectively recognized the retirement bubble since the year 2000
    - Worried that AP is in denial of severity of issue -> Economy downturn is blinding organization to current KT needs
    - Issue is that KT does directly affect project or operations directly -> low priority
    - Human Resource Planning (HRP)
        - Objective is to identify experts a minimum of 5 years before departure
        - Assess criticality on a 2 x 2 grid

	2 Yrs out	5 Yrs out
Critical		
Less Critical		

        - Performed on individual level but also investigate high level SMAs as well
            - At SMA level try to assess pipeline of personnel for SMA sustainability
        - HRP is supported by managers to develop KMS with expert. Time is typically of the essence and shadowing is set up
    - Other techniques used include shadowing, lunchtime seminars (not used as often anymore, preparation seen as extra work), narrative database, keep retired engaged, yellow pages (not used as often, trendy, not maintained), outsourcing/acquisition, desk side reviews, grooming assignments
    - Also use supplemental employment program with retirees (half time employment in whatever capacity required)
    - Basic Considerations Identification: System pairing “what” specs with the “why”
        - Ex. Spec-A23 established B/C meeting “y” -> link to meeting minutes ->meeting minutes state that A-23 established to address occurrence of “x”
    - Barriers:

    - Time requirement for management of program, sources, & receivers
    - Different organizations/project types/ resources
    - Program often lacks leadership or a champion
- Success Factors:
    - Strong Leadership
    - Issue related to business impact
    - Easy Implementation and not seen as extra work

Interview Summary

Interviewee: GM Corporate KM, Chemical Production

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?

- USE the HRP (Human resource process)
    - Continuous cycle repeating every two years
    - Business units address business needs and talent requirements
    - Generates action items -> Identify top talent and succession planning
    - Risk assessment medium -> 50% departure risk=medium, 75% is high
    - RA used in conjunction with criticality risk
    - Corporate HR committee sponsors program
    - Business partners help develop HRP process to business units
    - Characterize by
        - Critical skill type
        - Rarity
        - Future needs
    - Metrics used for quantifying:
        - Skill type
        - Talent profiles
        - Gaps
        - Business unit needs
    - Strategic level -> Top down
        - Looking back; planning foreword
        - Where are we going? What skills do we need?
    - Integrated talent management
        - What type of skills are needed for corporate path
    - HRP
    - Knowledge transfer
        - Identify skills needed for business operations
        - Develop prescriptive knowledge through corporate university (interaction classes)
    - Engagement teams
        - Six sigma (continuous improvement)
        - Diversity inclusion teams

        - Peer recognition teams
        - Provide training to educate about knowledge transfer and retention
        - Structures semi-formal
            - Governance teams, guidelines, charter required, metrics, objective, time frame

2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart)

    - SMAs
        - Governed by AP University
        - Chaired by HR VP & CFO to provide tangibles that allow cost tracking and value

3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise?

    - Effectiveness measured using a likeart scale
    - Senior execs ensure business needs are being met
    - 11 key skills areas
        - Center for excellence delivers teachings
    - Motivation for establishing structure
        - Consistency throughout organization for learning & knowledge transfer and retention
    - HRO sessions are typically full day sessions

Barriers to Success

- Urgency <- also an opportunity – gets a lot of energy assigned to the project
- Time & day jobs

Success Factors

- Tools have to be simple, consistent so that it does not take much time
- Limited time -> force through simple & essence
- Embed in existing systems
- Maintain relevance
- Need organizational readiness
- Needs to fit with company culture
- Maintain familiarity

Interview Summary

Interviewee: Training & Development Group PM, Beverage Producer

1. Does not have a systematic process. Talking about implementing one.
    a. Informal process of identifying retirees
    b. Burden to capture falls on the managers
    c. Development not currently on anyone's radar
2. No knowledge structure within the company. Within groups there is some sharing, but no formal system. Ad-hoc. Explicit Knowledge Sharing
3. Strategies are up to the manager, no formalized process, no documentation.
   Effects of no system:

- Not anticipating large retirement wave (merger brought in a lot of new blood and provided an opportunity to have incentivized retirements)

Interview Summary

Interviewee: Refining Projects Continuous Improvement, Oil & Gas Production

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?
   - Nonstandard -> Some business units do, some do not
     - Privacy laws & Policy with respect to demographic questions
     - System is available but not mandatory
   - No formal effort to address risk of knowledge loss
     - Budding system -> about people not knowledge specifically
     - EK & Prescriptive Knowledge not distinct
     - Prescriptive knowledge libraries

2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart)

   - Technical disciplines & business units

3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise?
   - University classes
   - Continuous improvement forums (CoPs)
     - SME & Facilitator act as performance leaders
     - Regional and global meetings
     - Teleconferences garner good participation
   - Interviews
   - Storytelling
   - Training
   - Best practices
   - COPs
   - Masters Classes
   - Peer Review
   - Lessons learned included in KM plan for project
   - BP Connect -> Similar to yellow pages
   - Keep retired connected
   - Success factors
     - Production Quality; User interface
     - Belief & buy in

- Barriers
    - Non-formal (ad-hoc nature)
    - Availability & awareness (attributed to size of organization)

Interview Summary

Interviewee: Organizational Learning Specialist, Oil & Gas Production

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?
    - Discontinuous throughout organization, each silo approaches the problem independently
    - Differentiating between tacit and explicit knowledge
        - Networks used to drive tacit knowledge development & explanation through calls -> disseminated through learning bulleting & review committees check to make sure learning's are being used (learning verification)

2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart)

    - Technical disciplines & business units

3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise?
    - Strong network of retirees with expertise
    - Knowledge Transfer Strategies -> Nest practices, discipline networks (CoPs)
    - Best practices
        - All accessible through a database (learning loop is used to update best practices)
        - People required to utilize & provide best practice feedback based on conditions
    - Experts become well connected through networks
    - Lessons learned: update best practices
        - Lessons learned are scored with a $value
- Project engineering colleges: classes & work capability training
- Mentoring: Chosen by mentoree, full time career advice
- Job Rotation; Moved around within organization for first three years -> on boarding process
- Capability resources for learning about KM System
- Success Factors:
    - Very well defined roles for all KTs
        - Very clear who the expert is and who the decision makers are

        - Expert rollout makes identification of experts very easy
        - Communication of success of best practices through lessons learned
        - Capability development resources for raising awareness
        - Strong Executive level champions -> core values involve learning
        - Projects have a contact to reach out to for organizational learning <-> facilitates communication & ensures standards are communicated
- Barriers
    - Awareness of systems in place
    - Lack of understanding

Interview Summary

Interviewee: Learning & Performance Improvement Manager, Chemical Production

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?

- Yes, just beginning; program began in 2011 and began an informal rollout through critical silos (business planning) .There is a succession planning process is in place, but that is not specifically targeted at attrition. Started developing a program to address attrition within ten years. Encompasses knowledge retention. Not the first attempt to begin KM, tend to be reactive in the past. Trying to make this program stick.
    - Used HR managers to identify (through silo leadership teams) to identify critical individuals. Informal. 60 identified individuals.
    - Supported by VP Talent Management & VP HR but is still not a number one priority. Decided against a companywide oversight team because of cost and lack of momentum.
    - Yes, used to use succession planning then started this initiative to target attrition and KM.

2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart)

- Databases and SharePoint to capture explicit knowledge. No specific knowledge structure.

3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise?

- ICE -> Identify (critical knowledge areas). Capture, Exchange
    - Thirty different ways to capture knowledge… interviewed consultants, lit review
    - Did not want ANOTHER HR process or ANOTHER IT solution, emphasis on integrating within existing initiatives.
    - Four main ways
        - Incumbent employee internalizes knowledge (mostly explicit) cheapest
        - Interviews with employee (exit interviews)

        - Performed as a series of interviews, aimed at capturing experiential knowledge
        - Good for individuals that are retiring quickly
        - Brainstorm list of questions to ask individuals is available
        - Knowledge explicated, but in the process of finding the best way to transfer the knowledge. Plan to integrate the knowledge into existing procedures, and training programs
- Interactive sessions with a group, record session
    - Presentations on specific subjects
    - Socialize the knowledge prior to departure
- Job shadowing, considered the best but most costly
    - Need to improve succession planning to increase length of time and opportunity to perform job shadowing
    - Do not see the company extending the transition period to 2 or 3 months due to associated costs and potential to delay retirement. Challenging to change culture
- Use retirees as consultants heavily (due to voluntary retirement plans) but introduced a need for post-retirement service contracts

Interview Summary

Interviewee: Energy Division Learning Leader, Energy Provider

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?

- Yes -> Because the average age and tenure of high level employees need to track
  - Multiple ways to identify individuals; look for three year succession plan
  - Supported throughout executive level
  - Capturing Experiential knowledge is identified by looking at tenure and experience
  - Very formal succession planning with 2 reviews annually
- Succession Planning Process (Annual Process)
  - Performance Reviews for everyone (look at career path, goals, and objectives)
    - Everyone is looked at, but not everyone has a succession plan
  - CEO spends ~1 mo/yr working on succession plan
  - "Session C' -> looks at bench strength & critical skills identification
  - SMA identification
    - SME Search engine (tool) powered by keyword search
    - Social network links keywords
    - SUCCESS FACTOR: high awareness and dependability of tool
- Videotaping
  - Database with keyword searches
  - 1 year old program "GE Video"
    - Establish a large database prior to roll-out
    - Original video owner Marshalls content & us responsible for updating
    - CHALLENGES video content, length, depth of the videos
- Mentoring, talent swap, rotation, video recording, shadowing, training modules developed by SMEs, Lunch & Learns
- Choosing what strategy is looked at the individual level and functional group

- Mentoring is used by everyone
- Rotation: Has to be addressing a specific need based on career path
    - Charter of points to learn while on rotation
    - Has to be an identified need to go on rotation
- Shadowing:
    - Implementation and launch had to be well received as a succession tool
    - Three year program
    - Yr 1-> full shadowing
    - Yr 2 -> Retiree scales workload back (75% - 50%)
    - Yr. 3 scales back to 25-50%
    - EXPENSIVE, only used for critical roles
    - Occasional personality conflicts
    - Generally well received
    - High enthusiasm by both protégées and mentors

Interview Summary

Interviewee: Leader of Capital Effectiveness, Food Production/Distribution

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?

    - Talent management managed through HR
        - Comprehensive knowledge capture strategies
        - Supported by executives
        - Many transfer initiatives are in the development process
            i. Need recognized as the company expands, there is a need for more consistency across the company, a need to share the wealth of knowledge within the company, and to capture the wealth of knowledge that is potentially walking out the door with retirees

2. Does your organization have an established structure of knowledge areas or subject matter areas? (more than an organization chart)

    - Divided by technical areas, COEs (Centers of Excellence), Engineering and Process centered, Each Area has a SME, Business units consist of multiple domains
        - SMEs identified based on years of experience, past experience, hand selected by supervisors

3. Does your organization have one or more mitigation strategies in place to respond to the impending loss of expertise?

    - YES
        - System to bring new hires “Up-to-Speed” on culture and principals and minimum requirements, final product is a site engineering manual
        - Shadowing
            i. Timeframe depends on position and individual and position
        - Lessons Learned
            i. Vary by business units (Some use SharePoint, some Bus are less formal)
        - Communities of Practice

    i. Focus on connecting global experts for various processes
    ii. Vision is to facilitate collaboration
    iii. Informal at this stage (just starting initiative)
- Facilitate masters classes
    i. In the process of developing training programs that focus on highlighting case studies “Simulations” to put the programs into context
- IT Collaboration/Communication
    i. Support some initiatives, SharePoint to distribute knowledge
- Mentoring/Coaching
    i. Informal
- Job Rotation
    i. Informal program, talent management program, as needed
    ii. Used to train and develop other offices
    iii. Enhances communities of practice networks
- Grooming Assignment
    i. Senior Executives have a grooming path
    ii. Individuals identified through talent management program and grooming
- Keep Retired Connected
    i. Hired as contractor, about one year after their retirement is average but not the rule
    ii. Many of the more senior level individuals are kept on in some capacity for a long time (socially)

Interview Summary

Interviewee: Associate Director Capital Systems Management, Medical Supplies Supplier

1. Does your organization formally assess/track the impending near-retirement departure of workforce talent in order to assure expertise transfer?
    - Unofficially. Awareness of people's ages within business units
        - 2-3 years out talked about, 3-6 months' notice
    - Looked at in a project context and corporate context
        - Project Context
            - Transition period wherein a protégé shadows to take over
        - Corporate Context
            - Supervisors monitor the content
            - SMEs input majority of information, but everyone has the opportunity to input
            - SMEs Travel around regions and conduct training
                - Focus on CBAs and work at aligning company units
                - Training group will facilitate program and content delivery
                - Follow up question posed to training group
                - Available online all the time, PG Database
        - Encourage experienced people to act as trainers
            - Focus on sharing knowledge throughout their career
            - SMEs as a trainer is part of their day job requirements
        - Communities of practice
            - Every two years meet face to face to talk through issues and develop training needs
            - "Sensing the organization" – identification of risk areas in SMAs – awareness of training programs
            - Identify needs for new training programs
            - Interim CoPs meet quarterly, governed by budget – typically teleconference
            - 15 – 250
        - Use story telling in training to make material more relatable than just reading slides
            - Storytelling preferred to simulation
        - Informally keep retired connected – lunches primarily – sometimes contract basis – No conflict with

- Peer Reviews – Used to connect company experts to less experienced teams

Interview Summary

Interviewee: Senior Training Manager, Energy Supplier

1. Yes, new initiative (within first year)
    - Look at years of experience, and have a conversation regarding their planned retirement. Conversation centered around "Legacy", motivates buy-in. HR tracks near retirement, questions about retirement surface during annual reviews at which time supervisor is brought on board in retirement plan
    - Executive leadership on board with program
    - Look at both experiential & explicit knowledge in staff, experiential focus with craft
2. Yes there is a SMA structure
    - Talent management includes specific training for business units including regulatory training, SME training for training
3. Strategies:
    - Mentoring/Coaching, (iDrive)
        - informal
        - Helps to connect senior programs with junior employees
        - Mentors volunteer, are trained on how to be effective mentors
        - Mentorees volunteer and pair with a mentor
        - Mentoring focused on softer skills (networking, career path, etc.)
        - 3:1 Mentorship ratio
        - Corporate HR Supports program (provides material, subject matters, success reports)
        - Power Hour – Focused on professional development sessions
        - Pit Crew – Communication & Accountability
        - Advisor Session – Career path
    - Talent Connection (To find expertise)
        - Formal Mentor
        - Connects SMEs with junior employees
        - Helps to develop technical skills
        - 3:1 ratio for mentorship
        - Run for 12 months minimum, and then perpetuates or mentor changes

- Emerging Leaders Database (~1 year old)
    - Focused on individuals who are going to move into another role (3 yrs within current role)
    - Fed from foundational leadership program (function specific leadership training, meant for new managers)
    - Groomed for a position of more significant managerial responsibility
    - 2 year program, generally meet quarterly dependent on size and scope of task
    - Must be nominated by an executive manager or business unit
    - Nominated based on 9 block setting (8, or 9 required)
- Developing Leaders Program (~1 year old)
    - 2 years long
    - 5+ years experience
    - Nominated by functional leadership
    - Populated from Emerging leaders program
    - Look at leadership, managerial, and financial acumen
    - Managerial to directorship roles
    - 5-7 years experience
- Strategic Leadership Program
    - 10 years experience required
    - Demonstrations of critical thinking
    - How to develop a cascading business strategy
    - Direction comes from executive VPs
    - Simulation & coaching heavy
    - Executive directors
- Visionary Leadership Programs
    - ~ 15 years experience (executive vps)
    - Develop business plans, culture
    - Nominated
- Leadership program suite implementation requirement
    - Shaw leadership accountability program
    - Addressed the question “What is being done to develop and retain talent?”
    - Complete executive buy-in

Appendix H: Survey Forms

Internal Survey

RT-292 Phase II Internal Survey

Page 1

1. Please enter the folloing information:

Name:

Position:

Company:

Years with company:

RT-292 Phase II Internal Survey

2. How effective is Lessons Learned at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
A Lesson Learned is knowledge gained from experience, successful or otherwise, for the purpose of improving future performance. In developing Lessons Learned, the wisdom, insight, and good judgment necessary to respond to, or that lead to, a scenario can be identified, and shared.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

3. Comments:

RT-292 Phase II Internal Survey

4. How effective is Community of Practice at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Community of Practice is a group of individuals that share a common interest and expertise creating an environment for learning and sharing knowledge by encouraging discussion and developing intuition based on the experience of others.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

5. Comments:

RT-292 Phase II Internal Survey

6. How effective is Facilitating a Masters Class at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
A facilitated masters class is group problem solving session led by an experienced facilitator. The group works through hypothetical problem scenarios individually with the facilitator guiding the students by sharing his/her wisdom, insight, and experience as it relates to the problem under consideration.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

7. Comments:

RT-292 Phase II Internal Survey

8. How effective are Lunchtime Seminars at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
A lunchtime seminar is a brief presentation, or series of presentations, provided with the intent of sharing an idea or experience pertinent to the development of the wisdom, insight, or decision making capacity of the audience.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

9. Comments:

RT-292 Phase II Internal Survey

10. How effective is Storytelling at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Storytelling is the process wherein an experienced individual shares a narrative of a specific experience or experiences that were pertinent to the development of his/her critical wisdom, insight or decision making capacity.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

11. Comments:

RT-292 Phase II Internal Survey

12. How effective is a Standardized College Program at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
A standardized college program is a method to fill an industry wide experiential knowledge gap by developing their pertinent wisdom, insight, or good judgment in a classroom setting.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

13. Comments:

RT-292 Phase II Internal Survey

14. How effective is Web Based Communication at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Web based communication is a means to connect individuals and experts by improving their ability to network, connect, and correspond. Web based communication is highly dynamic, and is often used as a support mechanism for other risk mitigation strategies.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

15. Comments:

RT-292 Phase II Internal Survey

16. How effective is Outsourcing/Acquisition at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Outsourcing or acquisitions are methods for acquiring job specific wisdom, insight, or good judgment when their internal development is either cost or time prohibitive. Examples of outsourcing or acquisition include contracting out job elements, hiring experts, or acquiring specialized firms to fill a knowledge requirement.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

17. Comments:

RT-292 Phase II Internal Survey

18. How effective are Desk Side Reviews at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
A desk side review is a strategy wherein a peer, or supervisor, exchange information and tools pertinent to an employee's job in an informal setting (i.e. at the employee's desk). The intent of using the source's workplace is that it provides insight of what the source has in terms of personal resources at their disposal that supports their ability to make decisions.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

19. Comments:

RT-292 Phase II Internal Survey

20. How effective is Job Shadowing at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Job shadowing requires the pairing of an experienced individual with a protégée with the intent of having the protégée observe, internalize, and eventually collaborate with the expert. Shadowing provides a means for the wisdom, insight, and good judgments that is not easily articulated to pass to the protégée through socialization and collaboration with the expert.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

21. Comments:

RT-292 Phase II Internal Survey

22. How effective is Mentoring at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Mentoring requires an experienced individual to help their mentees professional development by being available and approachable for sharing their wisdom and insight and helping to develop the decision making capacity of their mentees. The scope of a mentor's work is typically focused on career development and organizational structure rather than technical savvy.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

23. Comments:

RT-292 Phase II Internal Survey

24. How effective are Simulations at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below

Simulations simulate experience by providing hypothetical scenarios in problem solving sessions that require participants to think critically and make on-the-spot decisions. These simulations serve to develop the decision making capacity of participants.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

25. Comments:

RT-292 Phase II Internal Survey

26. How effective is Job Rotation at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Job Rotations provides an opportunity for the worker to gain a broader experience base with respect to organizational operation and how their work contributes to it. This helps to develop the individual's ability to make more well-rounded decisions.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

27. Comments:

RT-292 Phase II Internal Survey

28. How effective is Participating in Meetings without Commitment at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Participating in meetings without comitment is a risk mitigation strategy wherein a less experienced employee attends meetings in the capacity of an observer with no commitment to participate. The intent being that the employee has the benefit of absorbing the experiences of multiple sources through the discourse and proceedings of the meeting.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

29. Comments:

RT-292 Phase II Internal Survey

30. How effective is a Grooming Assignment at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
A grooming assignment is a strategy wherein an employee is put into a position, or given a project, that will facilitate their assent into a specified role (ex. to become an SME). The grooming position is intended to provide increased exposure to their future position, and help the individual to gain a more thorough understanding of the responsibilities, and knowledge necessary for the position and the network that they will become a part of.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

31. Comments:

RT-292 Phase II Internal Survey

32. How effective is Keeping Retired Connected at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Keepoing retired connected: The intent maintaining a connection with retirees is to continue to benefit/learn from their accrued experiential knowledge and to maximize the dissemination of their wisdom, insight, and good judgment.

	Low	Medium	High
When there is only one knowledge source and one knowledge receiver	☐	☐	☐
When there is only one knowledge source and many knowledge receivers	☐	☐	☐
When the knowledge source is available less than 5 hours a week	☐	☐	☐
When the knowledge source is available between 5 and 20 hours a week	☐	☐	☐
When the knowledge source is available between 20 and 40 hours a week	☐	☐	☐
When IT infrastructure to support/distribute knowledge is available	☐	☐	☐
When IT infrastructure to support/distribute knowledge is not available	☐	☐	☐

33. Comments:

External Survey

RT292 Phase II External Survey

Page 1

1. Please enter the following information:

Name:

Position:

Company:

Years of Experience:

RT292 Phase II External Survey

Page 2

2. How effective is Lessons Learned at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
A Lesson Learned is knowledge gained from experience, successful or otherwise, for the purpose of improving future performance. In developing Lessons Learned, the wisdom, insight, and good judgment necessary to respond to, or that lead to, a scenario can be identified, and shared.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

3. Comments:

RT292 Phase II External Survey

4. How effective is Community of Practice at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
   Community of Practice is a group of individuals that share a common interest and expertise creating an environment for learning and sharing knowledge by encouraging discussion and developing intuition based on the experience of others.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

5. Comments:

RT292 Phase II External Survey

6. How effective is Facilitating a Masters Class at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
A facilitated masters class is group problem solving session led by an experienced facilitator. The group works through hypothetical problem scenarios individually with the facilitator guiding the students by sharing his/her wisdom, insight, and experience as it relates to the problem under consideration.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

7. Comments:

RT292 Phase II External Survey

8. How effective are Lunchtime Seminars at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
A lunchtime seminar is a brief presentation, or series of presentations, provided with the intent of sharing an idea or experience pertinent to the development of the wisdom, insight, or decision making capacity of the audience.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

9. Comments:

RT292 Phase II External Survey

10. How effective is Storytelling at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Storytelling is the process wherein an experienced individual shares a narrative of a specific experience or experiences that were pertinent to the development of his/her critical wisdom, insight or decision making capacity.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

11. Comments:

RT292 Phase II External Survey

12. How effective is a Standardized College Program at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
A standardized college program is a method to fill an industry wide experiential knowledge gap by developing their pertinent wisdom, insight, or good judgment in a classroom setting.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

13. Comments:

RT292 Phase II External Survey

Page 8

14. How effective is Web Based Communication at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Web based communication is a means to connect individuals and experts by improving their ability to network, connect, and correspond. Web based communication is highly dynamic, and is often used as a support mechanism for other risk mitigation strategies.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

15. Comments:

RT292 Phase II External Survey

16. How effective is Outsourcing/Acquisition at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Outsourcing or acquisitions are methods for acquiring job specific wisdom, insight, or good judgment when their internal development is either cost or time prohibitive. Examples of outsourcing or acquisition include contracting out job elements, hiring experts, or acquiring specialized firms to fill a knowledge requirement.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

17. Comments:

RT292 Phase II External Survey

18. How effective are Desk Side Reviews at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
A desk side review is a strategy wherein a peer, or supervisor, exchange information and tools pertinent to an employee's job in an informal setting (i.e. at the employee's desk). The intent of using the source's workplace is that it provides insight of what the source has in terms of personal resources at their disposal that supports their ability to make decisions.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

19. Comments:

RT292 Phase II External Survey

20. How effective is Job Shadowing at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Job shadowing requires the pairing of an experienced individual with a protégée with the intent of having the protégée observe, internalize, and eventually collaborate with the expert. Shadowing provides a means for the wisdom, insight, and good judgments that is not easily articulated to pass to the protégée through socialization and collaboration with the expert.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

21. Comments:

RT292 Phase II External Survey

22. How effective is Mentoring at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Mentoring requires an experienced individual to help their mentees professional development by being available and approachable for sharing their wisdom and insight and helping to develop the decision making capacity of their mentees. The scope of a mentor's work is typically focused on career development and organizational structure rather than technical savvy.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

23. Comments:

RT292 Phase II External Survey

24. How effective are Simulations at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below

Simulations simulate experience by providing hypothetical scenarios in problem solving sessions that require participants to think critically and make on-the-spot decisions. These simulations serve to develop the decision making capacity of participants.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

25. Comments:

RT292 Phase II External Survey

Page 14

26. How effective is Job Rotation at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Job Rotations provides an opportunity for the worker to gain a broader experience base with respect to organizational operation and how their work contributes to it. This helps to develop the individual's ability to make more well-rounded decisions.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

27. Comments:

RT292 Phase II External Survey

28. How effective is Participating in Meetings without Commitment at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Participating in meetings without comitment is a risk mitigation strategy wherein a less experienced employee attends meetings in the capacity of an observer with no commitment to participate. The intent being that the employee has the benefit of absorbing the experiences of multiple sources through the discourse and proceedings of the meeting.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

29. Comments:

RT292 Phase II External Survey

Page 16

30. How effective is a Grooming Assignment at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
A grooming assignment is a strategy wherein an employee is put into a position, or given a project, that will facilitate their assent into a specified role (ex. to become an SME). The grooming position is intended to provide increased exposure to their future position, and help the individual to gain a more thorough understanding of the responsibilities, and knowledge necessary for the position and the network that they will become a part of.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

31. Comments:

RT292 Phase II External Survey

32. How effective is Keeping Retired Connected at transferring experiential knowledge (i.e. wisdom, insight, and good judgment gained through experience)? Please mark your answers for each of the knowledge transfer characteristics listed on the table below.
Keepoing retired connected: The intent maintaining a connection with retirees is to continue to benefit/learn from their accrued experiential knowledge and to maximize the dissemination of their wisdom, insight, and good judgment.

	Low	Medium	High	Don't Know
When the knowledge source and knowledge receiver are co-located	☐	☐	☐	☐
When the knowledge source and knowledge receiver are not co-located	☐	☐	☐	☐
When there is less than 3 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is 3 to 6 months for the knowledge transfer to take place	☐	☐	☐	☐
When there is more than 6 months for the knowledge transfer to take place	☐	☐	☐	☐

33. Comments:

Appendix I: Survey Results

Internal Survey

Internal Survey Results								
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-01	Lessons Learned	When there is only one knowledge source and one knowledge receiver	MEDIUM	1	7	3	0	11
		When there is only one knowledge source and many knowledge receivers	MEDIUM	2	7	2	0	11
		When the knowledge source is available less than 5 hours a week	LOW	6	4	1	0	11
		When the knowledge source is available between 5 and 20 hours a week	MEDIUM	2	6	3	0	11
		When the knowledge source is available between 20 and 40 hours a week	HIGH	1	4	6	0	11
		When IT infrastructure to support/distribute knowledge is available	MEDIUM	1	9	1	0	11
		When IT infrastructure to support/distribute knowledge is not available	LOW	9	2	0	0	11

Internal Survey Results								
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-02	Community of Practice	When there is only one knowledge source and one knowledge receiver	MEDIUM	3	5	3	0	11
		When there is only one knowledge source and many knowledge receivers	MEDIUM	1	6	4	0	11
		When the knowledge source is available less than 5 hours a week	LOW	6	3	2	0	11
		When the knowledge source is available between 5 and 20 hours a week	MEDIUM	1	5	5	0	11
		When the knowledge source is available between 20 and 40 hours a week	HIGH	1	2	8	0	11
		When IT infrastructure to support/distribute knowledge is available	HIGH	1	4	6	0	11
		When IT infrastructure to support/distribute knowledge is not available	LOW	8	3	0	0	11

Internal Survey Results								
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-03	Facilitated Masters Class	When there is only one knowledge source and one knowledge receiver	MEDIUM	3	4	4	0	11
		When there is only one knowledge source and many knowledge receivers	HIGH	1	3	7	0	11
		When the knowledge source is available less than 5 hours a week	LOW	6	3	2	0	11
		When the knowledge source is available between 5 and 20 hours a week	MEDIUM	1	6	4	0	11
		When the knowledge source is available between 20 and 40 hours a week	HIGH	1	3	7	0	11
		When IT infrastructure to support/distribute knowledge is available	MEDIUM	2	5	4	0	11
		When IT infrastructure to support/distribute knowledge is not available	MEDIUM	4	6	1	0	4

Internal Survey Results								
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-04	Lunchtime Seminars	knowledge source and one knowledge receiver	LOW	6	2	3	0	11
		When there is only one knowledge source and many knowledge receivers	MEDIUM	1	6	4	0	11
		When the knowledge source is available less than 5 hours a week	LOW	5	2	4	0	11
		When the knowledge source is available between 5 and 20 hours a week	MEDIUM	2	5	4	0	11
		When the knowledge source is available between 20 and 40 hours a week	HIGH	2	4	5	0	11
		When IT infrastructure to support/distribute knowledge is available	MEDIUM	2	6	3	0	11
		When IT infrastructure to support/distribute knowledge is not available	MEDIUM	4	6	1	0	4

Internal Survey Results								
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-05	Story Telling	When there is only one knowledge source and one knowledge receiver	HIGH	0	3	8	0	11
		When there is only one knowledge source and many knowledge receivers	HIGH	2	4	5	0	11
		When the knowledge source is available less than 5 hours a week	MEDIUM	3	4	4	0	11
		When the knowledge source is available between 5 and 20 hours a week	HIGH	1	3	7	0	11
		When the knowledge source is available between 20 and 40 hours a week	HIGH	2	1	8	0	11
		When IT infrastructure to support/distribute knowledge is available	HIGH	4	1	5	1	11
		When IT infrastructure to support/distribute knowledge is not available	MEDIUM	3	4	3	1	11

Internal Survey Results								
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-06	External Professional Development	When there is only one knowledge source and one knowledge receiver	LOW	8	0	3	0	11
		When there is only one knowledge source and many knowledge receivers	LOW	5	3	3	0	11
		When the knowledge source is available less than 5 hours a week	LOW	7	4	0	0	11
		When the knowledge source is available between 5 and 20 hours a week	LOW	5	4	2	0	11
		When the knowledge source is available between 20 and 40 hours a week	LOW	5	3	3	0	11
		When IT infrastructure to support/distribute knowledge is available	LOW	4	4	3	0	11
		When IT infrastructure to support/distribute knowledge is not available	LOW	8	3	0	0	11

Internal Survey Results								
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-07	IT Collaboration/Communication	knowledge source and one knowledge receiver	MEDIUM	4	6	0	0	10
		When there is only one knowledge source and many knowledge receivers	MEDIUM	4	5	1	0	10
		When the knowledge source is available less than 5 hours a week	LOW	5	5	0	0	10
		When the knowledge source is available between 5 and 20 hours a week	MEDIUM	3	6	1	0	10
		When the knowledge source is available between 20 and 40 hours a week	MEDIUM	2	7	1	0	10
		When IT infrastructure to support/distribute knowledge is available	MEDIUM	2	5	3	0	10
		When IT infrastructure to support/distribute knowledge is not available	LOW	8	1	0	0	9

Internal Survey Results								
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-08	Outsourcig/Acquisition	When there is only one knowledge source and one knowledge receiver	LOW	3	3	3	0	9
		When there is only one knowledge source and many knowledge receivers	LOW	4	4	1	0	9
		When the knowledge source is available less than 5 hours a week	LOW	5	2	2	0	9
		When the knowledge source is available between 5 and 20 hours a week	MEDIUM	4	5	0	0	9
		When the knowledge source is available between 20 and 40 hours a week	LOW	4	4	1	0	9
		When IT infrastructure to support/distribute knowledge is available	LOW	5	4	0	0	9
		When IT infrastructure to support/distribute knowledge is not available	LOW	6	3	0	0	9

Internal Survey Results								
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-09	Desk Side Review	When there is only one knowledge source and one knowledge receiver	HIGH	0	4	6	0	10
		When there is only one knowledge source and many knowledge receivers	MEDIUM	4	6	0	0	10
		When the knowledge source is available less than 5 hours a week	MEDIUM	3	6	1	0	10
		When the knowledge source is available between 5 and 20 hours a week	MEDIUM	1	6	3	0	10
		When the knowledge source is available between 20 and 40 hours a week	MEDIUM	0	7	3	0	10
		When IT infrastructure to support/distribute knowledge is available	MEDIUM	2	6	2	0	10
		When IT infrastructure to support/distribute knowledge is not available	LOW	4	4	2	0	10

Internal Survey Results								
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-10	Job Shadowing	When there is only one knowledge source and one knowledge receiver	HIGH	0	1	9	0	10
		When there is only one knowledge source and many knowledge receivers	MEDIUM	2	6	2	1	11
		When the knowledge source is available less than 5 hours a week	LOW	7	1	2	0	10
		When the knowledge source is available between 5 and 20 hours a week	MEDIUM	1	6	3	0	10
		When the knowledge source is available between 20 and 40 hours a week	HIGH	0	2	8	0	10
		When IT infrastructure to support/distribute knowledge is available	MEDIUM	2	6	2	0	10
		When IT infrastructure to support/distribute knowledge is not available	MEDIUM	3	5	2	0	10

Internal Survey Results								
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-11	Mentoring/Coaching Program	When there is only one knowledge source and one knowledge receiver	HIGH	0	1	9	0	10
		When there is only one knowledge source and many knowledge receivers	MEDIUM	3	4	3	0	10
		When the knowledge source is available less than 5 hours a week	LOW	5	2	3	0	10
		When the knowledge source is available between 5 and 20 hours a week	HIGH	1	4	5	0	10
		When the knowledge source is available between 20 and 40 hours a week	HIGH	1	0	9	0	10
		When IT infrastructure to support/distribute knowledge is available	MEDIUM	2	5	3	0	10
		When IT infrastructure to support/distribute knowledge is not available	MEDIUM	3	5	2	0	10

		Internal Survey Results						
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-12	Simulations	When there is only one knowledge source and one knowledge receiver	MEDIUM	1	6	3	0	10
		When there is only one knowledge source and many knowledge receivers	MEDIUM	2	5	3	0	10
		When the knowledge source is available less than 5 hours a week	LOW	6	3	1	0	10
		When the knowledge source is available between 5 and 20 hours a week	MEDIUM	2	6	2	0	10
		When the knowledge source is available between 20 and 40 hours a week	MEDIUM	3	5	2	0	10
		When IT infrastructure to support/distribute knowledge is available	MEDIUM	1	6	3	0	10
		When IT infrastructure to support/distribute knowledge is not available	LOW	7	3	0	0	10

Internal Survey Results								
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-13	Job Rotation	When there is only one knowledge source and one knowledge receiver	HIGH	0	4	5	0	9
		When there is only one knowledge source and many knowledge receivers	HIGH	2	2	5	1	10
		When the knowledge source is available less than 5 hours a week	LOW	5	4	0	1	10
		When the knowledge source is available between 5 and 20 hours a week	MEDIUM	0	6	3	1	10
		When the knowledge source is available between 20 and 40 hours a week	HIGH	0	3	6	1	10
		When IT infrastructure to support/distribute knowledge is available	MEDIUM	3	5	1	1	10
		When IT infrastructure to support/distribute knowledge is not available	MEDIUM	4	5	0	1	10

Internal Survey Results								
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-14	Participating in Meetings With No Commitment	When there is only one knowledge source and one knowledge receiver	MEDIUM	1	7	2	0	10
		When there is only one knowledge source and many knowledge receivers	MEDIUM	3	5	1	1	10
		When the knowledge source is available less than 5 hours a week	LOW	5	3	2	0	10
		When the knowledge source is available between 5 and 20 hours a week	MEDIUM	2	7	1	0	10
		When the knowledge source is available between 20 and 40 hours a week	MEDIUM	2	6	2	0	10
		When IT infrastructure to support/distribute knowledge is available	MEDIUM	4	5	0	1	10
		When IT infrastructure to support/distribute knowledge is not available	LOW	5	3	1	1	10

Internal Survey Results								
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-15	Grooming Assignment	When there is only one knowledge source and one knowledge receiver	HIGH	0	2	8	0	10
		When there is only one knowledge source and many knowledge receivers	MEDIUM	3	4	3	0	10
		When the knowledge source is available less than 5 hours a week	LOW	6	3	1	0	10
		When the knowledge source is available between 5 and 20 hours a week	MEDIUM	1	5	4	0	10
		When the knowledge source is available between 20 and 40 hours a week	HIGH	0	2	8	0	10
		When IT infrastructure to support/distribute knowledge is available	MEDIUM	2	5	3	0	10
		When IT infrastructure to support/distribute knowledge is not available	LOW	4	4	2	0	10

Internal Survey Results								
			EFFECTIVENESS	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-16	Keep Retired Connected	When there is only one knowledge source and one knowledge receiver	HIGH	0	2	8	0	10
		When there is only one knowledge source and many knowledge receivers	MEDIUM	1	6	3	0	10
		When the knowledge source is available less than 5 hours a week	HIGH	3	3	4	0	10
		When the knowledge source is available between 5 and 20 hours a week	MEDIUM	0	8	2	0	10
		When the knowledge source is available between 20 and 40 hours a week	HIGH	1	3	6	0	10
		When IT infrastructure to support/distribute knowledge is available	HIGH	3	3	4	0	10
		When IT infrastructure to support/distribute knowledge is not available	LOW	4	3	3	0	10

External Survey

External Survey Results								
			Effectiveness	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-01	Lessons Learned	When the knowledge source and knowledge receiver are co-located	HIGH	2	12	18	0	**32**
		When the knowledge source and knowledge receiver are not co-located	LOW	14	14	4	0	**32**
		When there is less than 3 months for the knowledge transfer to take place	MEDIUM	11	12	7	2	**32**
		When there is 3 to 6 months for the knowledge transfer to take place	MEDIUM	8	19	3	2	**32**
		When there is more than 6 months for the knowledge transfer to take place	LOW	13	6	10	4	**33**
KTS-02	Communities of Practice	When the knowledge source and knowledge receiver are co-located	MEDIUM	1	15	11	3	**30**
		When the knowledge source and knowledge receiver are not co-located	LOW	16	9	1	3	**29**
		When there is less than 3 months for the knowledge transfer to take place	MEDIUM	10	12	3	4	**29**
		When there is 3 to 6 months for the knowledge transfer to take place	MEDIUM	6	16	3	4	**29**
		When there is more than 6 months for the knowledge transfer to take place	MEDIUM	7	9	9	4	**29**
KTS-03	Facilitate Masters Classess	When the knowledge source and knowledge receiver are co-located	HIGH	2	5	11	7	**25**
		When the knowledge source and knowledge receiver are not co-located	MEDIUM	3	13	2	7	**25**
		When there is less than 3 months for the knowledge transfer to take place	DON'T KNOW	3	7	6	9	**25**
		When there is 3 to 6 months for the knowledge transfer to take place	MEDIUM	2	10	4	9	**25**
		When there is more than 6 months for the knowledge transfer to take place	DON'T KNOW	6	4	5	10	**25**

External Survey Results								
			Effectiveness	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-04	Lunchtime Seminars	When the knowledge source and knowledge receiver are co-located	MEDIUM	5	11	9	2	**27**
		When the knowledge source and knowledge receiver are not co-located	LOW	13	9	2	3	**27**
		When there is less than 3 months for the knowledge transfer to take place	MEDIUM	7	11	5	5	**28**
		When there is 3 to 6 months for the knowledge transfer to take place	LOW	9	9	3	6	**27**
		When there is more than 6 months for the knowledge transfer to take place	LOW	10	6	5	6	**27**
KTS-05	Narrative Database/StoryTelling	When the knowledge source and knowledge receiver are co-located	HIGH	3	8	13	3	**27**
		When the knowledge source and knowledge receiver are not co-located	MEDIUM	8	11	4	4	**27**
		When there is less than 3 months for the knowledge transfer to take place	MEDIUM	5	11	5	6	**27**
		When there is 3 to 6 months for the knowledge transfer to take place	MEDIUM	2	13	5	7	**27**
		When there is more than 6 months for the knowledge transfer to take place	HIGH	3	8	9	7	**27**
KTS-06	External Professional Developm	When the knowledge source and knowledge receiver are co-located	MEDIUM	6	11	5	5	**27**
		When the knowledge source and knowledge receiver are not co-located	MEDIUM	9	10	0	8	**27**
		When there is less than 3 months for the knowledge transfer to take place	MEDIUM	6	12	2	7	**27**
		When there is 3 to 6 months for the knowledge transfer to take place	MEDIUM	6	12	1	8	**27**
		When there is more than 6 months for the knowledge transfer to take place	LOW	10	3	5	9	**27**

External Survey Results								
			Effectiveness	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-07	IT Collaboration/Communicatio	When the knowledge source and knowledge receiver are co-located	MEDIUM	6	16	2	3	**27**
		When the knowledge source and knowledge receiver are not co-located	MEDIUM	7	15	2	3	**27**
		When there is less than 3 months for the knowledge transfer to take place	MEDIUM	8	13	2	4	**27**
		When there is 3 to 6 months for the knowledge transfer to take place	MEDIUM	7	17	0	4	**28**
		When there is more than 6 months for the knowledge transfer to take place	LOW	12	8	4	4	**28**
KTS-08	Outsourcing/ Acquisition	When the knowledge source and knowledge receiver are co-located	MEDIUM	8	11	4	4	**27**
		When the knowledge source and knowledge receiver are not co-located	LOW	11	10	1	5	**27**
		When there is less than 3 months for the knowledge transfer to take place	LOW	9	9	4	5	**27**
		When there is 3 to 6 months for the knowledge transfer to take place	MEDIUM	9	11	2	5	**27**
		When there is more than 6 months for the knowledge transfer to take place	LOW	12	4	5	5	**26**
KTS-09	Desk Side Reviews	When the knowledge source and knowledge receiver are co-located	HIGH	1	7	17	2	**27**
		When the knowledge source and knowledge receiver are not co-located	MEDIUM	10	12	1	3	**26**
		When there is less than 3 months for the knowledge transfer to take place	MEDIUM	6	10	7	5	**28**
		When there is 3 to 6 months for the knowledge transfer to take place	MEDIUM	3	12	7	5	**27**
		When there is more than 6 months for the knowledge transfer to take place	HIGH	6	3	13	5	**27**

External Survey Results								
			Effectiveness	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-10	Job Shadow	When the knowledge source and knowledge receiver are co-located	HIGH	2	5	18	1	**26**
		When the knowledge source and knowledge receiver are not co-located	LOW	13	7	2	3	**25**
		When there is less than 3 months for the knowledge transfer to take place	MEDIUM	6	10	9	2	**27**
		When there is 3 to 6 months for the knowledge transfer to take place	MEDIUM	3	15	5	3	**26**
		When there is more than 6 months for the knowledge transfer to take place	HIGH	7	6	10	3	**26**
KTS-11	Mentoring/ Coaching Program	When the knowledge source and knowledge receiver are co-located	HIGH	1	7	17	1	**26**
		When the knowledge source and knowledge receiver are not co-located	MEDIUM	6	16	3	1	**26**
		When there is less than 3 months for the knowledge transfer to take place	MEDIUM	5	13	5	3	**26**
		When there is 3 to 6 months for the knowledge transfer to take place	MEDIUM	3	15	6	2	**26**
		When there is more than 6 months for the knowledge transfer to take place	HIGH	5	8	11	2	**26**
KTS-12	Simulations	When the knowledge source and knowledge receiver are co-located	HIGH	4	5	8	7	**24**
		When the knowledge source and knowledge receiver are not co-located	LOW	6	6	4	8	**24**
		When there is less than 3 months for the knowledge transfer to take place	HIGH	5	4	6	9	**24**
		When there is 3 to 6 months for the knowledge transfer to take place	LOW	6	5	4	9	**24**
		When there is more than 6 months for the knowledge transfer to take place	LOW	8	2	3	10	**23**

External Survey Results								
			Effectiveness	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-13	Job Rotation	When the knowledge source and knowledge receiver are co-located	HIGH	5	6	13	2	**26**
		When the knowledge source and knowledge receiver are not co-located	MEDIUM	6	10	7	3	**26**
		When there is less than 3 months for the knowledge transfer to take place	MEDIUM	7	9	7	4	**27**
		When there is 3 to 6 months for the knowledge transfer to take place	MEDIUM	4	13	5	4	**26**
		When there is more than 6 months for the knowledge transfer to take place	HIGH	6	5	11	4	**26**
KTS-14	Participate in Meetings Without	When the knowledge source and knowledge receiver are co-located	MEDIUM	9	13	2	2	**26**
		When the knowledge source and knowledge receiver are not co-located	LOW	15	8	0	2	**25**
		When there is less than 3 months for the knowledge transfer to take place	LOW	14	7	1	4	**26**
		When there is 3 to 6 months for the knowledge transfer to take place	LOW	12	9	1	4	**26**
		When there is more than 6 months for the knowledge transfer to take place	LOW	12	5	4	4	**25**
KTS-15	Grooming Assignment	When the knowledge source and knowledge receiver are co-located	HIGH	1	6	16	3	**26**
		When the knowledge source and knowledge receiver are not co-located	MEDIUM	8	12	3	3	**26**
		When there is less than 3 months for the knowledge transfer to take place	LOW	10	7	5	4	**26**
		When there is 3 to 6 months for the knowledge transfer to take place	MEDIUM	3	16	3	4	**26**
		When there is more than 6 months for the knowledge transfer to take place	HIGH	7	2	13	4	**26**

External Survey Results								
			Effectiveness	LOW	MEDIUM	HIGH	DON'T KNOW	RESPONSES
KTS-16	Keep Retired Connected	When the knowledge source and knowledge receiver are co-located	MEDIUM	3	11	6	6	**26**
		When the knowledge source and knowledge receiver are not co-located	LOW	10	10	0	6	**26**
		When there is less than 3 months for the knowledge transfer to take place	LOW	7	7	5	7	**26**
		When there is 3 to 6 months for the knowledge transfer to take place	MEDIUM	4	13	1	8	**26**
		When there is more than 6 months for the knowledge transfer to take place	LOW	8	5	5	8	**26**

Comment Log

KTS-01	Best-practice Session/ Lessons Learned	• Lessons learned have some ability but low. Lessons Learned have been the depository of technical lessons, rarely experiential lessons. • People tend to want to experience things for themselves and really don't listen when lessons learned are shared. Big things, maybe they get. But not the small things that can often be the difference. • I struggled with my rating on the impact of time. In general I find that having more time to do knowledge transfer is important. But I also feel that workload (or time available to focus on this instead of other conflicting work priorities) and the personality/desire (ownership) of the people involved to learn/share the knowledge. • I answered with our official Lessons Learned process and tools in mind. They aren't working well. • My responses are based on the fact that our org only recently started a Lessons Learned program so it's in its infancy at this point. My responses regarding the knowledge transfer is based on my personal experience with the professional development of employees working with other employees that are either changing positions or retiring. • Knowledge transfer should be made in a timely fashion as it has a rapid half-life in our world today • Lessons Learned can be applied in a number of different ways, so answers to the above may vary depending on one's definition. • More time is always better, however there is cost impact too. • We do not have a formal Lessons Learned program in place. We do utilize SOPs, GOPs (Good Operating Practices) and Best Practices, but these are all essentially resources for use during work, not programs designed to enhance learning. • The general practice is for people to post

		lessons in a database and people to go to that database and look for information. Appropriate CONTEXT is the biggest challenge and that renders CONTENT to be less than useful. • Lessons Learned would not be the best vehicle for transferring experiential knowledge. It is best transferred by the individuals working together for a period of time.
KTS-02	Communities of Practice (CoP)	• Here we start to seek the out of the box type discussions, what if discussions and hypothetical thinking. • We have had a lot of success with CoPs that are not co-located. I think taking advantage of recording sessions for future review has been a good tool. • In general, we do not utilize this mechanism to transfer knowledge/expertise within our organization.
KTS-03	Facilitate Master Classes	• Can work if the pitcher has a personality to insure that excitement, interest and catcher commitment is stimulated. • Based on the perspective of applicability within our organization, we do engage SMEs to facilitate groups, but the use of such a mechanism is not widespread or systematic. • Not sure why you would have a correlation between co-location and a facilitated session unless there was follow up that required group sharing.
KTS-04	Lunchtime Seminars	• Low, little commitment. • Lunchtime has too many other distractions. • I believe lunchtime seminars, which we conduct more as technical webcasts, provide an introduction to transferring knowledge. Follow-up and hands-on application beyond these seminars is really needed to gain more than a basic understanding of the topic. • Knowledge transfer should be timely • Some business units utilize brown bags to teach/discuss salient topics/issues. These

		activities are elective and used by some departments and not by others. • Not sure why you would have a correlation between co-location and lunchtime seminars. These would be held in a separate location and wouldn't matter where the attendees sat unless this was done through a WebEx or other on-line sharing tool.
KTS-05	Narrative Databases/ Storytelling	• Requires commitment of time by all parties. • Storytelling sessions have been very effective for many of our teams. The challenge we have found is the transfer takes place between the individuals that are currently part of the team, but how do you then transfer this to team members that enter the team in the future. • We do not use storytelling, per se at Abbott. However, it is my opinion that when someone hears a message through an experiential story there may be some enhanced value. Again, there is probably some follow-up interaction required to enhance the learning. • Stories are timeless when presented well either verbally or in written form. • I would equate storytelling to anecdotal examples - we use these as much as possible in our training and development activities to provide context and relevance.
KTS-06	Standardized College Program/ Course	• I think standardized college programmers are good for explicit knowledge but not for experiential knowledge. • We do not have specific experience with Standardized College Program but we do have classroom & web-based training. Much of the feedback on classroom based training is that unless the attendee is in a position to actually practice the skills when they leave, much knowledge is lost after attending the class. • I see Standardized College Programs as a way to build the foundational knowledge one may need prior to gaining more applicable hand-on knowledge from more experienced employees. Hence my thought on the need for this to occur over a shorter

		period of time. • I rated all items low because our corporate employee development philosophy is 70-20-10: 70% developmental/OJT activities, 20% relationships/mentoring, 10% training. There is very little opportunity for our employees to participate in standardized college programs.
KTS-07	IT Collaboration/ Communication	• Web Based implies IT infrastructure is in place. • We find any type of web-based communication is very useful for people that are not co-located or when there may be knowledge transfer across different countries/languages. • We don't currently use this within Abbott but are somewhat involved through external organizations like CII and ASME. Hard for me to answer but my thoughts are this is more limited to the questions submitted by those looking for answers, and by those posting information. • Web based training must be timely. If not updated and maintained it becomes boring to the listener. • Web-based communication is a useful tool for the transfer of knowledge IF participants have prerequisite background knowledge. We utilize this medium a great deal.
KTS-08	Outsourcing/ Acquisition	• Here again it is about time commitment and insuring the outsource has the wisdom and knowledge that is needed. • I believe experiential knowledge resides in personnel who are long term members of the company or long term members of the profession who have a body of historical knowledge and experience. I doubt if there are companies around who are set up with the right people to offer this outsourced service. This could be a niche are for some entrepreneurial company to fill a gap and then my answers would parallel those for master classes • We know from experience that even when you contract out there is no guarantee you will get the expertise you are seeking. Therefore, we have specifically defined

		what expertise we need to retain in-house to ensure continuity of knowledge and oversight of the quality of services we are contracting for outside. There are some areas of expertise we do not retain in-house because they are easily acquired outside Abbott, at a relatively high quality of service. • I believe the best training is by those inside the Company because they better understand what counts in that Company's hierarchy and DNA. Outsiders usually don't possess that insight to a company and end up being too generic • We commonly utilize the services of others to supplement our workforce and complete well-defined projects. This is a great way to expand the workforce without taking on the headcount burden. • We don't employ this technique as a routine practice
KTS-09	Desk Side Reviews	• I think this is good as long as desk side means within a set of walls to avoid outside distraction. Cubicles do not work well for this. • We found this to be a very useful tool. • We are currently using this between a very experienced employee and a relatively new employee who has made some rookie mistakes. I feel this is beneficial in communicating how to approach situations, review processes, looking at challenges from different viewpoints and decision making. • This type of training can be highly effective if the reviewer has the correct attitude in helping the team meet its success criteria. • I would equate this to informal OJT, and we utilize this a great deal, probably more than we know. • We don't employ this technique across the organization as a recognized good practice
KTS-10	Job Shadowing	• I believe this is the best way to do the transfers. No scripts, just day to day activities where judgment and experiential knowledge is used and the catcher sees this in real world time. • I'm not sure how many can Job Shadow an

		individual. • We have had limited experience with using the technique as it requires 2 people to be performing the same job. In the one example that we used it was for a business critical position and was very effective, but in many situations it can be cost/resource prohibitive for 2 people to be doing the same job. • I have always felt this is an extremely boring/ ineffective way for someone to train. • Job shadowing does not work nearly as well as formal OJT. Success depends on the teaching skills/expertise of the mentor and the background/wherewithal of the student. If either of these foundations is weak, success is reduced. We generally recommend against such a practice and encourage documented, formal OJT when practical. • We don't employ this technique as a regular practice across the organization
KTS-11	Mentoring/ Coaching	• Mentoring is also an excellent approach but if it is only performed outside of the action of effort environment then it is less effective than Shadowing. • Mentoring is most helpful in providing guidance towards specific situations the mentee is experiencing. Different situations arise over time requiring a longer period for the benefits to be realized. • Effectiveness depends on the mentors and mentees desire to make time to develop a relationship. Must have face to face time initially to develop their relationship. • Mentoring is great when people can devote the time needed and there are clear goals and roles/responsibilities. We utilize mentoring with mixed success - some mentors are very good, others can't seem to find the time to make it happen. • Although co-location would be beneficial the mentoring process and how the learnings are obtained are more important
KTS-12	Simulations	• Simulations are a fantastic way to learn without negative consequences, but they tend to be costly, time-consuming and

		difficult to build (and sometimes maintain) and are usually best when accompanied by instructor-led debriefs. We use some simulations, but generally do not build/include these types of activities.
KTS-13	Job Rotation	• Works as long as there are proper pitchers providing the shadowing and mentoring needed in each rotation spot. • Job rotation with one source and one receiver is just like shadowing. It also means full time exposure to the particular job. It usually comes early on one's career and is intended as an initiation/familiarization programme. I don't regard it as a vehicle for experiential knowledge transfer from the retiring generation. • Very important in seeing the whole picture and the effect decisions made in one area affect another area. Not necessarily applicable to all jobs but very valuable. • Experiencing situations are the best form of data transfer. • Job rotation is a great way to learn more about the depth and breadth of the organization, and works best when tied to specific goals and objectives and led by a mentor/champion.
KTS-14	Participating in Meetings without any Commitment	• There are unlikely to be many knowledge receivers invited to a meeting. Also beyond 5 hours a week the timeframe is likely to be meaningless. IT infrastructure is irrelevant in the context of meeting attendance. • As long as meetings are interactive knowledge transfer can occur. If meetings are a monologue not much learning will occur. • We use this technique all the time, but it assumes transfer of knowledge regarding key learning points. I think this may be a stretch assumption, unless other meeting participants actively point out key takeaways.
KTS-15	Grooming Assignment	• As long as there is a good commitment from pitchers and catchers and that the pitchers are qualified at transferring their experiences.

		• Grooming assignments are critical to an employee really understanding what the role they aspire to is all about. In the end they may decide it's not for them. They are also critical for management assessment of the ability of the employees to learn the position and meet the challenges. It's possible that in the end the employee may not have the right skills or aptitude, or that additional training/coursework may be required. • We utilize grooming assignments for our management trainees, and attempt to monitor progress, though I don't believe we have a formal assessment mechanism in place to do so. The success of grooming assignments, like mentoring programs, depends on the people involved. I think it can be a useful technique, but I would not recommend it unless the process is documented (e.g., goals, roles/responsibilities).
KTS-16	Keep Retired Connected	• I think it is only really valuable if the persons requiring the knowledge has consistent contact with the retiree. • In my experience retirees are retained for task specific purposes. I a retiree is retained for knowledge transfer purposes it should be in a mentoring role. • Often there is not enough time for effective knowledge transfer. Keeping retirees engaged can support the ongoing development of employees who are taking on those new responsibilities. • Depends on retiree and how individuals interact. The value of the retirees knowledge value diminishes over time • We utilize our retirees to supplement expertise for projects. It's a great way to enhance knowledge/skills for an effort.

REFERENCES

Ball, K., & Gotsill, G. (2011). *Surviving the Baby Boomer Exodus.* Boston: Course Technology.

Braganza, A., Hackney, R., & Tanudjojo, S. (2009). Organizational knowledge transfer through creation, mobilization and diffusion: a case analysis of InTouch within Schlumberger. *Info Systems*, 499-522.

Buckley, P. J., Carter, M. J., Clegg, J., & Tan, H. (2005). Language & Social KNowledge in Foreign Knowledge Transfer To China. *International Studies of Management and Organization*, 47-65.

Busch, P., & Richards, D. (2000). Graphically Defining Articuable Tacit Knowledge. *VIP 2000 Selected Papers from the Pan-Sydney Workshop on Visualization* (pp. 51-60). Darlinghurst: Australian Computer Society.

Chappell, T. (2011, December 21). *Plato on Knowledge in the Theaetetus.* Retrieved April 2012, from Stanford Encyclopedia of Philosophy: http://plato.stanford.edu/cgi-bin/encyclopedia/archinfo.cgi?entry=plato-theaetetus

ConocoPhillips. (2013, March). *Who We Are*. Retrieved March 2013, from ConocoPhillips Website: http://www.conocophillips.com/EN/about/who_we_are/Pages/index.aspx

Construction Industry Institute. (2007). *Effective Management Practices and Technologies for Lessons Learned Programs.* Austin: CII.

Construction Industry Institute. (2012). *Database Development, Labor Supply Information.* Austin: CII.

Cowan, R., David, P., & Foray, D. (1999). The Explicit Economics of Knowledge Codification and Tacitness. *3rd TIPK Workshop.* Strasbourg.

Dataware Technologies. (1998). *Seven Steps to Implementing Knowledge Management in Your Organization.* Melbourne: Dataware Technologies.

Ermine, J.-L., Boughzala, I., & Tounkara, T. (2006). Critical Knowledge Map as a Decision Tool for Knowledge Transfer Actions. *Electronic Journal of Knowledge Management*, 129-140.

Finding Petroleum. (2006, April 3). *Knowledge Management in Schlumberger*. Retrieved from Finding Petroleum: http://www.findingpetroleum.com/n/Knowledge_management_in_Schlumberger/ffe7506a.aspx

Fluor Corporation. (2012). *About Fluor*. Retrieved from Fluor: http://www.fluor.com/about_fluor/Pages/default.aspx

Grundstein, M., & Rosenthal-Sabroux, C. (2008). GAMETH: A Process Modeling Approach to Identify and Locate Crucial KNowledge. *The 12th World Multi-*

Conference On Systematics, Cybernetics and Informatics. Orlando: Paris Dauphine University.

Harrison, R. (2008). Closing the Knowledge Gap: Retention of the Transiotory Employee. *Journal of Contract Management*, 49-59.

Hoadley, C. (2012). What is a Community of Practice and How Can we Support It? In S. M. Land, & D. H. Jonassen, *Theoretical Foundations of Learning Environments* (pp. 287-300). New York: Routledge.

Hsieh, H.-L., Hsieh, J.-R., & Wang, I.-L. (2011). Linking Personality & Innovation: The role of Knowledge MAnagement. *World Transactions on Engineering and Technology Education*, 38-44.

Hubert, C. (2012). *Seamless Collaboration: Enabling Employees to Work Together Across Boundaries.* APQC.

International Atomic Energy Agency. (2006). *Risk Management of Knowledge Loss in Nuclear Industry Organizations.* Vienna: IAEA.

Interstate Oil & Gas Compact Commision. (n.d.). *Issues: Manpower Shortages*. Retrieved February 2012, from http://www.iogcc.state.ok.us/manpower-shortages

Kivark, S., Ross, A., & Arslan, G. (2009). Impacts of Cultural Differences on Knowledge Management Practices in Construction. *Collaboration and Integration in Engineering, Management, and Technology.* Istanbul: CITC.

Kivrak, S., Ross, A., & Arslan, G. (2008). Effects of Cultural Differences in Construction Projects: An Investigation Among UK Construction Professionals. *Securing High Performance through Cultural Awareness and Dispute Avoidance.* Shanghai: ICMC.

Kleinman, B., Quandt, M., Turbek, S., & Wehrle, N. (2000). *What is Tacit Knowledge.* Razorfish Science Department.

Koene, R. E. (2005). Measuring and Demonstrating the Value f KM. *Inside Knowledge, 9*(3).

Leach, B. (2011). How Good is Your Organization's Corporate Memory? *PEG*, 38-39.

Marketline. (2011). *Construction & Engineering in the United States.* MArketLine.

McDermott, R. (2007). *Learning the Master's Art: How to Deepen and Disseminate Near-Lost Expertise.* Boulder: McDermott Consulting.

McDermott, R., & Archibald, D. (2010, March). Harnessing Your Staff's Informal Networks. *Harvard Business Review*, pp. 82-89.

Newhouse, B., & Smith, R. (2001). Communities of Practice: Building & Sustaining KNowledge Networks to Drive Business Solutions. *KMWorld 2001.* Santa Clara.

Nonaka, I. (1997). Organizational Knowledge Creation. *Knowledge Advantage Conference.*

Pace, D., & Sheehan, J. (2002). Subject Matter Expert (SME)/Peer Use in M&S V&V. *Session A4 Foundations for V&V in the 21st Centuary.* Laurel.

Parise, S., Cross, R., & Davenport, T. H. (2006, Summer). Strategies for Preventing a Knowledge-Loss Crisis. *MIT Sloan: Management Review*, pp. 31-38.

Pew Research Center. (2010, December 20). *Publications.* Retrieved January 2012, from Pew Research Center: http://pewresearch.org/databank/dailynumber/?NumberID=1150

Psycometric Success. (n.d.). *The 'Big5' Aspects of Personality*. Retrieved June 2012, from http://www.psychometric-success.com/personality-tests/personality-tests-big-5-aspects.htm

Schlumberger. (2013, March). *About Us: Schlumberger*. Retrieved from Schlumberger Corporaion Website: http://www.slb.com/

Schlumberger Marketing Communications. (2004, June). *Knowledge Hub Facilities Sharing of Expertise.* Schlumberger.

Serrat, O. (2009, April). *Glossary of Knowledge Management.* Retrieved May 2012, from Knowledge Solutions: http://knowledgesolutions.blogspot.com/2009/04/glossary-of-knowledge-management.html

Smith, A. D. (2004). Knowledge Management Strategies: A Multi Case Study. *Journal of Knowledge Management*, 6-16.

Spillane, J. (2004). "The Perfect Storm" in the Construction Industry. *Construction Executive*, 21-24.

Stewart, T. (2001). *The Wealth of Knowledge: Intellectual Capital and the 21st centuary Organization.* New York: Currency Doubleday.

Teleos. (2010). *2010 MAK Finalist: ConocoPhillips Case Study.* Teleos.

Tennessee Valley Authority. (n.d.). Knowledge Retention: Preventing Knowledge from Walking Out the Door - An overview of Processes & Tools at the Tennessee Valley Authority.

Tiwana, A. (1999). *The Knowledge Management Toolkit.* Prentice Hall.

Tseng, T.-L., & Huang, C.-C. (2005). Capitalizing on Knowldege: A Novel Approachto Crucial Knowledge Determination. *IEEE Transactions on Systems, Management, and Cybernetics*, 919-931.

United States Department of Labor. (2012, March 1). *Bureau of Labour Statistics.* Retrieved July 2012, from Labour Force Statistics From the Current Population Survey: http://www.bls.gov/cps/cpsaat03.htm

Vertommen, J., & Duflou, J. (2007). *A Quantified Approach to Tacit Knowledge Management in R&D Environments Through the Use of Document Based User Profiles.* Belgium: Center for Industrial Management.

Wilcox King, A., & Zeithaml, C. (2003). Measuring Organizational Knowledge: A conceptual and Methodological Framework. *Strategic Management Journal*, Wiley InterScience.

Will, A. J. (2008). *The Institutionalization of Knowledge Management in an Engineering Organization.* Collaboratory for Research on Global Projects.

Wisler, D. (2005). Retrieved March 2012, from American Society of Civil Engineers: http://files.asme.org/asmeorg/Governance/Institutes/7990.pdf

Wright, A. (2006, August). *TVA's Approach to Retaining Critical KNowledge of an Ageing Workforce.* TVA.

Yew Wong, K. (2005). Critical Success Factors For Implementing Knowledge Management in Small & Medium Enterpirses. *Industrial Management & Data Systems*, 261-279.

Zhenhua, Y. (n.d.). Tacit Knowledge/Knowing and the Problem of Articulation. *Tradition and Discovery: The Polyani Society Periodical*, pp. 11-23.