ASSESSING THE USEFULNESS OF THE DECISION FRAMEWORK FOR IDENTIFYING AND SELECTING KNOWLEDGE MANAGEMENT PROJECTS

THESIS

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Abstract

Knowledge management (KM) is becoming recognized as a valuable tool for the Department of Defense (DoD) in its effort to maintain a competitive, strategic advantage against its enemies in a new threat environment. Decision superiority is the ultimate end result and is only possible through the effective and efficient use of its chief key resource--knowledge. As the Air Force seeks to transform the way it does business the concept of knowledge management has made its way to the forefront of both the Air Force's Information Strategy and Information Resource Flight Plan. This research assesses the usefulness of a knowledge management decision framework previously designed for the Air Force by Captain William Bower (2001) and refined by 1st Lt Jeffrey Phillips (2003) referred to as the Bower-Phillips decision framework. Guided by the framework, a case study was undertaken at an Air Force organization in an attempt to identify and address potential knowledge management opportunities. The framework was found to be useful in identifying possible KM opportunities.

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Gabriel Budai

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ASSESSING THE USEFULNESS OF THE DECISION FRAMEWORK FOR IDENTIFYING AND SELECTING KNOWLEDGE MANAGEMENT PROJECTS

I. Introduction

Background

The Department of Defense (DoD) is currently undergoing a transformation. A major part of this transformation is the identification of potential opportunities to exploit technology in order to maintain an advantage over potential enemies in the light of new challenges (HQ-USAF/XPXC, 2003). Doing this sometimes requires a new way of thinking and adapting of our current posture and wartime readiness. In the current military operating environment of fighting the current global war on terrorism, while at the same time planning for future combat, the only real certainty facing our combat forces is uncertainty. One of the ways of ensuring that the DoD maintains a competitive, strategic advantage against its enemies is through decision superiority which is achieved through the effective and efficient use of our chief key resource--knowledge.

As the Air Force begins to adapt to this new era by transforming military capabilities in order to maintain an advantage over potential enemies many opportunities to exploit technology are being considered. One of these opportunities, knowledge management (KM), has made its way to the forefront of the Air Force's Transformation Flight Plan, Information Resources Flight Plan, and Information Strategy (AF/CIO, 2002, 2004; HQ-USAF/XPXC, 2003).

Problem Statement

The Air Force is the adolescent in the playing field of knowledge management practitioners within the DoD. The Army and Navy have both been successful in implementing KM initiatives and have knowledge strategies, knowledge management strategies, and knowledge management frameworks developed to assist subordinate organizations in the development and implementation of KM opportunities (Bower, 2001). Early attempts of implementing KM within the DoD have been shown to provide benefits to include improved business processes and greater employee and customer satisfaction (Sasser, 2004).

Absent an Air Force level knowledge strategy, knowledge management strategy, or knowledge management framework, and as Air Force organizations look to implement knowledge management, commanders and managers desire a comprehensive "roadmap" to assist in identifying potential KM opportunities. An initial decision framework for identifying and selecting KM initiatives was designed in March 2001 by the research effort of Captain William Bower. A subsequent study in March 2003 performed by 1st Lt Jeffrey Phillips evaluated this initial framework and adapted it to include a more in-depth assessment of organizational culture and its affect on KM. Both studies relied on Delphi panels to identify the steps of the framework. Capt Bower recommended that the theoretical framework be used in a real-world field environment to validate the concepts presented. This study will take the adapted framework and examine its usefulness in the real-world setting of an organization attempting to identify and implement KM.

Research Question

How well does the Bower-Phillips decision framework support an organization's decision making process necessary to select specific knowledge management (KM) projects?

Methodology

An explanatory case study of an Air Force organization attempting to identify potential knowledge management opportunities was conducted using the Bower-Phillips decision framework designed to assist in identifying potential knowledge management (KM) opportunities. An explanatory case study was an appropriate methodology in this situation to test the usefulness of the designed framework in a real-world setting (Leedy & Ormrod, 2001). The specific case under study was the 738th Engineering Installation Squadron (EIS), a unit interested in identifying potential KM opportunities. Data collected included specific unit mission information, internal documents, various Air Force (AFIs), Air Force Material Command Instructions (AFMCIs), information technology (IT) structure, commander's briefings, and interviews with key squadron personnel.

Assumptions

Although extensive literature exists on knowledge management (KM) in commercial industry (Davenport & Prusak, 1998; Holsapple & Joshi, 2002), less exists for the military and specific Air Force units. Many of the KM issues prevalent in industry and civilian institutions may not have equivalent issues in the military culture

and vice versa. A few specific differences of commercial companies from military organizations include the requirement to remain profitable, the need to remain flexible and sensitive to specific market pressures, cultural issues, and personnel longevity. Although there are differences, evidence exists that both military and commercial organizations implementing KM are influenced by some of the very same factors (Bartczak, 2002). Therefore, since the majority of current KM literature is based solely on empirical study of the commercial sector it is to be assumed that KM issues found in current literature will apply to military, specifically Air Force, organizations. Also, it was known going into this study that no knowledge management practices were currently being implemented at the 738th EIS.

Thesis Overview

This document will report the efforts taken to answer the research question presented in this chapter. In Chapter II, literature will be reviewed to support the theoretical foundation for this effort and provide a resource for the sponsor of the study. Specifically, a general review of knowledge, knowledge management (KM), technological issues associated with KM, and influences and barriers of KM will be explored, followed by a review of a KM research framework, and subsequent additions, identified for this study. Chapter III details the research methodology specific to this study, while Chapter IV presents the results of the case study. Chapter V presents discussion of the results, limitations of the study and recommendations for future research.

II. Literature Review

Overview

This research effort applied a knowledge management project selection decision framework designed by Captain William Bower and subsequently modified by 1st Lt Jeffery Phillips, to determine if it was useful in identifying opportunities for applying knowledge management in an Air Force organization. The framework will be referred to as the Bower-Phillips decision framework. This literature review begins with an overview of current literature in the areas of knowledge, knowledge management (KM), influences affecting KM implementation, the role of technology, and KM in the military. The chapter concludes with a description of the knowledge management project selection decision framework developed by Captain William Bower and 1st Lt Jeffery Phillips.

What Is Knowledge?

Knowledge is defined simply as "actionable" information (Drucker, 1993; Tiwana, 2000) which is embedded within the human mind or consciousness (Alavi & Leidner, 2001; Brown & Duguid, 2002; Muller-Merbach, 2004; Nonaka & Takeuchi, 1995) that provides one the capacity to make well informed decisions (Marchland, Davenport, & Dickson, 2000).

Human knowledge can further be broken down into two kinds-- explicit and tacit. Explicit knowledge is that knowledge which is easily captured and codified into a communicable source external to one's mind. Nonaka describes explicit knowledge as that which can be "expressed in words and numbers, and easily communicated and shared

in the form of hard data, scientific formulae, codified procedures, or universal procedures" (1995), a military technical order or instruction, for example.

Tacit knowledge, on the other hand, is that which is still considered "trapped" inside a person's head to be used only by them. It is "embedded in personnel experience, complex [and] developed and internalized by the knower over a long period of time…" (Nonaka & Takeuchi, 1995). Tacit knowledge is considered the most difficult to reproduce or communicate for use by others (Davenport & Prusak, 1998).

Data, Information, and Knowledge

Knowledge seems to be at the highest point in the hierarchy of data-information-knowledge as graphically depicted in Figure 1 (Alavi & Leidner, 1999b; Davenport & Prusak, 1998; Firestone, 2001; Holsapple & Joshi, 2002; Kakabadse, Kakabadse, & Kouzmin, 2003b; Lim & Ahmed, 2000; Tiwana, 2000; Vouros, 2003). Some academics believe in the opposite "reversed hierarchy," or one which is "circular" in which knowledge leads to data (Spiegler, 2000; Tuomi, 1999); while others still take the middle ground and argue that both are true (King, 2001; Nonaka & Takeuchi, 1995).

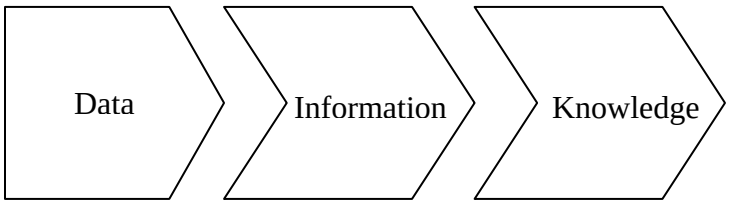


Figure 1. Data-Information-Knowledge Hierarchy
(Kakabadse, Kakabadse, & Kouzmin, 2003a)

Data has been described as "a set of discrete, objective facts about events" (Davenport & Prusak, 1998) or " a set of particular and objective facts about an event or simply the structured record of a transaction (Tiwana, 2000). Therefore, data itself is not directly meaningful. When one places data into a context which is meaningful, or "interpreted data," it then becomes information (Vouros, 2003). The well-accepted premise is that data is transformed into information after undergoing one of the five C's, as detailed below and in depicted in Figure 2 (Davenport & Prusak, 1998; Tiwana, 2000).

- "*Contextualized*: we know for what purpose the data was gathered
- *Categorized*: we know the units of analysis or key components of data
- *Calculated*: the data may have been analyzed mathematically or statistically
- *Corrected*: errors have been removed from the data
- *Condensed*: the data may have been summarized in a more concise form" (Davenport & Prusak, 1998)

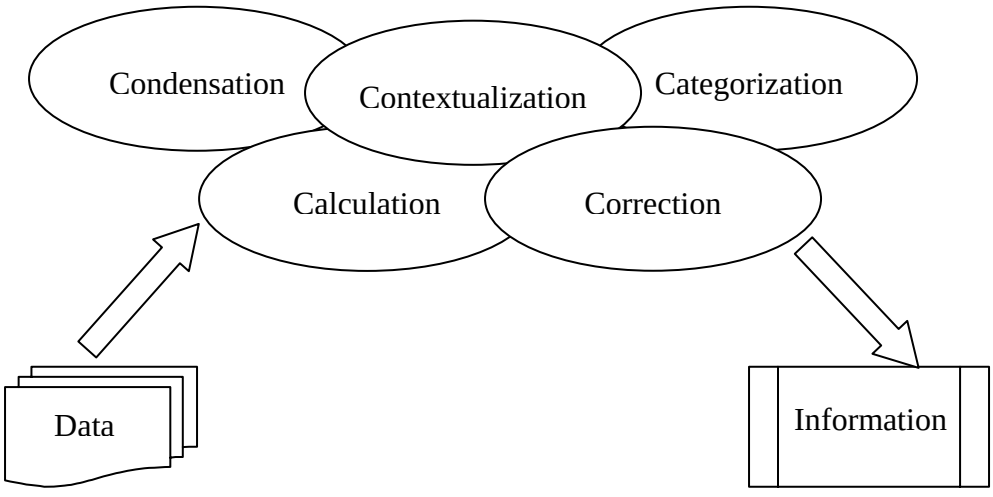


Figure 2. The Five C's that Differentiate Data from Information (Tiwana, 2000)

Some hold that knowledge is more valuable because it is information which can be transformed into action (Alavi & Leidner, 1999b; Davenport & Prusak, 1998; Vouros, 2003). Action refers to "measurable efficiencies," or "wiser decisions" and should be evaluated as such (Davenport & Prusak, 1998; Vouros, 2003). Much of the literature uses the terms information and knowledge interchangeably and posit that information and knowledge aren't radically different; information simply becomes knowledge once it is processed in the mind of an individual (Alavi & Leidner, 1999b; Davenport & Prusak, 1998; Holsapple & Joshi, 2002; Vouros, 2003).

What Is Knowledge Management?

Knowledge management is an emerging discipline that holds promise for organizations attempting to achieve the full potential and value of its knowledge resources. As with any emerging concept, the details of knowledge management may be fuzzy or confusing. KM is regarded to be among one of the fuzziest concepts in recent times, with business and academic journals seeing a 100 percent increase, per year, in KM articles (Despres & Chauvel, 2000).

Knowledge management involves the use of techniques, most often technological, of providing an organization's knowledge resources for the use and resultant advantage of the organization as a whole in the support of decision making (Alavi & Leidner, 2001; Brown & Duguid, 2002; Davenport & Prusak, 1998; M. Earl & Scott, 2000; Holsapple & Joshi, 2001; King, 2001; Murray, 2000; Roth, 2000).

Some of the benefits of managing knowledge include empowering members of an organization with the ability to make the best decisions based upon the complete

knowledge base of the organization, using that knowledge base to formulate solutions to an organization's problems and changing business environment, and, probably most importantly, preventing the organization from making the same mistake twice (Davenport & Prusak, 1998).

As the name implies, KM is not a technology issue (although technology is a key enabler); it is a management issue. KM is more about the management of processes and people than of technology. Efficient business processes are a result of a well-informed organization, and empowering employees with knowledge enables the fine-tuning of these processes. As will be seen in a later section, KM relies heavily on an organizational culture which is driven by a "performance-linked-to-reward system" that encourages knowledge workers to share what they know (Tiwana, 2000).

Information Management vs. Knowledge Management and the Role of Technology

A problem with KM is that most continue to confuse it with information management. While information technology (IT) and information management are the cornerstones to knowledge management they should not be confused. "The medium is *not* the message, though it may strongly affect the message. The thing delivered is more important that the delivery vehicle" (Davenport & Prusak, 1998: 4).

As touched on earlier, knowledge is different form information in the sense that knowledge provides a mental framework one uses to evaluate and incorporate new experiences and information in the process of making a decision. Knowledge, therefore, is more difficult to manage than information because it's more difficult to "capture". This is especially true with tacit knowledge which is still considered "stuck" within

individuals' heads. IT doesn't always provide a solution because knowledge management requires the building of relationships and trust between people to allow for the flow of knowledge and the sharing of personal experiences and this can occur without technology.

Most KM efforts in the past have focused on codifying, archiving, and retrieving needed information. This is considered an obvious misdirection of technological effort that continues to confuse KM with information management (Roth, 2000). Knowledge assets are more difficult to pin down and the mere introduction of technology won't ensure these assets are accessible or usable. Advocates of KM assert that technology should only be viewed as an enabler that allows explicit knowledge to be observable and accessible while also allowing tacit knowledge to be identified and accessed through the use of knowledge maps of an organization, collaboration tools, and on-line discussion boards. Since the key knowledge resource of any organization is the human resource, technology should be focused on creating relationships between these people. Information technology (IT), then, becomes critical in achieving the relationship between human resources to facilitate information and knowledge exchange (Malafsky, 2000).

Knowledge management systems have taken many forms and include expert systems, artificial intelligence, and knowledge repositories (Davenport & Prusak, 1998). The most prevalent knowledge management systems in industry have been knowledge repositories (Alavi & Leidner, 1999a; Davenport & Prusak, 1998; Wickramasinghe, 2002). A knowledge repository is simply the compilation of structured, explicit knowledge--usually in the form of documents (Davenport & Prusak, 1998). A 1997

study performed on 109 international companies claiming to have a knowledge management system (KMS) showed that web-based technologies were taking the lead in practice; these findings are presented in Table 1.

Table 1. Percentage of Technologies/Tools used as Knowledge Management Systems (KMS)

Browser	90%
Electronic mail	84%
Search/retrieval tools	73%
Information repositories	52%
WWW server	42%
Agents/Filters	36%
External server services	31%
Videoconferencing	23%

(Alavi & Leidner, 1999a)

The growing body of literature studying KMS implementation identifies some key *broad* technological areas for successful *explicit* knowledge management--"database and database management, communication and messaging, and browsing and retrieval" (Alavi & Leidner, 1999b). All technologies should be focused on supporting the knowledge management cycle graphically represented in Figure 3 (Alavi & Leidner, 1999b; Consulting, 2000; Davenport, Long, & Beers, 1998; Edenius & Borgerson, 2003; M. W. Salisbury, 2003; Tiwana, 2000; Wickramasinghe, 2002).

Other technologies are necessary to access people with the desired tacit knowledge that is necessary at any particular time. Commonly used are knowledge maps or corporate yellow pages that members of an organization can access to identify those with the needed knowledge (Davenport & Prusak, 1998).

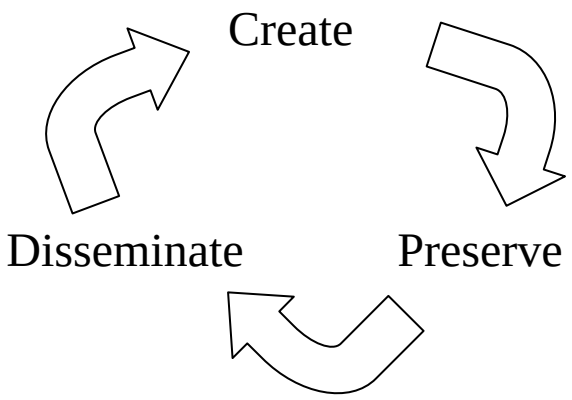


Figure 3. The Knowledge Management Cycle
(M. W. Salisbury, 2003)

Some organizations are concerned with the handling of their personal, sensitive, or classified information especially in global organizations like the military. Modern encryption methods now available to web-browsers enable dissemination of some of an organization's most valuable resources while preventing unauthorized use or access (Bhatt, Schulze, Hancke, & Horvath, 2003; Budai, 2004; Dassen et al., 2002; Lavery & Boldyreff, 2001; Trinidad, 2002). The use of these security measures has facilitated knowledge management at organizations that deal with what is considered to be "high value" knowledge to include hospitals, the Department of Energy (DOE), and military portals or on-line knowledge resources (Bartczak, 2002; M. W. Salisbury, 2003). A few academics advocate against codifying tacit knowledge to prevent unauthorized disclosure (Bloodgood & Salisbury, 2002; W. D. Salisbury & Gopal, 2003). Recent events at the Los Alamos National Laboratory, in which computer disks containing highly classified information were found to be missing, may be a case in point of the dangers of codifying tacit scientific knowledge (CNN, 2004).

Knowledge Management Participation Enablers and Barriers

Many factors contribute to the success or lack of success of knowledge management. A number of issues that act as enablers or barriers to KM are presented throughout current literature. The most prevalent issues that affect KM participation within organizations include understanding the organization's corporate strategy, whether it's culture is one of sharing or hoarding information/knowledge, how receptive it's people are to change, and the values and relationships between the people within the organization (Ardichvili, Page, & Wentling, 2003; Davenport & Prusak, 1998; Tiwana, 2000; M. Zack, 1999).

As a starting point for all KM initiates, it is suggested that an organization perform a "knowledge audit" to identify critical knowledge areas and vulnerabilities based upon it's corporate strategy (Koulopoulos & Frappaolo, 2001; Tiwana, 2000; M. Zack, 1999). A knowledge strategy would be the ultimate product of the audit. This strategy could ensure that critical knowledge resources are properly focused to achieve the overall strategy of the business or organization (M. Zack, 1999).

Upon identifying a knowledge strategy for the organization, the practitioner next needs to achieve a better understanding of the organizational culture. The culture will make or break any knowledge sharing initiative no matter the money spent on it or technology applied (Davenport & Prusak, 1998; Tiwana, 2000). The ideal culture would be one that shares openly, realizes all members are active participants, discourages knowledge hoarding behaviors, builds relationships and trust, and has senior management's support (Ardichvili et al., 2003; Davenport & Prusak, 1998; Nonaka &

Takeuchi, 1995; Tiwana, 2000). Some sactors that influence knowledge sharing and ultimately KM implementation and KMS participation by its members are shown in Table 2.

Not surprisingly the crucial element of any KM initiative is a thorough understanding of the people of an organization and their personal knowledge. Those working with artificial intelligence and expert-based systems have found it hard to replace the power of people's minds and the knowledge within them. Companies have been known to spend considerable dollars to build systems that "proved to be 80 to 85 percent as accurate as the two-second human glance" (Davenport & Prusak, 1998: 127).

Table 2. Enablers and Barriers to Knowledge Sharing:

Enablers	**Barriers**
High levels of trust	Fear and suspicion
Rewards for sharing	Unintentionally rewarded for hoarding
Team-based collaborative work	Individual effort without recognition and reward
Aligned mission, vision and values, and strategy	Individual accountability and reward
Joint team-wide accountability and rewards	Functional focus
Group accountability and rewards	Employee-owner interest conflicts
Process focus	Lack of alignment
Focus on customer satisfaction	Not-invented-here syndrome
Open to outside ideas	Too busy to share
Eye on competition	Internal competition
Collaborative and cross-functional work	Incompatible IT
Need to share	Compartmentalization of functional groups
Localized decision making	Centralized top-down decision making

(Tiwana, 2000)

An organization wishing to implement a KMS, thereby attempting to tap into and use all of its knowledge resources, would be wise to carefully select information

technologies suited for the level of expertise and technology acceptance of its users (Davenport et al., 1998; Davenport & Prusak, 1998; Money & Turner, 2004).

Knowledge Management in the Military

The current threat environment for the Department of Defense is like none previously encountered. The enemies being fought today are those that rely on unique autonomous organizational structures that lack military bases, air fields, or distinguishable uniforms. The Department of Defense (DoD) is currently undergoing a massive transformation to account for this shift in military affairs (Director, 2003a; Navy, 2003). Lessons learned from recent conflicts indicate that great emphasis must be given to the concept of network-centric warfare and knowledge management (Director, 2003b).

Our enemies have the capacity to achieve some of the same technological advantages that we currently do to include computer technologies, robust communication networks, and successful information operations (R. S. Earl & Emery, 2003). To counter these threats the DoD must embrace technological advances that will propel them to the next level, specifically the leveraging of the collective knowledge of the total force to achieve synergistic decision superiority (Defense, 2000).

A theme consistent throughout each of the service's transformation roadmaps is the need for knowledge management to ensure that all members are capable of making the best decisions possible in the face of an ever-changing threat environment (AF/CIO, 2002; Army, 2003; HQ-USAF/XPXC, 2003; Navy, 2003). This decision ability is consistent with the expressed desire within Joint Vision 2020 that "information superiority provides the joint force a competitive advantage only when it is effectively

translated into superior knowledge and decisions" (Director for Strategic Plans and Policy, 2000). Superior weapons, weapon delivery systems, technology, and other material items are no longer sufficient, in themselves, in sustaining a superior military force.

The DoD is not alone in this effort; almost all government agencies are undergoing forms of transformation in response to national security threats. The 9/11 Commission tasked with identifying deficiencies in infrastructure which failed to prevent the September 11, 2001 terrorist attacks upon the United States concluded that the FBI "did not have the capability to link the collective knowledge of agents in the field," action officers didn't have the ability to draw on "all available knowledge about al Qaeda," and the Commission recognized the immediate need for a single agency to act as an "authoritative knowledge bank, bringing information to bear on common plans" (Commission, 2004).

A Framework for Knowledge Management Project Selection

Both Bower's and Phillips' research provide a framework for selecting KM projects based on factors identified in the research conducted by each. The project selection decision framework is intended to guide the identification, selection, and eventual implementation of knowledge management projects within the Air Force. The Delphi studies conducted to create the overall framework included senior knowledge managers from across the Department of Defense (DoD), therefore its use across the DoD is warranted (Bower, 2001). This specific framework was chosen as the basis for this

study because Bower recommended that its theoretical basis be tested in a field environment.

7-Step KM Project Selection Decision Process Framework

The original framework introduced by Bower consisted of six (6) steps. Phillips added an additional step but labeled it Step 2b. To prevent confusion, this effort re-numbered the steps one through seven (1-7).

The framework was constructed and deemed to be important because it "serves as a guide for identifying, categorizing, and understanding the myriad ideas, issues, and interrelated components underlying and supporting a complex construct or phenomena, in this case knowledge management" (Bower, 2001). It can be used to guide and support the decision-making process for selecting KM projects that support the organization's goals. The structure of the framework is such that it provides a user-friendly decision flow diagram context for those who may be unfamiliar with the concept of knowledge management. The 7-Steps are:

- Step 1: Analyze Corporate Strategic Objectives Using SWOT (Strengths, Weaknesses, Opportunities, Threats) Methodology
- Step 2: Identify & Analyze Potential Knowledge Management Opportunities
- Step 3: Identify and Analyze Cultural Aspects of the Organization
- Step 4: Identify & Address Potential Knowledge Management Projects
- Step 5: Identify & Address Knowledge Management Project Variables Affecting Project Implementation & Success

- Step 6: Identify & Address Success Factors For Project Variables Affecting the Successful Implementation of Knowledge Management Projects
- Step 7: Finalize Knowledge Management Project Selection

These seven (7) steps will each be explored more fully to provide an understanding of what is anticipated from an organization using the framework.

Step 1: Analyze Corporate Strategic Objectives Using SWOT (Strengths, Weaknesses, Opportunities, Threats) Methodology (Bower, 2001)

This step begins with an analysis of the organization's overarching strategic vision, plan, and objectives using a standard Strengths, Weaknesses, Opportunities, and Threats (SWOT) methodology and concludes with an identification of key considerations (factors) that must be resolved prior to project implementation to ensure success. The ultimate result of Step 1 is to decide whether or not knowledge management can provide a strategic advantage to the organization. The goal is to identify the overall current knowledge management vision, strategy and initiatives within the organization. One method to identify these is to perform a SWOT analysis.

A SWOT analysis is an assessment of an organization's strengths, weaknesses, opportunities, and threats (SWOT) based upon their current business posture and environment. The SWOT analysis could assist an organization in identifying the organization's knowledge gap (what they need to know) and strategic gap (what they need to be able to do). A number of factors affect this decision process include the corporate or organizational strategic objectives, knowledge required to achieve these objectives, and a corporate or organizational knowledge vision and strategy.

During this step it is important to investigate the current and future information and knowledge requirements of the organization and to identify potential opportunities in which the organization can capitalize and leverage its existing organizational knowledge.

Step 2: Identify & Analyze Potential Knowledge Management Opportunities (Bower, 2001)

The analysis in Step 1 is utilized here in Step 2 to identify potential knowledge management opportunities and limitations as they relate to the organization's strategic goals and objectives. In this step an analysis of the SWOT findings from Step 1 is performed to identify specific areas where KM can assist in closing the organizations knowledge gap and aid in achieving a strategic advantage for the organization. The knowledge gap will be based on the types of knowledge needed to achieve the organization's strategic objectives and the usability and availability of the information to be used to support the potential KM objectives.

A few of the major factors to consider in this step include identifying and analyzing current business processes for potential knowledge management opportunities and an in-depth valuation process of current organizational knowledge (tacit & explicit) to determine current worth and potential to capitalize on existing knowledge to create more value for the organization. Also in this step the availability and usability of current organizational knowledge (tacit & explicit) should be reviewed for possible opportunities of exploitation. Examples of these would be to identify whether or not knowledge is readily available and usable in its current state (i.e. tacit knowledge not identified or shared, explicit knowledge supporting core business processes not readily available to

potential users) and the potential loss of critical organizational knowledge (i.e. personnel are due to retire or separate from the military, etc.), etc.

The organization should look at its current structure to see if it will readily support and utilize knowledge management initiatives. Some areas for investigation include and examination of the current structure and whether it's conducive to knowledge sharing (do boundaries limit or inhibit the flow and transfer of knowledge?), a review of the existing IT infrastructure and whether it's aligned to support knowledge management activities and initiatives (current and future state; KM initiatives are heavily reliant on IT for information gathering, storage, and transfer and infrastructure must support initial knowledge management initiatives and be robust/dynamic enough to meet future demand), and a thorough review of organizational resources available for knowledge management initiatives (manpower, equipment (primarily IT), funding, a footprint (space), and funding).

Step 3: Identify and Analyze Cultural Aspects of the Organization

This additional step to the original decision framework is provided by the research effort of 1st Lt Jeffrey Phillips and is referred to as Step 3 (Phillips, 2003). Lt Phillips evaluated the decision framework proposed by Captain Bower and adapted it by including specific culture aspects of an organization that may affect attempts of implementing knowledge management. A Delphi panel concluded that organization culture factors should be considered to assist in the decision of whether or not the culture is "knowledge friendly." Identified factors include communication, team orientation,

trust, conflict, leadership support, learning, adaptability, tolerance for risk, and a strong and positive culture. Each will be covered in greater detail.

Communication

Phillips contends that open channels of communication are extremely important in an organization attempting to implement KM. Effective communication should exist between an organizations senior management and its members as well as between distinct organizational functions, divisions, and individuals. An organization that doesn't communicate well will have difficulty trying to implement KM.

Team Orientation

A team is a group of organizational personnel associated to achieve a common goal. According to Phillips, organizations that value and have been known to encourage teamwork in achieving its goals have had greater success in the adoption of KM.

Trust

Simply put, trust is the faith one places in the character, ability, strength, or truth of someone or something. Phillips found that organizations that have had successful KM initiatives reported a greater amount of trust between individuals. Trust will promote an atmosphere that is more favorable for the sharing of information, experience, and knowledge.

Conflict

Although some level of conflict may be healthy, excessive competitive or opposing struggle can be damaging to an organization. Phillips found that intense debate can lead to innovation while competition between individuals may prohibit a trustful

relationship therefore hindering the openness required for information and knowledge sharing. According to Phillips, organizations that report low levels of conflict have had greater success in implementing KM initiatives.

Leadership Support

As with any change initiative the organization's leadership has the responsibility to promote and instill a corporate vision and direction. Phillips' study found that KM initiatives are no different and require arguably even greater leadership involvement since some KM issues are nebulous concepts. Some large corporations have gone to great lengths to promote KM including the creation of the position of Chief Knowledge Officer (CKO), to lead and guide the use of an organization's knowledge resources.

Learning

Organizations that place a greater value on learning have greater success in implementing KM initiatives, according to Phillips. Learning is the passing of an individual's expertise and personal knowledge to others in the organization both on and off duty.

Adaptability

The ability of an organization to modify its behavior in the face of change is important to all organizations not just those wishing to implement KM. It has been suggested by Phillips that organizations that can adapt more readily to organizational change are more likely to succeed in implementing KM.

Tolerance for Risk

Phillips found that the propensity an organization has towards taking risk is very telling of its culture. Risk taking is synonymous to experimentation and well-intentioned errors and failures. Organizations that have a low propensity for taking risk will punish employees that try something new and fail. Knowledge and learning initiatives have a greater chance for success in organizations that tolerate well-intentioned risk taking.

A Strong and Positive Culture

A strong and positive culture is one where employees share common values, have high morale, and are committed to organizational goals. A strong and positive organizational culture will "self-police" and exact more influence upon the organization's members performance. These environments have greater success implementing KM practices(Phillips, 2003).

Step 4: Identify & Address Potential Knowledge Management Projects

This step aims to identify specific KM projects that can capitalize on the organization's potential KM opportunities by addressing the existing and future potential limitations identified in Step 2 and the cultural factors addressed in Step 3. Potential KM projects should be tied to the key business processes identified in Step 2.

Any effort should be one that is focused on people and the organizational processes and not the technology. Any knowledge management efforts/initiatives/projects should have a detailed scope and desired outcome. In order to do this it is important to define the knowledge to be utilized by the knowledge management effort and ensure this knowledge is tied directly to knowledge valuation

process performed in Step 2. It is recommended that a common taxonomy of terms (common language) be developed to ensure everyone is operating off of the same page and have the same understanding of knowledge management definitions, desired outcomes, goals, milestones, metrics, and expectations.

Step 5: Identify & Address Knowledge Management Project Variables Affecting Project Implementation & Success

This step will assist in identifying whether or not there's a good probability that a KM project will succeed. It specifically identifies certain project variables affecting the implementation and success of the project as identified in KM literature. One important factor throughout the entire KM selection process is that of senior leadership interest and project sponsorship. Knowledge management project sponsorship and active participation and involvement from senior leadership are vital to any KM initiative. Requirements of the knowledge management effort/project should be defined and include specifics on how to capture and codify desired knowledge, how this knowledge will be shared, accessed, and reutilized, and ultimately how new knowledge will be created through collaboration and knowledge sharing.

Also included in this step is the need to develop project goals, expected outcomes and performance measures. Performance measures/metrics can be used to tie daily organization activities to the overall strategic objectives.

Step 6: Identify & Address Success Factors For Project Variables Affecting the Successful Implementation of Knowledge Management Projects

This step will aid in identifying success factors for the project variables identified in the previous step, Step 5. For example, one variable investigated under Step 5 was senior leadership interest and project sponsorship. Success factors for these variables would be the need for continued active participation and involvement from senior leadership and the need for an appointed knowledge management champion and project sponsor.

Also with this step is the need to ensure the knowledge management project selected could provide substantial and measurable value to the organization. To ensure active participation by organizational members it's recommended that employee compensation be structured to encourage employee utilization. Compensation doesn't necessarily need to be financial (financial compensation in the military isn't reasonable); forms of compensation can include recognition, awards, higher ratings on performance appraisals/reports, etc. These efforts are intended to promote the sharing and utilization of organizational knowledge.

Policy and guidance that governs KM use may need to be developed to support and encourage acceptance under this step. Policy and guidelines should promote the creation, sharing, and utilization of organizational knowledge bases. Factors that potentially impact the identification and mapping of knowledge repositories should also be identified and addressed.

Chapter Overview

This chapter provided an overview of the scholarly literature to support the theoretical foundation for this research effort and was intended to provide a meaningful resource for the sponsor of the study. Covered in this chapter included a general review of knowledge, knowledge management (KM), technological issues associated with KM, influences and barriers of KM, and a thorough review of the KM research framework identified for this study.

Researchers responsible for creating the theoretical Bower-Phillips decision framework recommended that the framework be used in a real-world field environment to validate the concepts presented. This study will take the adapted framework and examine its usefulness in the real-world setting of an organization attempting to identify and implement KM. The next chapter, Chapter III, will detail the research methodology chosen for this study and detail how the study was performed.

III. Methodology

Overview

This chapter describes the methodology used to conduct this research. Specifically this chapter will describe the case study design, explain why the case study methodology is appropriate for this effort, and address the type of data collected and describe how these data will be analyzed to answer the research question presented.

Case Study Research

Robert Yin defines the appropriateness of case study as a research method by providing the following technical definition:

> "A case study is an empirical inquiry that:
> - investigates a contemporary phenomenon within its real-life context, especially when
> - the boundaries between phenomenon and context are not clearly evident" (Yin, 2003: 13)

Paul Leedy also advocates the use of a case study in situations when "its unique or exceptional qualities can promote understanding or inform practice for similar situations," and "a case study may be especially suitable for learning more about a little known or poorly understood situation" (Leedy & Ormrod, 2001: 149).

Knowledge management implementation in specific Air Force organizations is a poorly understood phenomenon and the Bower-Phillips decision framework may be helpful in assisting organizations in efforts to identify and select potential KM opportunities. An explanatory case study was required to test the usability, or validity, of the designed framework in a real-world setting.

Also as part of this methodology, “because phenomenon and context are not always distinguishable in real-life situations, a whole set of other technical characteristics, including data collection and data analysis, now become the second part of our technical definition” (Yin, 2003: 13):

The case study inquiry:

- copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result
- relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result
- benefits from the prior development of theoretical propositions to guide data collection and analysis (Yin, 2003: 13-14).

Therefore, “the case study as a research strategy comprises an all-encompassing method—with the logic of design, data collection techniques, and specific approaches to data analysis” (Yin, 2003: 14).

Form of Research Question

A qualitative research approach is appropriate for investigating "how" and "what" questions given the researcher wishes to "gain insights about the nature of a particular phenomenon, develop new concepts or theoretical perspectives about the phenomenon, and/or discover the problems that exist within the phenomenon," ((Leedy & Ormrod, 2001: 149; Yin, 2003). A qualitative approach also allows "a researcher to test the validity of certain assumptions, claims, theories, or generalizations within real-world contexts" (Leedy & Ormrod, 2001: 150)

Since the purpose of this research was to explain why, or why not, the Bower-Phillips decision framework was useful in a real-world setting, "how" questions were appropriate to allow for these explanations.

Components of Case Study Research Design

To ensure the chosen case study methodology provides meaningful results, proponents of case study research advocate the use of specific design criteria. Yin identifies five components that are critically important; these five components are:

1. a study's questions,
2. its propositions, if any,
3. its unit(s) of analysis,
4. the logic linking the data to the propositions, and
5. the criteria for interpreting the findings (Yin, 2003: 21)

These criteria will be outlined in greater detail, as they relate to this case study, in the respective sections below.

Study's Questions.

This research effort was based upon the Bower-Phillips decision framework for identifying knowledge management projects as detailed in (Bower, 2001) and (Phillips, 2003). The only research question for this study was designed from the framework selected for the study and was intended to provide explanatory feedback on the actual usability and comprehensiveness of the framework in a real-world setting.

Research Question.

How well does the Bower-Phillips decision framework support an organization's decision making process for selecting specific knowledge management (KM) projects?

Study Proposition.

As outlined by Yin, "each proposition directs attention to something that should be examined within the scope of study" (Yin, 2003). The proposition is that the Bower-Phillips framework will provide a usable means of identifying and selecting KM projects. This effort will explain how it assists, or fails to assist, in the decision making process of identifying and selecting these projects.

Unit(s) of Analysis.

Another vital component to case study research is that of determining just what the "case" is (Yin, 2003). This "case" is known as the unit, or units, of which one is to study or analyze. The unit of analysis in this study was a single squadron within the Air Force; specifically, the 738th Engineering Installation Squadron (EIS), Keesler Air Force Base (AFB), Mississippi. This squadron is an organization consisting of both military and civilian employees.

Logic Linking Data to Proposition.

Linking the findings of the study to the established propositions are considered by Yin to be "the least developed in case studies"(Yin, 2003). He continues that "one promising approach for case studies is the idea of 'pattern matching' described by Donald Campbell (Campbell, 1975), whereby several pieces of information from the same case may be related to some theoretical proposition" (Yin, 2003). This is consistent with Leedy's recommendation, "ultimately the researcher must look for convergence (triangulation) of the data: Many separate pieces of information must point to the same conclusion" (Leedy & Ormrod, 2001: 150). Consistent with these advocates numerous

sources of data were collected based upon the factors outlined within the Bower-Phillips decision framework. A majority of these data came from structured interviews with squadron personnel. Other data included commander mission briefings, squadron pamphlets, internal documents, commander's briefings, Air Force Instructions (AFIs), Air Force Material Command Instructions (AFMCIs), and newspaper/media interviews/articles.

Criteria for Interpreting the Findings.

Proponents of case study research suggest that "currently, there is no precise way of setting the criteria for interpreting these types of findings"(Yin, 2003), and that "a case study researcher often begins to analyze the data during the data collection process; preliminary conclusions are likely to influence the kind of data that he or she seeks out and collects in later parts of the study" (Leedy & Ormrod, 2001). To aid the researcher in interpreting the findings and reaching conclusions based upon the proposition of the study it is recommended to collect extensive data on the event on which the investigation is focused (Leedy & Ormrod, 2001). The data collected for this study were tabulated, grouped according to the *Key Factors Affecting the Decision Process* of the Bower-Phillips decision framework, and conclusions were based upon these findings.

Conduct of Research

The overall quality of case study research is dependent upon certain criteria to ensure the method is reliable and valid. This section will address the issues applicable to case study research design.

Testing of Existing Theory

This research will test the existing theory of the Bower-Phillips decision framework. Therefore, the framework will provide the guidance for the design of this study and ensure relevant data are collected. This is consistent with Yin, "for some topics, existing works may provide a rich framework for designing a specific case study" (2003: 29).

Analytic Generalization

This qualitative approach will serve as a means of interpretation and verification of the Bower-Phillips decision framework (Bower, 2001; Phillips, 2003). Leedy and Ormrod offer the following definitions:

> *Interpretation*. …enable[s] a researcher to (a) gain insights about the nature of a particular phenomenon, (b) develop new concepts or theoretical perspectives about the phenomenon, and/or (c) discover problems that exist within the phenomenon.
> *Verification.* …allow[s] a researcher to test the validity of certain assumptions, claims, theories, or generalizations within real-world contexts (Leedy & Ormrod, 2001: 148).

The Bower-Phillips decision framework will be used as a template to facilitate data collection and provide a foundation for what Yin describes as "analytic generalization," further defined as that where "a previously developed theory is used as a template with which to compare the empirical results of the case study" (2004: 32). Yin continues that "the use of theory, in doing case studies, is not only an immense aid in defining the appropriate research design and data collection but also becomes the main vehicle for generalizing the results of the case study" (2003: 33).

Framing the Research

It has been found that "initial hunches begin the process of bounding and framing the research, of establishing the parameters and developing a perspective through the conceptual framework" (Marshall & Rossman, 1989). The researcher had initial hunches about the validity of the Bower-Phillips decision framework. The framework appeared to possess face validity upon accomplishing the literature review, but it still needed to be tested in a real world setting.

Research Design Characteristics

Single-Case Study

This was a single-case study with a unit of the Air Force as the unit of analysis. Context for this study was the Bower-Phillips decision framework for identifying and selecting knowledge management opportunities. The case, and therefore the unit of analysis, was the 738th Engineering Installation Squadron.

Yin offers numerous rationales for selecting a single case, the first being "when it represents the *critical case* in testing a well-formulated theory" another being that the case is "a representative or typical case" (2003). The key to this research is the testing of the theory within the Bower-Phillips decision framework in an Air Force organization. For this purpose, the 738th EIS may be considered to be a typical active duty Air Force organization, consisting of enlisted and officer military personnel and government civilian employees.

A third rationale provided by Yin for the selection of a single case study is "the revelatory case...when an investigator has an opportunity to observe and analyze a

phenomenon previously inaccessible to scientific investigation" (Yin, 2004: 42). The framework selected for this study has never been tested for usability in a real-world context. As the Air Force attempts to advocate the use of knowledge management there is a need for a usable framework to assist organizations in identifying potential KM opportunities.

Desired Skills of the Case Study Researcher

Certain skills are desired of case study investigators for successful study completion and legitimate results. Yin outlines these desired skills as:

- A good case study investigator should be able to *ask good questions*--and interpret the answers.
- An investigator should *be a good 'listener'* and not be trapped by his or her own ideologies or preconceptions.
- An investigator should *be adaptive and flexible*, so that newly encountered situations can be seen as opportunities, not threats.
- An investigator must *have a firm grasp of the issues being studied*, whether this is a theoretical or policy orientation, even if in an exploratory mode. Such a grasp reduces the relevant events and information to be sought to manageable proportions.
- A person should *be unbiased by preconceived notions*, including those derived from theory. Thus, a person should be sensitive and responsive to contradictory evidence (Yin, 2003: 59).

Further, and important for this research effort, the researcher "[would] need to demonstrate that they [could] conduct the research in such a way that neither the setting nor the people in it [were] harmed" (Marshall & Rossman, 1989). Care was taken to prevent harm to current and future EIS missions through either disclosing strengths or weaknesses to current posture or policy. Care was taken to ensure nothing classified or sensitive was released and that the anonymity of those individuals that volunteered to participate was protected.

Research Design Quality

Yin proposes that the quality of a research design can be judged according to certain logical tests (2003). Four of the better known tests are outlined by Kidder and Judd (1986) as referenced in Yin:

- *Construct validity*: establishing correct operational measures for the concepts being studied
- *Internal validity* (for explanatory or causal studies only, and not for descriptive or exploratory studies): establishing a casual relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships
- *External validity*: establishing the domain to which a studies findings can be generalized
- *Reliability*: demonstrating that the operations of a study--such as the data collection procedures--can be repeated, with the same results (Yin, 2003).

Each of these will be addressed in detail and tactics to achieve each can be reviewed in Table 3.

Table 3. Case Study Tactics for Four Design Tests
As adopted from COSMOS Corporation as referenced in (Yin, 2003)

Tests	Case Study Tactic	Phase of research in which tactic occurs
Construct Validity	• Use of multiple sources of evidence • Establish chain of evidence • Have key informants review draft case study report	Data collection Data collection Composition
Internal Validity	• Do pattern-matching • Do explanation-building • Address rival explanations • Use logic models	Data analysis Data analysis Data analysis Data analysis
External Validity	• Use theory in single-case studies • Use replication logic in multiple-case studies	Research design Research design
Reliability	• Use case study protocol • Develop case study database	Data collection Data collection

Construct validity

Consistent with Table 3 and as discussed previously, to achieve construct validity multiple sources of data were collected. Primary data collection included commander mission briefings, internal documents, Air Force and Air Force Material Command policy documents, newspaper/on-line articles, and structured interviews. These multiple sources assisted with the desired effect of "triangulation" in which convergence of the data assists in achieving the same conclusion (Leedy & Ormrod, 2001). Another means of achieving construct validity was through establishing a chain of evidence. The purpose of this chain of evidence "is to allow an external observer--in this situation, the

reader of the case study--to follow the derivation of any evidence, ranging from initial research questions to ultimate case study conclusions" (Yin, 2003). This requirement was partially fulfilled through the use of a case study database, in which all data collected were logged, categorized, and digitally stored. Finally, all interviewee's comments used as part of this study were transcribed and submitted back to them for their final approval. This ensured their answers were not misinterpreted or incorrect. (Exception: those that participated in the pilot study did not receive a transcribed interview; those interviews were conducted solely to assist in formulating interview questions for the main study.) Also, each respondent was provided with a copy of the final report for review.

Internal validity

Yin offers two possible methods to ensure the internal validity of case study research: 1) pattern-matching and 2) key informant cross-checking (Yin, 2003). Pattern-matching was used to analyze interview transcripts and other data. Upon completion of the study key informants of the 738th EIS were provided a copy of the findings of the study for review, feedback, and a cross-check of the facts.

External validity

External validity "deals with the problem of knowing whether a study's findings are generalizable beyond the immediate case study" (Yin, 2003). Case study research relies on analytical generalization in which the researcher strives to generalize a particular set of rules to a broader theory (Yin, 2003). In this case external validity is provided through use of the theory and decision framework for selecting potential

knowledge management opportunities provided by the Bower-Phillips decision framework.

Reliability

Reliability of a study allows for a future investigator to arrive at the same conclusions and findings of the first investigator when performing the *same* case study over again. Yin contends that "the ultimate goal of reliability is to minimize the errors and biases of the study"(Yin, 2003). Yin suggests establishing a case study protocol and the development of a case study database; these are covered in greater detail in a later section.

Limitations of the Design

One serious limitation of this case study was that there was only one researcher. Yin identifies numerous researchers are beneficial in data collection when:

> 1. a single case calls for intensive data collection at the same site, requiring a "team" of investigators;
> 2. a case study involves multiple cases, with different persons being needed to cover each site or rotate to the others sites; or
> 3. a combination of the first two conditions (Yin, 2003)

Only one researcher was available to travel to conduct data collection for this case study over the course of two days. All of the data collection and interviews were performed by the single researcher at the site selected for the study. Some interviews, at a very last resort, were performed by telephone and/or electronic mail. Care was taken to carefully plan the site visit given the fact that proponents of case study research agree that a single case study researcher may be sufficient if a sound methodology and a well designed case study exist prior to data collection (Yin, 2003).

Conducting the Research

Case Study Protocol

Prior to any data collection for this study a case study protocol was established (Yin, 2003). A protocol can simply be equated to a data gathering "roadmap." The main purpose of the protocol was to ensure the researcher stayed focused on the subject of the case study and the preparation of the protocol forced the researcher to anticipate unforeseen issues (Yin, 2003). The protocol for this study began with an investigation of the Bower-Philips decision framework and specific knowledge management concepts identified during the literature review.

Yin recommends that a case study protocol contain the following sections, all of which are included within this research effort:

- An overview of the case study project (project objectives and auspices, case study issues, and relevant readings about the topic being investigated)
- Field procedures (presentation of credentials, access to the case study 'sites,' general sources of information, and procedural reminders)
- Case study questions (the specific questions that the case study investigator must keep in mind in collecting data, 'table shells' for specific arrays of data, and potential sources of information for answering each question)
- A guide for the case study report (outline, format for data, use and presentation of other documentation, and bibliographical information) (Yin, 2003).

Pilot Investigation

A pilot case study is also a recommendation of Yin (2003) to assist with refining data collection plans. Due to timing constraints, a pilot study was not possible or practical. However, this study began with two pilot interviews which were selected as a matter of convenience. The informants were previous work acquaintances of the researcher from the 738th EIS. These interviews were conducted over the telephone and

key data were provided via email. These informants proved to be extremely beneficial and assisted in the refining of the overall case study protocol and data collection plan. The interviews were also instrumental in identifying key personnel for interviews, initially overlooked sources of data, and specific projects that were underway that could be of interest for this study. The informants used in the pilot interviews, although from the same unit, were not the same used in the actual case study.

Coordination for Case Study Interviewees

Upon determination of the unit of analysis, the commander of the 738th EIS was contacted directly. He then provided a single point of contact for the study and ensured full support from his staff as the study progressed. Coordination for the nine (9) interviews that were conducted was provided through this single point of contact. While on-site, and as the study progressed, interviews led to potential other key informants. The organization was extremely flexible and provided all personnel needed for interviews, even though a hurricane threatened the base and hurricane preparations were underway.

Human Experimentation Requirements

Consistent with the requirements of the Air Force Institute of Technology, an exemption letter was filed with the Human Subjects Review Board and was based on the Code of Federal Regulations, title 32, part 219, section 101, paragraph (b)(2), which states:

> Research activities in which the only involvement of human subjects will be in one or more of the following categories are exempt from this policy: (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude,

achievement), survey procedures, interview procedures or observation of public behavior.

Additionally, in accordance with these guidelines information obtained weren't recorded in such a manner that human subjects could be identified, directly or through identifiers linked to the subjects nor would any disclosure of the human subjects' responses outside the research reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation. Primary means for data collection was through structured audio-taped interviews. All subjects were asked to volunteer to participate in the interview process and signed a letter of consent containing a copy of the Privacy Act Statement of 1974. No adverse action was taken against those who choose not to participate. Subjects were made aware of the nature and purpose of the research, sponsors of the research, and disposition of the interview results. Those who chose to participate were interviewed and audiotape recorded using a micro cassette recorder, transcribed, then presented to the interviewee, electronically through the use of email, for their final approval. No identifying information obtained during interviews was retained or reported. Additional individual data pertinent to the study included duty title and duration in current position, which facilitated analysis and follow up throughout the study only.

Data Collection Techniques

Data for this study came from many sources (Yin, 2003). The majority of data for the study came from nine (9) structured interviews with a purposive sampling of squadron personnel (Miles & Huberman, 1994). Other data included commander mission briefings, squadron pamphlets, internal documents, AFIs, AFMCIs, OIs, and

newspaper/media interviews/articles. As stated earlier, multiple sources of evidence support validity by converging on the same set of facts or findings (Yin, 2003).

The core data for this effort came from the interviews; these interviews consisted of structured questions that focused primarily upon the framework itself and the *Key Factors Affecting Decision Process* within each step of the Bower-Phillips decision framework. The researcher interviewed four (4) civilians with an average of 18.25 years of EI experience and five (5) military personnel with an average of 2.9 years of EI experience. The researcher traveled to the 738th EIS on 13 September-14 September 2004 to conduct the interviews on site. Each interviewee reviewed a handout of the framework (Appendix B) then read and signed a letter of consent and a letter authorizing the use of direct quotes from their interview. The interviews were transcribed, placed into the findings of the study, and emailed to each individual for review and final approval for use. Published documents such as Air Force Instructions, Major Command (MAJCOM) policy guidelines, and 738th EIS mission information were downloaded from various AF websites.

An electronic case study database was established to manage the data collected. The database was instrumental in organizing the raw data and tracking the established points of contact (POC) from the site. The raw data were organized as a means to facilitate independent inspection by those other than the researcher. All personal data were scrubbed from the interviews to ensure confidentiality.

Data Analysis Strategy

Case study data analysis, strategies and techniques are among some of the least developed of the research methods (Yin, 2003). To assist in overcoming these difficulties, it is advised to have analytic strategy that attempts to define the priorities of what to analyze and why (Yin, 2003). The strategy chosen for this effort was "relying on theoretical propositions" as prescribed in the Bower-Phillips decision framework (Yin, 2003). The analysis began early in the process while developing the research question from this framework and data gathering was also based upon the theory presented within the framework.

The general data analysis technique selected for this case study was pattern matching (Yin, 2003). The theoretical Bower-Phillips decision framework guided the data collection and the data were categorized accordingly based upon the steps, and *Key Decisions Affecting the Decision Process*, within the framework. A conceptually clustered matrix of categories based on the *Key Factors Affecting Decision Process* within each step of the framework was created (Miles & Huberman, 1994). Data from any of the sources that matched the categories of the framework were placed in their respective category for examination, analysis, and final conclusions. These are reported in the following chapter.

A final portion of the analysis was provided by feedback from the squadron commander upon his review of the findings. The framework was established to assist in the decision making process of whether or not to proceed with KM. Therefore, the data gathered using the Bower-Phillips decision framework as part of this study will be

analyzed to see how well it supported the squadron's decision process in selecting KM projects.

IV. Results and Analysis

Chapter Overview

This chapter will begin with a description of demographics of the 738th EIS. Then, using the theoretical decision framework under study, the data will be categorized and analyzed. The data will be conceptually organized within the steps and *Key Factors Affecting the Decision Process* of the decision framework to assess the frameworks real-world usefulness. The chapter will conclude with the answering of the research question. Unless otherwise noted, the majority of data used for this study came from semi-structured interviews with the squadron personnel.

The 738th Engineering and Installation Squadron (EIS)

The 738th Engineering Installation Squadron (EIS) based at Keesler Air Force Base, Mississippi is subordinate to the 38th Engineering Group, Tinker Air Force Base, Oklahoma. Aligned under the Air Force Materiel Command (AFMC), its mission is to provide engineering and installation of integrated command, control, communications, and computer (C4) systems for the Air Force and other government agencies worldwide (Baca, 2004a).

The 738 EIS is the only remaining active duty engineering installation squadron in the Air Force. The squadron provides a rapid response force that can deploy personnel and resources within 48 hours to assess damage, engineer, install and reconstitute command, control, communication and computer systems worldwide. This same capability is utilized for quick reaction taskings and other engineering installation requests that meet training requirements for their wartime mission. The squadron also

boasts a one-of-a-kind specialized engineering function that investigates radio frequency interference, measures electromagnetic radiation hazards, and performs tests to determine protection from high-altitude electromagnetic pulse. The engineers also evaluate, provide advice and resolve problems on all type of communications, as well as power, grounding, and lightning protection systems. The 738 EIS also acts as an advisor to an additional nineteen (19) Air National Guard Engineering and Installation (E&I) units. The unit is currently structured into three flights: Rapid Response Flight, Specialized Engineering Flight, and Mission Support Flight.

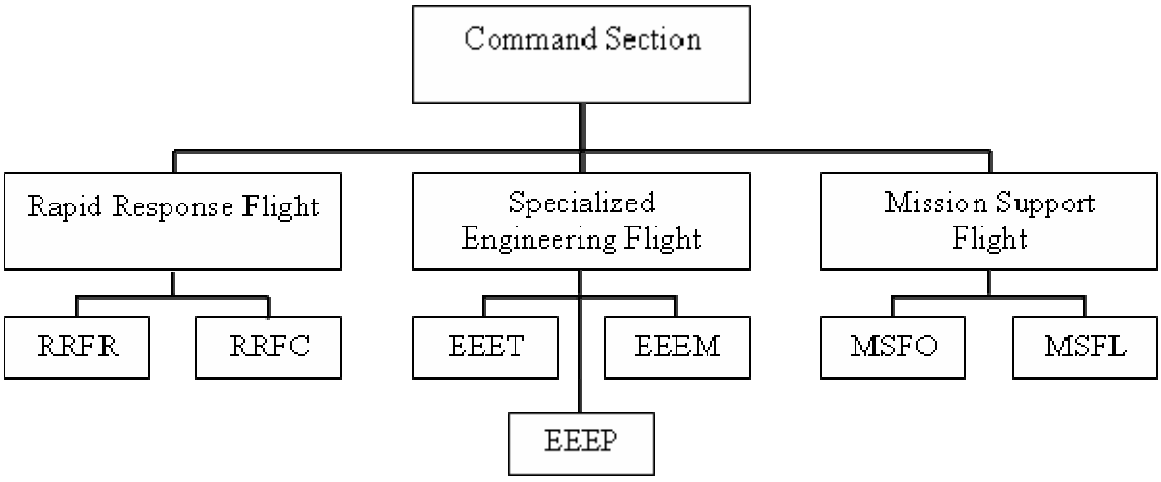


Figure 4. 738th Engineering Installation Squadron Organizational Chart (Baca, 2004b)

Rapid Response Flight (RRF)

The Rapid Response Flight is further broken down into two sections as graphically indicated in Figure 4: Electronic Systems (RRFR) and Cable and Antenna Systems (RRFC). The flight provides combat installation teams trained and equipped to

install C4 systems for both peacetime and contingency operations. They are capable of deploying personnel and resources in fewer than 48 hours to access damage, engineer, install, remove, relocate, and reconstitute C4 systems. The flight is capable of performing engineering technical solutions, project package development, rapid, accurate and cost effective resolutions to specific customer requirements. Some of the services this flight is capable of providing include antenna, narrow and wideband radio, satellite, copper and fiber optics cable, local, wide and metropolitan area networks, Air Traffic Control radar systems, meteorological equipment, and secure voice and data transmission systems. The flexibility and ability of the flight to tailor teams of experienced Communications-Electronics personnel to each unique mission enables RRF to rapidly meet customer demands.

The flight is currently tasked to provide seventeen (17) different Unit Type Code (UTC) teams for wartime missions as shown in Table 4. The flight consists of one (1) officer and one hundred and twenty three (123) enlisted personnel including twenty four (24) certified team chiefs. There are seven (7) different Air Force Specialty Codes (AFSC) among the enlisted personnel.

Table 4. 738th EIS Wartime Mission Taskings by Unit Type Code (UTC)			
UTC	**Total Number**	**Flight/Section**	**Description/AFSC**
6KQJ1	2	RRFR	Ground Radio (AFSC 2E1X3)
6KQK1	2	RRFR	Secure Communications (AFSC 2E2X1)
6KQE1	2	RRFR	Satellite Communications (SATCOM)/Wideband (AFSC 2E1X1)
6KQG1	2	RRFR	METNAV (AFSC 2E1X2)
6KQF1	2	RRFR	RADAR (AFSC 2E0X1)
6KQLA	2	RRFR	Global Network Enhancement Team (GNET)
6KQC1	3	RRFC	Cable (AFSC 2E6X2)
6KQB1	2	RRFC	Antenna (AFSC 2E6X2)
6KQV1	3	EEEP	Initial Communications (AFSC 3C0X1)
6KQA1	2	EEEP	Radio Direction Finding
6KQLA	2	EEEP	Global Network Enhancement Team (GNET)

Source: (Baca, 2004b)

The team chief is considered the workhorse of the flight and arguably of the entire squadron. Team chiefs are highly skilled installers that have the necessary administrative, supervisory, managerial, and technical skills required for their specific profession or AFSC. Individuals must undergo an intensive nomination process, attend numerous management and technical training courses, and receive special evaluations in order to achieve, and maintain, the status of team chief. The team chief is the most knowledgeable, and most valuable, military professional the squadron has.

Specialized Engineering Flight (EEE)

The Specialized Engineering Flight provides worldwide C4 engineering, testing, and analysis services to Air Force and DOD organizations, other government agencies, and allied foreign governments. This flight has three sections as graphically indicated in Figure 4: Electromagnetics (EEEM), Telecommunications (EEET), and Project

Engineering (EEEP). The members of this flight are capable of providing engineering expertise in such areas as fiber optics, electromagnetic radiation hazards, microwave system testing, electromagnetic interference reduction, electromagnetic compatibility, circuit testing and analysis, antenna system measurement and alignment, high altitude electromagnetic-pulse verification, local area networks performance testing, and grounding and lightning protection. The project engineering element provides engineering support for C4 projects in which RRF will install.

This flight consists of forty five (45) personnel. Twenty five (25) are civilian government employees all of which are assigned to EEET and EEEM. Project engineering (EEEP) consists of twenty (20) military officers. Twelve (12) of these officers are Aerospace Communications and Information Expertise (ACE) lieutenants serving only a 2-year tour.

> The ACE program was established to provide a common operational foundation for new communications and information officers…the program assigns new accessions to operational units for their initial tour of duty to help ensure that accessions have a thorough grounding in the operational aspects of the career field (Donahue, 2004).

Of the 20 officers in project engineering, 7 engineers are tasked to support 7 UTCs for wartime missions as shown previously in Table 4.

Mission Support Flight (MSF)

The mission support flight provides in-garrison and deployment support for the Rapid Response Flight and Specialized Engineering Flight. This flight is also further broken down into two sections: Operations (MSFO) and Logistics (MSFL) as

graphically indicated in Figure 4. Together these flights support the overall mission of the squadron by providing the project management, equipment, vehicles, training and monetary resources essential to ensure combat capability and quick response teams are equipped and ready to deploy.

Operations (MSFO) is the unit central point for interfacing with customers, coordinating project engineering and installation, managing projects, monitoring and reporting project status, and providing technical and team chief quality assurance evaluations. It also maintains a large technical library and is home to the Air National Guard liaison officer and NCO. They are the unit's 24-hour focal point for any contingency or routine engineering/installation requirements and provide the workload for actual real worldwide training to all installation personnel including installation work being performed by advised Air National Guard (ANG) units. MSFO has five (5) personnel assigned, one (1) government civilian employee and four (4) military senior noncommissioned officers (NCOs).

Logistics (MSFL) manages and supervises in-garrison and deployment support requirements and has five elements: Standard Installation Practices Training Element, Readiness Element, Materiel Control Element, Information Technology Element, and Vehicle Operations Element. MSFL has twenty (20) personnel assigned, including three (3) civilian government employees and seventeen (17) military personnel.

Assessing the Framework

Each step will be further broken down into the prospective *Key Factors Affecting Decision Process* contained within that step. Upon completion of the analysis of the data specific to the case each step will be assessed on its usability in the context of the study.

Step 1: Analyze Corporate Strategic Objectives

Key Factors Affecting Decision Process:

Corporate Knowledge Vision and Strategy

The 738th EIS has no established knowledge vision or knowledge strategy. Nobody interviewed had any understanding of a knowledge strategy. One interviewee stated that the closest thing to a knowledge strategy that he knew of was the Engineering Installation (EI) Strategic Plan which discusses training requirements but that was the extent of it.

Corporate Strategic Objectives

The strategic objective of the 738th is to fulfill permanent installation requirements of integrated C4 systems and services during war, preparations for war, and peace. The aim of peacetime engineering and installation is to prepare the unit's personnel for war. A Total Force Group (TFG) meets to distribute upcoming projects between the 738th and 19 National Guard EI units. Typically, projects are selected based upon training deficiencies identified by squadron senior management. In the past few years the 738th EIS has received direct communications from potential or repeat customers based upon their reputation for providing an invaluable service with outstanding quality and a cost savings over civilian contractors. For example, if the 738th has some personnel that need additional training in laying and terminating fiber

optic cabling, they would select a project at a base that was proposing the installation of fiber optic cable.

Another strategic objective the squadron provides is through Specialized Engineering and includes services such as fiber optics, electromagnetic radiation hazards, microwave system testing, electromagnetic interference reduction, electromagnetic compatibility, circuit testing and analysis, antenna system measurement and alignment, high altitude electromagnetic-pulse verification, local area networks performance testing, and grounding and lightning protection. These services, too, are offered during both peacetime and war and typically are performed by civilian engineers.

Future Knowledge Requirements

The future knowledge requirements of the squadron can be classified as extremely high and placed into two categories, future technologies and experienced personnel. Not surprisingly, there is a need for the squadron to be proficient in the most current C4 systems available to the DoD and government agencies. Currently, however, none of those interviewed could think of a technology that they are incapable of installing, based upon recent and past customer requests. The commander did feel, however, that there was a lack of enlisted expertise specifically in the 3C2XX AFSC (Tech Controllers) career field. Currently no airman with this AFSC are assigned to the 738th and numerous Tech Control Facility (TCF) projects are currently underway in the United Air Forces in Europe (USAFE); for these the 738th relies heavily on the expertise of the civilian engineers in EEE. There is a clear understanding by those interviewed that the 738th EIS must always be at the "top of its game" because they are the only Air Force active duty E&I unit available.

The fact that the 738th is the only active EI unit doesn't shield them from downsizing and hurts them even more when personnel are moved or lost due to permanent change of station (PCS), separation, or retirement. Given that there are no "sister EI units" from which to receive manning, the unique requirements of EI personnel requires a great deal of training.

Some sections have a higher turnover rate than others. For example, the Project Engineering section has 20 military officers, 12 of these are ACE lieutenants fulfilling only a 2-year assignment. The other 8 officers, at best, will fulfill only 3-year assignments. No other long-term continuity exists within this section, as soon as the project engineers are comfortable with doing their jobs they PCS. One project engineer stated:

> "It takes a long time to get 'up to speed' with things and by the time you finally get the hang of it and start doing more projects and becoming more knowledgeable you gotta [sic] go…you don't really get the chance to become as knowledgeable as the team chief or civilian engineers…you're always scrambling around asking questions trying to figure out what the hell is going on."

One of the civilians stated with a sense of frustration that project engineering is always in a "constant state of train the trainer with trainees." A typical installer or experienced team chief can expect to be deployed or away from home station performing temporary duty (TDY) installing C4 systems approximately 200 days per year. With such a high operations tempo (OPSTEMPO) one might expect many of the younger personnel to look for alternate work centers or assignments; however, the flight commanders say the opposite is true and personnel regularly request additional work and TDYs.

Currently there are no measures to ensure continuity for personnel leaving the squadron. When they depart they take years of training and experience with them, and the squadron must start the training process over again with their replacement.

During recent deployments to both Operations Enduring Freedom and Iraqi Freedom the 738th performed its mission in a wartime environment although one team chief felt that "stateside installs will not get you ramped up for what we encountered [in Iraq]." The same team chief stated that one area that seemed to be overlooked was the team chiefs in certain career fields get "stove piped" into certain installs:

> "because of [our] knowledge background [within our] AFSC we don't cross utilize [ourselves] as we should, some of the older team chiefs are cross-utilized to gain broad knowledge of the combined [cable/antenna] career field."

Current & Future Information Requirements

Of those interviewed, all seemed to agree that the most information intensive process of the 738th EIS was that of Project Engineering. For the most part, projects are engineered by the least experienced personnel in the squadron with little or no oversight. The project engineers rely heavily on the information and knowledge of the experienced team chiefs and installers to ensure they draft the project support agreement (PSA) correctly, order the correct parts and materials, write the correct installation procedures according to numerous military instructions and federal standards, update base communications infrastructure drawings, etc..

Often, when the project engineer needs the team chief most, the team chief assigned to the site survey team is gone to another installation. One project engineer stated his frustration, "when you get back [from the site survey] to try to write the PSA or

[project] package [the team chief is] already off on the next job and it's tough to get hold of them to get that knowledge."

One senior civilian suggested a reason for this was that at the 738th "the guys that really know their stuff, we work the hell out of." The most knowledgeable team chiefs are most often away from the unit leaving the least knowledgeable to assist the project engineers. The engineering of some projects may extend numerous years and may include many different project engineers and team chiefs. With most of the team chiefs being TDY in excess of 200 days a year, the absence of this critical experience can lead to serious deficiencies with the project.

One project, a copper cable installation at Scott AFB, IL, was engineered over a lengthy period. It initially began in 1998 but due to budget constraints and other issues the project was on and off until the final engineered project in 2003. During this time it may have had five different project engineers and an equal number of team chiefs assigned to it. During the installation in 2004, major material deficiencies were found throughout the project and the final tally, in monetary figures, wasn't available for this writing but was in excess of $30,000. The project had simply passed through too many hands with little or no continuity.

Information needs seem to be higher in-garrison and not while installation teams are TDY or deployed. Deployed installation teams travel with the detailed project package, laptops which include a Team Chief's Handbook detailing specific installation practices and procedures and a complete Standard Installation Practices Technical Orders (SIPTOs). Very seldom is there a time when a deployed team has to "reach back" to the squadron for assistance for the project they're currently working. The team chief may

have to check back with the squadron to assist a project engineer with a new project still being engineered.

Specialized Engineering has the need for great amounts of information prior to deploying. As stated earlier, they are responsible for numerous tasks to include engineering expertise in such areas as fiber optics, electromagnetic radiation hazards, microwave system testing, electromagnetic interference reduction, electromagnetic compatibility, circuit testing and analysis, antenna system measurement and alignment, high altitude electromagnetic-pulse verification, local area networks performance testing, and grounding and lightning protection.

Quite often testing is done on circuits or systems installed by the 738th and it's extremely beneficial to have detailed tasks performed by the installation teams; however, these detailed tasks don't exist. If a civilian engineer wants to know who installed Cable 12 at Scott AFB, for example, the civilian engineer either needs to know first hand which team chief installed it and approach them directly, or they have to try to just figure it out once he arrives on site.

Opportunities to Capitalize on Organizational Knowledge

When questions based upon this topic were presented to each of the interviewees a central theme became apparent--they needed continuity within the sections. Other opportunities to include measures to share networked files across work centers, filing and sharing lessons learned, a well-defined and structured mentorship program also presented themselves, but continuity seemed to be the hot topic. All agreed continuity was definitely needed within Project Engineering, especially since a majority of the officers in

this section were ACE lieutenants. Measures are needed to prevent the constant "outflow" of organizational knowledge from this vital section.

Current Organizational Knowledge

The core knowledge available to allow the 738th to complete its mission rests with experienced and knowledgeable team chiefs, installers, and specialized engineers. Project engineers and the specialized engineers need the tacit knowledge of the team chief and installers to assist them in performance of their duties.

Captured or Known

The known core organizational knowledge resides with the heads of the experienced team chiefs and installers. Other sources of captured knowledge include stored project support agreements (PSAs), project packages, SIPTOs, and the Team Chief's Handbook. Specialized engineering also files reports after completion of special projects, but these reports reside on one individual's secluded computer. When interviewees were asked about their first source of help when they struggled with an issue the answer almost always involved a co-worker.

Uncaptured or Unknown

Uncaptured knowledge includes that tacit knowledge within the heads of team chiefs and installers. Specialized engineers hold a wealth of knowledge unknown to most of the squadron. The reason this knowledge is unknown is primarily because most squadron members don't even know what the civilian engineers do. Another source of uncaptured and unknown knowledge is lessons learned from the field. There has *never* been a project that went through the entire project engineering process with no errors. There is no formal feedback process to address lessons learned when the installation team

returns to the squadron; if it isn't heard through rumor how badly a package was engineered the project engineer has no way of knowing how to improve his/her product. It only seems fitting that if one is to rely on the least experienced organizational member to engineer the projects the organization installs then a lessons learned process would be beneficial.

Other unknowns include future technologies that may pose potential knowledge gaps in the organization. The organization must constantly look ahead to future systems to include biometrics and future network centric warfare technologies.

Knowledge Required to Achieve Strategic Objectives

Currently, the critical knowledge required to achieve strategic objectives lies with experienced and well trained team chiefs, installers, and specialized engineers. To ensure strategic objectives are met in the future requires the establishment of a long-term knowledge base throughout the organization but especially within Project Engineering.

Key Subtask: Identify Knowledge and Information Issue Related to Strategic Objectives

The 738th EIS has no knowledge strategy which is recommended as an early step in any knowledge management effort (Holsapple & Joshi, 2002; M. Zack, 1999). Step 1 of the framework helped with identifying potential "gaps" within the knowledge resources available to squadron personnel. Knowledge management could provide the 738th EIS a long-term strategic advantage. Currently there is no effort to ensure that the people of the squadron that require access to knowledge resources the most have it.

Step 2: Identify Potential KM Opportunities & Limitations

Key Factors Affecting Decision Process:

Senior Leadership Interest & Project Sponsorship

One could conclude that senior leadership has an interest in the implementation of knowledge management since they agreed to sponsor this research. A senior civilian at the site agreed that knowledge management practices such as lessons learned and sharing of organization knowledge would be beneficial. The commander agreed that KM is a valuable initiative to implement, but recognized that with the upcoming realignment under ACC he "wouldn't support a KM effort until the 'dust' settles. [Too] much change [too] quickly." Military and civilian leaders at the squadron agreed that the overall "knowledge base is getting worse…team chiefs are retiring and there are no longer 'sister' units to [which] team chiefs can rotate back in and keep up experience level[s]."

Analyze Current Business Processes

One of the main processes the squadron performs is the project engineering process shown in Figure 5. The purpose of this process is the development of engineering installation (EI) project packages used to install, remove, relocate, reinstall, and retrofit communications and information systems (Haley, 2001).

Once training needs of the squadron are determined a project is selected from the TFG, or through direct customer contact, and the 738th assigns a project manager (PM) who will manage the project throughout its duration. An engineer is then assigned to engineer the package. AFMCI 33-104 states the criteria for assigning an engineer as:

> Project complexity and availability of personnel resources usually determine whether the project is assigned to a degreed engineer, team chief, or enlisted engineer for project package development (Haley, 2001).

The majority of the projects engineered at the 738th are assigned to the military officer project engineers in EEEP. If a site survey is needed, a team chief and additional installer(s) will travel with the officer to the customers site in order to determine specifics for the project. A project support agreement (PSA), basically a contract between the 738th and the customer, will be completed based upon the site survey data.

Upon completion of the site survey, and after receiving PSA concurrence from customer, the engineer will develop the project package. This package, the complexity and detail of which is directly proportional to project complexity, will include a List of Materials (LOM), installation or removal instructions, testing instructions, drawings, and other pertinent information applicable to the project. Ideally this will be developed with the direct involvement of the team chief that assisted with the site survey.

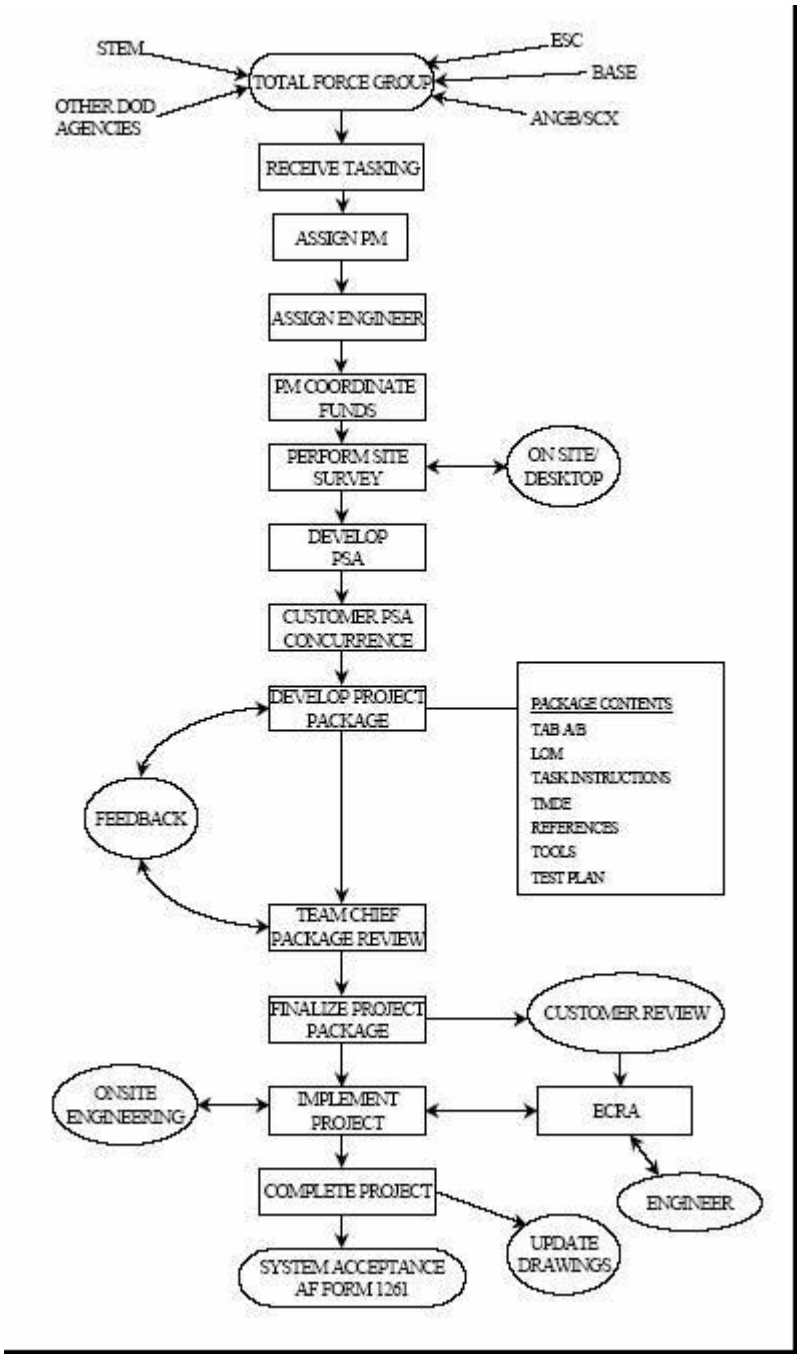


Figure 5. Project Engineering Process
(Haley, 2001)

The completed project package is then submitted for team chief review. An experienced team chief, other than the one that was originally assigned to the site survey team, will be assigned to review the package. This thorough review will ensure the correct materials in the correct quantities are ordered, all instructions are clear and complete, and all drawings have been annotated properly. All discrepancies are annotated and returned to the project engineer for correction. Once the package is suitable to all parties, including the customer, the finalized package is then scheduled for installation. If any changes need to be made to the package while it is being installed either the on site team chief or the customer submits an Engineering Change Request/Authorization (ECRA) to the project engineer.

Current Organizational Structure

As depicted in Figure 4 the squadron is organized into three (3) flights-- Rapid Response Flight, Specialized Engineering Flight, and Mission Support Flight. These are all detailed in the Introduction section of this chapter.

The current organization doesn't allow for easy access to experienced team chiefs or civilian engineers by the project engineers. They are physically separated and there appears to be a certain intimidation factor which prevents the young officer engineers from enlisting the help of the team chiefs and civilians. Most squadron personnel don't even know what experience the civilians have to offer to the squadron.

Existing IT Infrastructure

Currently all servers owned by the 738th are physically stored and maintained by the base communications squadron. The only hardware located at the squadron consists of the individual workstations and a 100 megabyte per second (MBPS) Entrasys switch

that is connected via single mode fiber backbone to the base network located 5 miles away. Services provided include email, file, and Internet. The squadron also has laptop computers that are available for TDY personnel. Currently the squadron has no virtual private network (VPN) capability but is pressing to get it as expressed by the IT manager, "we want VPN connectivity desperately so our folks in the field can get access to the drawings and other digital files required in meeting our mission." They do, however, have remote access to their email accounts while TDY. The Mission Support Flight (MSF) at the squadron performs administrative management all 738th EIS electronic files to include permissions and structure of the files.

MSF states that the permissions and rules for who has access to each flight's files (READ/READ & WRITE) is the responsibility of each section chief; however, department heads of each section report otherwise. There are problems with members of the same flight having access to the files of other elements within that flight. For example Specialized Engineering has three elements, EEEP, EEET, and EEEM. Members of EEET can't access and use information from EEEP or EEEM. Also, there are problems with access and file sharing between flights. Those interviewed felt strongly that all information should be available to all members, at least at the READ level unless classified or protected by the Privacy Act.

The 738th has an internal intranet that has many useful links for travel related issues, internal TDY planning forms, links to informative AF sites, etc. Other than for preparing for TDYs, of those interviewed none found the Intranet site useful for the performance of their duties. The commander, in line with the desire of the Air Force,

made a recent effort to ensure all squadron members had an active Air Force Portal account.

The squadron has an annual IT budget of "roughly $100K" and according to the IT manager there has never been an issue of not being able to upgrade or add to existing infrastructure because of lack of funds.

Resources Available to Apply to KM Efforts

Through discussions with many squadron personnel the main resources needed to support any KM effort would be people. Most felt that a majority of the resources needed are already on hand. A slight reorganization would also be required, possibly establishing some long-term civilian positions to provide a knowledge base within each section. This may require the addition of a number of civilian positions, which one interviewee stated "when the 738th was established at Keesler AFB with 9 military officers [project engineers] I thought that was a mistake…we had hundreds of project engineers that were civilians; we needed a mix of officers and civilians for continuity." He also felt positions could easily be procured from the 38th at Tinker AFB, Oklahoma by submitting a simple letter. It is believed the reason this hasn't been accomplished to date is because recent commanders have been concerned about losing military positions. (The commander later disclosed that he had, in fact, "sent the letter forward and that there was no link with losing military positions.")

The commander stated that he, in fact, had "asked that the 5 civilian positions taken from us (AFMC downward directed across the board cut) prior to my arrival be returned. I did in fact get a couple of these positions back after much negotiation." He

also included that another eleven (11) military positions are to be added in the summer of 2005.

Critical knowledge resources reside in past project packages and PSAs. Many completed project packages are archived in digital format on common project engineering hard drives. The computer resources available to the unit are more than adequate; however, policy on sharing the access to files is a problem across flights. One interviewee stated his frustration about the permissions for access as "it's your own library that you don't have access to" and felt that "anything that can be shared should be shared."

Budget Constraints

Budget constraints don't seem to be a problem for the 738th. For the fiscal year 2004, the total funding for the 738th was $4,572,700. However, $2,888,596 of theses funds consisted of selective cost reimbursement provided by customers. Out of those interviewed, none felt the budget could hamper any KM initiative, they all seemed very proud of the enormous budget. Some seemed concerned about the reorganization of the squadron under a new major command (MAJCOM). The 738th is supposed to transfer from Air Force Material Command (AFMC) to Air Combat Command (ACC). Although it's not clear as to when this reorganization is supposed to happen (the commander stated January 2005) or how it would affect the squadron, many felt money could be sparse, after the first couple of years, as E&I competes under ACC with other warfighters.

Potential to Create a Learning Organization

A learning organization is "an organization skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and

insights (Garvin, 1993)." The squadron has the potential to create a "Knowledge Library" with its existing infrastructure that would provide great value to the members of the organization and contribute directly to the project engineering process. This may be accomplished by relaxing some permission rules to facilitate information sharing, consolidating templates of project support agreements and packages, and creating an organizational knowledge map to assist in identifying tacit knowledge bases within the squadron.

The major hurdle to overcome to become a learning organization is that of behavior. One will have to make a concerted effort to change the behavior of each person to gain the benefits of KM. In speaking with squadron personnel the researcher believes this shouldn't be a difficult task for the 738th. Their motto is "With Pride Worldwide" and they appear to believe they are the best at what they do. They take great pride is being the only active EI unit and brag about being, by far, the best EI when compared to the nineteen (19) Air National Guard EI units.

Value of Tacit and Explicit Organizational Knowledge

The consensus from those interviewed was that squadron personnel value the tacit knowledge of some of the more experienced team chiefs and installers more than any other knowledge source that has been created by squadron personnel. Project engineers and civilians stated that they seek out other knowledgeable peers or team chiefs before browsing through previous PSAs, project packages, and reports.

The explicit knowledge that is available to personnel, with exception of the SIPTOs and other technical orders and manuals, isn't found to be as useful to those that would use it most. The main reason for this is believed to be that many of the sources

aren't trusted. Unless the author of the source is known, and known to be a trusted, knowledgeable source, most would rather start from scratch than take the chance of re-using a template that is incorrect.

Availability and Usability of Tacit and Explicit Organizational Knowledge

Tacit knowledge, from team chiefs and installers, isn't always readily available for use. As mentioned earlier, every project engineer interviewed stated frustration with trying to locate team chiefs at critical times in project package development. Sometimes projects get bogged down for weeks at a time because other team chiefs are reluctant to assist since they weren't the one that performed the site survey or aren't sure what the "thought process was of the original team chief". One team chief recommended a centrally located project folder that contained standardized notes from the original site survey, drawings, and pictures so any other team chief could pick it up and know what the other was thinking. Currently there is no policy or rule to prevent a team chief from going TDY while a package that they have an active participant role in is being developed.

An extremely knowledgeable civilian staff exists in the specialized engineering flight but is seldom, if ever, used. Most squadron personnel fail to realize the benefit this flight provides to the squadron. Their expertise is crucial in almost every package developed and especially in the process of developing the PSA. The commander spoke highly of the civilians filling in the gap of not having 3C2s (Tech Controllers) assigned to the squadron for the Tech Control Facility projects currently underway in USAFE.

A majority of the PSAs and project packages developed by the project engineers are available for use on a central squadron server. However, there is no means to know if the PSAs or packages contain errors. So if an engineer is to re-use the PSA or project package, which is common practice, they run the risk of making repeat mistakes.

Other forms of explicit knowledge, to include SIPTOs, technical orders (TOs), team chief guides, standard PSA template, and TDY travel data are available via 738th intranet or through their in-house technical library. Computer file permissions currently prevent the use, across flights, of stored information. Quality assurance (QA) reports, when performed, aren't made available to the entire unit for review, they are routed through senior management channels only. These QA reports are the closest thing the 738th has to a lessons learned/best practices program.

Potential Loss of Critical Organizational Knowledge

There are numerous instances where the loss of critical knowledge is currently happening. One major source, identified by all that were interviewed, is the frequency at which project engineers are transferred in and out of the squadron. Another is the recent retirement, upcoming retirement, PCS, or PCA of a number of experienced team chiefs as identified in Table 5. The loss of civilian positions is always a concern, especially with down-sizing and outsourcing; however, none of those interviewed felt it was an immediate threat. Retirement of high- level or experienced civilians is also a concern.

Table 5. Potential Loss of Team Chiefs			
Section	Last Calendar Year (2003)		
	PCS/PCA	Retire	Eligible to Retire
RRFR	1	1	0
RRFC	0	4	0
	This Calendar Year (2004)		
RRFR	0	0	3
RRFC	1	1	6
	Next Calendar Year (2005)		
RRFR	4	0	4
RRFC	2	0	8
Note: RRFR currently has nine (9) team chiefs; RRFC has fifteen (15)			

The project engineering process is well documented; however it isn't well known by many of the engineers. The explicit knowledge within the PSAs and project packages could stand to be more actively captured and managed. It is recommended that a methodology for archiving projects for both short- and long-term use be devised and practiced. Other methods could also be established to ensure these archived projects are trusted by future users.

Key Subtask: Identify and Analyze Potential KM Opportunities and Limitations

The Key Subtask of this step is to identify and analyze potential KM opportunities and limitations. Based upon the findings reported above, numerous KM opportunities seem evident to the researcher. It must be emphasized, however, that before any of these are considered it is recommended that the 738th devise a knowledge strategy and then ensure any KM opportunity they consider is in support of this strategy.

First, there is an opportunity for the squadron to recognize, and manage, its core knowledge as a resource and asset. When resources were discussed with key members the typical answers included people, money, and equipment. Currently the commander's

briefing contains slides to discuss each flight, the people within the flight, UTCs supported, the budget, and the vehicle fleet of the squadron. There appears to the researcher to be a lack of understanding that knowledge is a chief key resource and that the squadron could benefit from affording it the same attention as other resources.

Second, there is clearly an opportunity for the squadron to create a knowledge repository for use by all squadron members. Many instances exist in which the squadron can codify, or document, key knowledge needed for the core process of the squadron. This repository may well include any and all knowledge that can be placed into a document format to include standard templates for project packages and project support agreements for the different commodities, detailed instructions on tasks performed, technical documents, standard installation practices technical orders, lessons learned, trip reports, etc..

Third, it is recommended that the squadron provide measures to improve knowledge access to those who need it most. Whether this knowledge is captured in documents, reports, project packages, technical orders, technical publications, etc., or stored within experience personnel's heads, this knowledge must be made available, and accessible to all squadron members no matter the format. It is understood that classification and Privacy Act information may hinder this somewhat, but to the extent possible it is recommended to share what can be shared.

Limitations to any of these opportunities lie mainly with cultural change, education, and squadron acceptance. Realizing and managing knowledge as a resource isn't a common practice so it is advised that the squadron be educated so that they understand the importance of knowledge. The squadron then must accept this

understanding and incorporate it into its daily operations. This will be vital to the acceptance of creating and maintaining the knowledge repository.

Step 2b: Identify and Analyze Cultural Aspects of the Organization

Key Factors Affecting Decision Process:

Level of Communication

It has been determined that increased levels of communication in an organization contribute greatly to the success of implementing a KM initiative (Phillips, 2003). This is one area that the 738th needs to address prior to implementing any initiative. Many believe the communication level is low between flights and low within flights/elements.

However, the commander feels the squadron, as a whole, communicates "very well." He continues "the current structure and mixture of military and civilians has worked out well. [The] Operations [Flight] (MSFO) is the glue that holds projects together." He concedes, however, that "personalities do have a big impact [on communication]."

Most project engineers feel comfortable asking questions within their element because it is "more comfortable to reach out to one of your peers" than outside because they don't want officers to be perceived as being poor communicators:

> "It may look to others that we don't communicate well up here [in project engineering] if we're looking elsewhere for knowledge…they [enlisted team chiefs] feel they shouldn't have to continue to fix our problems when somebody else has asked the same thing."

The civilians of the squadron seem to be the forgotten group. One stated that he felt they were "useful, but the military people don't think we're useful [and] the commander doesn't even know what we do." Another even suggested the commander

"was uncomfortable working with civilians [and that] people don't know the potential of civilians." He continues that "with the average civilian time in the squadron being between 15 and 20 years [not knowing their potential] cuts the knowledge potential of the organization significantly." However, this wasn't the feeling the researcher received from the commander, he specifically stated that he placed "extreme value" on the assigned "professional, skilled, and talented civil[ian] engineers. [Without] them we could not accomplish the EEE mission."

Many feel the communications within individual flights is low because information isn't shared internally. A civilian employee stated that he hadn't attended a morning meeting to discuss topics "in many years." The lack of communication within project engineering is illustrated in a statement by one project engineer:

> "[we] don't talk about problems…one downside is there's no way to know what's going on with everybody else, we're all kind of focused on our own projects not really thinking about anything else."

Lack of communication also exists in selecting project engineers for projects, "they don't look at people's strong points…their past experience" stated one project engineer who recently PCSd from a combat communications unit. This engineer had recently been assigned to engineer a radio project even though his combat comm. experience was in computer networking.

One positive factor about the communication process at the 738th is that all seem to have the same common goal in mind when dealing with projects--to provide the best service to their customers. Most are comfortable with the jargon and particulars of many of the processes and things common to the squadron; however, the understanding and

comfort is diminished when the communication involves the technical aspects to specific projects.

Encouraging Team Orientation

Over the past twenty (20) years the observed trend has been that "people seemed to be separating more and becoming less cohesive," stated one squadron member. The civilians definitely don't feel part of the team. They feel they aren't trusted to supervise flights or elements, and they feel nobody in the squadron knows, or cares, about what they do. During many of the interviews the interviewees spoke of "us" or "them" or "them over there" which led the researcher to believe that many feel less part of a whole team and instead as an entity or somebody that supports, or is supported by, somebody else.

Most feel more of a team when in a deployed environment; one team chief spoke proudly about how his deployed team "was pretty loaded" with dedicated and knowledgeable personnel. It is believed that this greater sense of team orientation arises when the team is focused on achieving common goals. When deployed, or TDY on an installation, the team is focused on the task at hand and little else. The quicker the installation is completed, the quicker one gets to go home or move on to a "better" installation. The war on terrorism has given a great deal of visibility to EI; team cohesion seems to be prevalent with most squadron members because they all have a great deal of pride in what they do.

There doesn't seem to be the same team concept in-garrison. The project engineering process seems to be well structured as to who is to perform what and when and there doesn't appear to be any collaboration or overlap. The lack of team orientation

in-garrison exists because only one person is focused on the goal of engineering the project. Team chiefs and installers don't have the same ownership and motivation to complete a good project package; they leave it up to the engineer.

Trust Among Employees

On the military side one would have to say that the trust between enlisted and officers is fairly high. The conclusion is based on the fact that the officer engineers rely heavily on the advice and counsel of the enlisted team chiefs and installers in order to engineer projects. Many of the engineers don't have the experience, or time, to question the suggestions and advice provided them by the enlisted personnel. One team chief put this bluntly when he stated, "we have the experience and they [the engineers] are held liable for it…if it doesn't work it's on [the project engineer]."

Trust between enlisted installers and team chiefs seem to be a little less concrete. One team chief stated that he had little faith in some of the other team chiefs:

> "you come in here as a tech[nical] sergeant or master sergeant doesn't mean you have the knowledge for E&I…some tech sergeants they're pushing through I don't feel have the knowledge to do it; don't have the background to do it."

It seems doubtful that one could trust one's peer's abilities if they fail to respect the reason they are a team chief. The researcher has reason to believe that the installers pick up these "vibes" from the other team chiefs as well, thereby undermining the credibility of some team chiefs.

The civilians, on the other hand, feel they aren't trusted. This again comes from the fact that the commander fails to put them in positions of leadership/management. One squadron member stated they perceived "a civilian/commander barrier…in which

[his] advice isn't worth much." Also noteworthy was the perception some squadron members had that the commander would send an enlisted member to represent the squadron at crisis action team (CAT) meetings, conferences, and commander's calls, before he sent any of the civilians. Needless to say, the civilians feel no real value in what they contribute to the squadron, which can have a serious effect on trust.

The commander clearly recognizes that "it's a cultural thing." It's not that he doesn't trust civilians instead he bases his attitude towards civilians on the decisiveness of the military officers, "the biggest difference I see between the civilian chief and flight commander is that the officer will normally make the tough decisions while the civilian will take it to the squadron commander." The commander is also fundamentally a strong believer in placing military in charge for their professional development and the ability to deploy them in times of crisis, "when the balloon goes up the military goes [where] they are told; you have to ask most civilians."

The commander seemed receptive about the prospect of placing civilians in each section or flight for a long-term knowledge base, "the only way I would do this is by rewriting the job description and making them mission essential/deployable. If they are going to be in a flight or section that deploys…they will deploy."

Conflict Between Employees

Conflict between military personnel seems to be inherent to military culture. Since most military performance reports, awards, and decorations are based upon individual performance, it seems a certain level of conflict will always be present. Other than this competitive conflict no serious conflict seemed to exist between squadron members.

One area of interest was that of project engineering. The officers assigned to this section are mostly new to the Air Force and new to the communications and information career field. There seems to be a level of animosity between some of the enlisted team chiefs and installers and the officer project engineers. The officers rely on the knowledge of the enlisted personnel to perform their duties, but feel intimidated to have to ask for help. On the other hand, some of the enlisted are unwilling to help because they are "cocky" as one civilian stated, and feel engineering or communications officers "should know what they are doing." They leave the officers to make mistakes on their own.

One final area of contention was between civilian employees and their perceived uselessness in the eyes of military personnel and the squadron commander. Once again the civilians feel segregated from the rest of the squadron and feel what they do for the squadron isn't appreciated or understood.

Leadership Support for KM

The commander and a high level civilian both seemed extremely interested in implementing KM to improve business process within the unit. The researcher concluded this leadership would continue based upon the impressions of these key members.

Learning Initiative

There really isn't anything that could be considered a learning initiative currently at the 738th. Lessons learned aren't captured and shared, problems within sections seem to be handled haphazardly, and there doesn't seem to be a high priority placed on sending new engineers, installers, or team chiefs TDY on project installations to gain knowledge

required for their perspective duty. Many agreed that the best opportunity for learning occurred during project installations.

The 738th, however, does seem to make *training* a priority. They have an in-house *training* department that focuses mainly on standard installation practices and, as a core to their business, they select projects based upon squadron identified training deficiencies. One weakness in training seems to be that of properly training officer engineers for their wartime UTC taskings. For example, it was pointed out that a few military officer project engineers assigned to a radio UTC are currently engineering projects that aren't meaningful in providing training, and knowledge required for the wartime radio UTC and no other training is provided to them.

Adaptability to New Systems and Ideas

For the business this EI unit is in they really have no choice but to be able to adapt to new systems and ideas. There is no doubt the 738th is adapting to new systems and ideas. Recently in Afghanistan, during Operation Enduring Freedom, a deployed EI team had to rely on robotic trenchers to dig the trenches needed to bury fiber optic and copper cabling for base communications infrastructure. Hazardous explosive ordnance buried beneath the ground made the use of a conventional trencher a risk not worth taking.

One highly respected team chief is apparently an advocate of trying new things on installations; when he talked about doing new things on installations he stated "if it works, fine, if it doesn't say 'this is why it didn't' not 'this is the way we've done it for the past ten years.'" The same team chief recommended to his fellow team chiefs and installers to be "hands off" when training new airmen. When watching an airman

perform something unique, "nine times out of ten," he stated "it'll work and you'll learn something...I've learned more things from watching airman train."

Tolerance for Risk

There seems to be a high tolerance for risk within the squadron. To have the least experienced squadron personnel engineering multi-million dollar projects is clearly a risk. Since no projects have ever made it through the process with no mistakes, and some of those mistakes can be very expensive (one personally known to be in excess of $30,000) one would find it hard to argue that the squadron does not have a high propensity for risk. One good thing about these mistakes is that engineers and team chiefs aren't ever punished for making them. This is a clear indication that senior leadership won't punish those who are either learning or trying innovative things. There seems to be an accepted level of tolerance for well-intentioned errors.

One could argue that the commander sees placing civilians in charge of sections or flights as a risk. Many civilians believe the commander structured the squadron into the three flights, with either a captain or major in charge of each flight, because the he doesn't feel comfortable with the civilians' capacity to make decisions. Of the civilians interviewed one believed it was structured this way to provide an opportunity to professionally develop the officers of the squadron which was later confirmed by the commander. Another had a different perspective, "he's structured it because he doesn't want civilians in charge, he wants military in charge regardless of experience." That could be an indication that the commander doesn't want to risk placing a civilian in charge because of the unique wartime taskings of the squadron.

Having an Existing Strong & Positive Culture

It seemed that most of the squadron members, except for some of the civilian employees, had high morale. But without question all are committed to doing their best at what they do, even if they do feel "ill-prepared". The 738th has a great reputation and all members seem committed to maintaining that reputation. "We take a lot of pride in what we do," seemed to be a common response from those interviewed. There's no doubt this squadron lives up to its motto "With Pride Worldwide," and many commented on the fact that EIers are a "close knit bunch."

Key Subtask: Identify and Analyze Cultural Aspects of the Organization

A 1998 survey performed by knowledge management advocates found that the most important condition leading to the success of KM projects was the "knowledge-friendly" culture of the organization (Davenport et al., 1998). This step was excellent in identifying issues that may not be obvious to the leader of an organization.

Based on what was learned here, the 738th has some issues it may need to address prior to initiating any KM initiative. However, many of the issues may be eliminated once an initiative is initiated thereby providing an opportunity for better interaction between all members of the organization, better camaraderie between team members, and greater, measurable, organizational productivity, and, most importantly, better decision making by all.

It may be that many of the issues identified may be caused by the mere frustration of organizational members having to perform their duties while lacking the knowledge to do so. Others, specifically team chiefs, are frustrated because they are overworked for being too knowledgeable and therefore are always traveling. Also, the lack of a strategy

to best utilize the collective knowledge, in essence providing a "knowledge compass," may be the reason some areas and some people are overlooked or not properly managed. The organization appears not to know what it knows or know what it doesn't know.

While an initial assessment of culture was undertaken, the complexities of the concept suggest that more time could have been profitably spent in this area. The cultural issues under investigation in this step take much more data collection, consideration, and time to study than what was available to this researcher. None the less, the *Key Factors Affecting Decision Process* in this step were useful in identifying issues that may have otherwise been overlooked.

Based upon the interviews conducted and findings of this step, it may be fair to state that the 738th many not be "knowledge friendly" but rather "knowledge willing." Most believe they provide some value to the organization and have great pride in performance of their duties. A KM initiative that gives greater visibility to knowledge sharing and transfer between members may, in fact, help to create a culture that is more knowledge friendly.

Step 3: Identify Potential KM Project

As identified in Step 2 three potential opportunities for knowledge management were identified for the 738th EIS. These include the creation of a knowledge repository, improving the access to this repository and other knowledge resources, and realizing and managing knowledge as a resource. This section will outline some specific examples of projects that may be considered by the 738th for implementation considering the aforementioned opportunities and organizational culture issues identified. Each potential

project will be identified individually with its own set of *Key Factors Affecting Decision Process*.

Project 1: Creation of 738th Knowledge Library/Repository

One thing that may facilitate sharing is to codify, or put into digital format, everything that can be. Templates for common types of jobs with examples of how the package is developed may ease the burden on less knowledgeable squadron members. Operating instructions, technical orders, technical manuals, standard installation practices, and project reports may prove beneficial if they were to be all centrally located. An opportunity exists to implement a lessons learned and business best practices program that may provide considerable value to the organization. It is recommended that each package developed by the project engineering team be digitally recorded on a squadron server that all squadron members have access to. The military officer engineer could be responsible for ensuring lessons learned are documented and started from the beginning of the project from the site survey, project package development, installation, and quality assurance report (if available).

Along with the codified material, create a knowledge map of the organization and post it within the library to assist in identifying tacit knowledge "repositories." Identify knowledgeable team chiefs, installers, civilians, and project engineers and post their background, their specialty, their picture, and a contact number.

Many of these recommendations may be accomplished using knowledge management initiatives sponsored by the Air Force, specifically Air Force Knowledge Now website. It's recommended that the 738th EIS take advantage of the Air Force's Knowledge Management initiative and register a Community of Practice (CoP) for all

EIers. By doing this the 738th could store its digital knowledge repositories and knowledge map of squadron personnel with accessibility from the Internet, via the AF Portal, anywhere at anytime. Within this site, documents could be uploaded, searched by key words, and accessed by all squadron members. Another major advantage of implementing a CoP would be that the 738th could link with personnel that have PCSed by "inviting" them to join thereby allowing for the continued use of their knowledge. Of the many great features of the site, all members of a CoP would be notified, via email, when documents were uploaded, updated or removed. Members could participate in a community-based electronic discussion where questions or comments could be posted and be open to all squadron members for answers.

Key Factors Affecting Decision Process:

Senior Leadership Interest and Project Sponsorship

Senior support for any KM initiative would be required to give the project credibility.

Focus of KM Efforts on People and Processes, Not Technology

A knowledge repository would bring people together to work on common goals while encouraging trust building in each other and the codified knowledge. The primary purpose of the knowledge library would be to assist in the project engineering process. The technology provided by the Intranet, local servers, or the Air Force Knowledge Now website should only be viewed as an enabler for KM. It's important to remember that the repository would be for the future of the 738th, not just those currently assigned. People would be the end users of the repository; therefore it's recommended that the squadron

make an effort to identify what the people would want from the repository, not necessarily what would be easy or convenient for them.

Tie Potential KM Efforts to Key Business Process

The core business process of the 738th, the project engineering process, would be the main focus of the knowledge repository. Other processes within the squadron may also eventually benefit from the knowledge repository and include the project selection process and team chief review process.

Identify Scope and Desired Outcome of KM Effort

It is recommended that all knowledge requisite to creating project support agreements (PSAs) and engineering the entire individual project packages, no mater the commodity, be the scope of the knowledge repository. The desired outcome of the repository would be centrally located knowledge that is current, trusted, and strengthened through continued use by all squadron members. Also, it's strongly advised that the squadron focus on what may be useful to future members of the squadron.

Define Knowledge to be Utilized by KM Effort

Both explicit knowledge and tacit knowledge would be used by this project. Explicit knowledge would exist in the form of digitized documents or presentations, while tacit knowledge of all squadron members could be made accessible through the use of knowledge maps or community-based electronic discussion. Specific knowledge that could be used under this effort would be that which would be identified through an in-depth investigation of the knowledge required to support the project engineering process.

Develop Common Taxonomy of Terms

In conducting the interviews for this study it was apparent that most personnel had a firm understanding of terms commonly used to perform EI duties. However, since there is a high turnover of officer engineers it is recommended that a taxonomy of terms be devised and posted within the library. If the Air Force Knowledge Now site were to be used, a taxonomy of terms would already exist.

Project 2: Improving Knowledge Access

It was never clear in conducting this study why the personnel that were ultimately responsible for developing the entire project package were the most inexperienced military officer project engineers. Throughout the project engineering process the engineers have little or no direct oversight by the more knowledgeable or experienced team chiefs or installers. The military officers assigned to develop the project packages have only a fraction of the technical expertise required for many information and communications systems they are responsible for engineering.

One of the chief complaints of project engineers was that they didn't have access to knowledgeable team chiefs when they needed it most. One solution to this would be to create project teams consisting of a military officer engineer, team chief, civilian engineer, and installer(s). This team could be formed upon selection of the project from the TFG or customer and would work collectively to complete the PSA and project package. The team would not be dissolved (no TDYs, unless emergency/UTC tasking) until package is submitted for review. This team concept would not only decrease the time it takes for a project to be developed, but it could also allow for mentorship between

officer/enlisted/civilian which, in itself, is a knowledge management initiative that could help to professionally develop squadron personnel.

Currently, not all information on the squadrons severs are available to all members of the squadron. One recommendation would be to ensure permission is granted for all information unless prohibited by Privacy Act or classification. These permissions, along with the centrally located knowledge repository, may improve access and promote more efficient use of the available squadron knowledge.

Accessibility may also be provided through use of long-term civilian "super team chief" positions in all sections. This could help in the creation of a long-term knowledge base familiar with all projects and this member would act as a liaison between sections. These team chiefs would also be able to oversee those less experienced in certain tasks and also ensure the workload is distributed evenly and appropriately based upon an employee's background.

Key Factors Affecting Decision Process:

Senior Leadership Interest and Project Sponsorship

Senior support for any KM initiative would be required to give the project credibility.

Focus of KM Efforts on People and Processes, Not Technology

The project team and "super team chief" concepts would facilitate the collaboration of squadron personnel to influence the transfer of critical knowledge needed to engineer projects. There would be little use of technology in this project, except that which would be used to develop the required documents for the project.

Team collaboration and mentorship are proven methods of knowledge transfer and creation.

Tie Potential KM Efforts to Key Business Process

This proposed project would be an effort to achieve the greatest success in the project engineering process by bringing the right people together at the right time for the right reason; the project engineering process is the core business process of the 738th EIS.

Identify Scope and Desired Outcome of KM Effort

The scope of this project would be to bring the requisite knowledge together to engineer the project package through increased knowledge transfer, knowledge use, and mentorship between squadron members. The ultimate outcome would be increased process performance, less mistakes in project packages, better team cohesion, and knowledge transfer between personnel.

Define Knowledge to be Utilized by KM Effort

The main knowledge used in this proposed project would be tacit knowledge. Most of what the experienced installers, team chiefs, and civilian engineers bring to the table would be what's contained within their heads. Assembling a team for a common goal effectively utilizes personal experience that could be difficult, if not impossible, to capture otherwise.

Develop Common Taxonomy of Terms

Some new terms that may need to be added to EI terminology could include those necessary to identify the structure of the project team, team member responsibilities, etc.

Other taxonomies include those required to assist in the storage, access, and use of project data on the squadron's network.

Project 3: Recognize and Manage Knowledge as an Asset

Many civilian organizations have been successful in achieving this goal by treating knowledge like any other asset and presenting it on their balance sheets (Davenport et al., 1998). Military organizations could begin to achieve similar results by simply acknowledging the knowledge and experience of their people and where, within the organization, it resides. Most military commanders pay particular attention to money distribution throughout an organization, but don't give a second thought to their knowledge distribution. Money alone won't engineer, install, troubleshoot, or support the projects as outlined in the squadron's mission. This project could simply provide the military commander and civilian leaders a new perspective in which to view their organization.

Key Factors Affecting Decision Process:

Senior Leadership Interest and Project Sponsorship

Senior support for any KM initiative would be required to give the project both visibility and credibility. A project team assembled to identify the organizations knowledge may be necessary.

Focus of KM Efforts on People and Processes, Not Technology

Focus on the personnel in the organization that have the experience and knowledge and where they are located in the organization. The knowledge to identify would be that which is necessary for project engineering success, from beginning to end.

Other processes of the squadron could follow; however, the project engineering process would be the main focus of this effort since it is the 738th's core business.

Tie Potential KM Efforts to Key Business Process

This proposed project would be an effort to achieve the greatest success in the project engineering process; the project engineering process is the core business process of the 738th EIS.

Identify Scope and Desired Outcome of KM Effort

The desired scope of this project would be to generate a greater understanding and organizational acceptance of knowledge as a resource. The desired outcome would be increased knowledge owner awareness and its management in supporting key business processes.

Define Knowledge to be Utilized by KM Effort

Knowledge to be used under this project would include all organizational knowledge, both tacit and explicit. Tacit knowledge could be more easily overlooked since it is more difficult to identify and capture and some may be reluctant to share.

Develop Common Taxonomy of Terms

The squadron would need a thorough understanding of many of the terms and concepts identified in Chapter II. A well structured fact sheet on KM would be beneficial to share with squadron members.

Key Subtask: Identify Type of KM Effort to Pursue

It is clear from the data that the reuse of organizational knowledge would be the preferred direction for the KM initiative for the 738th EIS. The implementation of a knowledge library, or knowledge repository, seems the best method of KM to pursue.

Most of the knowledge needed to complete project packages can somewhat easily be codified and stored for reuse and the use electronic discussions could enable the access and use of the tacit knowledge of experienced personnel. It is recommended that standard templates for the different commodities be constructed by trusted sources and their use advocated.

As one team chief recommended common folders for each project should be developed for each project. The folder and contents could be either electronic or hardcopy. The folder could contain site survey results, notes, drawings, project requirements, pictures, etc. that are accessible to all squadron members.

Step 4: Identify Potential KM Project Variables Affecting Implementation and Success

This step will allow for the researcher to identify potential KM variables affecting implementation and success of the potential projects identified in Step 4. This step will only cover project variables for Project 1.

Project 1: Creation of 738th Knowledge Library/Repository

Key Factors Affecting Decision Process:

Senior Leadership Interest and Project Sponsorship

Just as in any new initiative any military organization undertakes senior support would be crucial. Senior support for any KM initiative would be required to give the project both visibility and credibility. It is recommended that members feel confident that this initiative could provide value to the organization and that it would receive full attention from management. The commander agreed and offered his complete support

but with some conditions "timing is key…because of the AFMC to ACC transition I wouldn't support a KM effort until the 'dust' settles. [Too] much change [too] quickly."

Requirement to:
Capture and Codify Desired Knowledge

Capturing and codifying what the 738th needs to engineer its projects would be the key of this project and it is recommended that this become an integral part of how it conducts its day-to-day business. Care should be taken to ensure this codification process is as non-intrusive as possible to the knowledge providers and the time required to do so is kept to a minimum. Desired knowledge could include team chief/project engineer initial notes/pictures from site survey, project support agreements, project packages, lessons learned and best business practices, etc.

Share Knowledge (Tacit and Explicit)

Once the repository is established it could be shared easily to all squadron members. Best practices and lessons learned are key tacit knowledge resources; these resources would provide an opportunity for the entire organization to learn from the experiences of others. Membership in a CoP would allow for sharing of critical information and knowledge via an electronic library, uploaded documents, and links to pertinent web-sites. The CoP could also allow access to critical tacit knowledge through features that facilitate community-based electronic discussion. Methods of recognizing those that share their knowledge may be incorporated and members that share should never feel their jobs are in jeopardy. Many believe in the old adage that knowledge is power; that paradigm needs to be breached through advocacy for sharing.

Access Knowledge

To be successful the library must be accessible to all squadron members all the time. One benefit of using the Air Force Knowledge Now website would be that the site could be accessible twenty four (24) hours a day, and accessible from sites other than .mil through the Air Force Portal. One downside to this, however, may be the reliability of the AF Portal. Members at the AFKN site state the reliability of their site is excellent, but they, too, worry about the reliability of the AF Portal. This capability could provide an advantage over the 738th's IT infrastructure which currently doesn't enable VPN capabilities. Some variables that could affect the success of this project are those which are out of the control of the squadron and include network downtime, quality of service issues, power outages, etc.

The repository through AFKN would not only allow world-wide access to critical captured knowledge, but it could also facilitate the use of the tacit knowledge of those squadron members away from home through the use of electronic discussion.

Reuse Knowledge

The library, or knowledge repository, would allow for reuse of key organizational knowledge pertinent to the project engineering process. Best practices and lessons learned could ensure the knowledge being reused is the best and most trusted available. To receive the greatest value, the squadron should advocate the reuse of internal knowledge whenever possible.

Create New Knowledge (Collaboration & Knowledge Sharing)

Knowledge creation is usually the direct result of knowledge sharing or collaboration. When existing knowledge is transferred to another member of the

organization the creation of knowledge has occurred. This creation can lead to further organizational knowledge creation as new EI techniques and procedures are openly discussed and shared. It is recommended that members be rated and openly praised for what they share and not what they know or "hoard."

Develop Project Goals, Expected Outcomes, & Performance Measures

This would have to be something the commander and civilian leaders determine. The researcher feels the goal of this project would be to create a knowledge repository of everything imaginable that is required to engineer projects. Performance measures could focus on how the KM effort has affected business processes and not how large the repository is or how often it is used. Expected outcomes and performance measures would have to be a decision the commander, and his/her staff, agrees upon. The key things to remember are--Why are we creating this repository and for whom?

<u>Key Subtask</u>: Identify Key Project Variables that will affect Project Implementation & Success

To ensure all squadron members take part in the knowledge repository initiative it must be easy to use, non-intrusive to employee's normal daily operations, and not time intensive. The majority of time could be spent up front in the initial stages of implementation creating a trusted and comprehensive repository. Once established, members would gain a greater appreciation for the repository as the knowledge within could be reused, shared, and built upon with little effort. It is recommended that efforts of the knowledge repository always be focused on providing support to and improving the project engineering process.

As with any change an organization undergoes the squadron commander and senior civilian managers need to stay actively engaged with the process and remain active participants. If management fails to use or advocate the use of the repository it could fail. Management could improve the chance for success by being clear and concise when detailing to squadron personnel the desired outcome of the KM project. Motivational practices could be incorporated to encourage use of the repository by squadron members. It is urged to focus awards and praise on promoting a sharing and not a "hoarding" culture.

When relying on communications over the computer network, it is advised that the squadron plan for unexpected downtime. If squadron members aren't accessing the Internet from a .mil site, with reliability problems at the AF Portal, access to the AFKN website may not always be accessible. However, it has been determined that .mil sites can expect greater reliability. The key would be to allow for flexibility and not to rely only solely on AFKN when teams are deployed or on an installation.

To summarize, some key variables that could affect project implementation and success include:

- There must be a direct link to improving project engineering process
- Members must be motivated to use repository; change the "hoarding" culture
- It is advised senior management stay engaged and communicate clear purpose
- Network downtime must not impede knowledge transfer; be flexible

Step5: Identify Success Factors for Project Variables

This step will help to identify the factors that may make the knowledge repository project more of a success. These success factors are based solely upon the knowledge

repository project. This step will conclude with the final project selection and suggested implementation strategies.

Key Factors Affecting Decision Process:

Senior Leadership Interest and Project Sponsorship

As with any change an organization undergoes the squadron commander and senior civilian managers need to stay actively engaged with the process and remain an active participant. If management fails to use or advocate the use of the repository it could fail.

KM Project Should Provide Substantial & Measurable Value to the Organization

There are numerous methods to measure value to the organization from the knowledge repository. One source of value to the organization may be the decrease in time it takes to engineer projects. This could allow more time to train for wartime mission requirements. Other value may come in the form of decreased mistakes in project packages. Decreasing mistakes may result in greater reputation for the 738th, less customer frustration, less critical communication system downtime, and greater financial savings to both the customer and the 738th.

People may feel a greater sense of pride and value in their contribution to the goals of the squadron if they are commended for using the KM system. Value may manifest itself as greater morale and esprit de corps, something that has reportedly been decreasing at the 738th in recent years.

Employee Compensation Structured to Encourage Employee Utilization

This isn't always possible with military employees. However, other options such as compensation time off, recognition awards, and structuring in-house award systems to honor and recognize those that participate in the initiative can be utilized to encourage repository use. Of the civilian companies that have received great results from their KM initiative, one promoted it best by giving away laptop computers to the top "knowledge sharers" (Davenport et al., 1998). Although this may not be possible to a military organization a PALM Pilot or similar incentives may be a suitable alternative. Simply, the squadron could be creative and make awards meaningful to squadron members and worth achieving.

Policies & Guidance Developed to Support & Encourage KM Use & Acceptance

Implementing policy may promote the long term use of the knowledge repository. Policy could outline management support, procedures for use, archival plans, and measurements on use of the repository. Any additional in-house policy regarding civilian and military decorations, awards, performance reports, etc., may be updated or revised to include provisions for identifying and promoting those that participate in knowledge sharing and knowledge repository usage.

Tie KM Project to Business Process

The knowledge repository would be directly related to the project engineering process. In the long-term other process may benefit from the KM project.

KM Project is Focused on People & Processes, not Technology

The focus of the repository should be on maintaining a knowledge base for future squadron members. When building the repository it's important to be conscious of the people that will be using it most and base its content design with them in mind. Those using the repository would be current members of the squadron and those members that have PCSed but still have critical knowledge. It could also be utilized by the 19 Air National Guard EI units thereby greatly enhancing the depth and breadth of available knowledge. The knowledge base of the system could ensure knowledge accessibility to those members directly engaged in the project engineering process, from the moment the project is accepted from the customer to the point the customer accepts the installed project.

The technology used in the repository should always be viewed as nothing more than an enabler to any initiative. It is strongly recommended that if the technology should fail other options are available to facilitate the accessibility and transfer of knowledge core to the project engineering process.

Identify & Map Tacit & Explicit Knowledge Repositories

The primary purpose of this project would be the actual codification of the explicit knowledge needed to support the project engineering process. It is recommended that the squadron perform an in-depth knowledge audit of what would be required for this process. The analysis of the explicit knowledge could include team chief and project engineer initial notes/pictures from site survey, project support agreements, project packages, Air Force Instructions, Major Command Instructions, Standard Installation

Practices Technical Orders, communication product manuals, lessons learned and best business practices, etc.

Additionally, all tacit knowledge could be identified and be made accessible through the use of a knowledge map and community-based electronic discussions. The community-based electronic discussions could assist the project engineer while the assigned team chief is TDY or deployed to another project. These open discussions could also be beneficial in pooling the entire organizations knowledge in making decisions on difficult projects.

Can KM be Implemented Within Current Organizational Structure?

This project could be implemented with the current organizational structure. The IT structure, on the other hand, if the 738th elects to provide the repository in-house, would have to be re-structured to provide READ/WRITE access to common folders assigned for project engineering. Also, technology to enable VPN or remote access capabilities from any location in the world would have to be addressed. However, long-term planning may include an organizational re-structure to include at least two civilian positions per element to provide personnel with a knowledge base.

Key Subtask: Finalize KM Project Selection

The final KM project selection proposed to the 738th EIS would be the launch of a knowledge repository for use throughout the project engineering process. This knowledge repository could be maintained in-house at the 738th on available IT resources, or through establishing an on-line Community of Practice (CoP) on the Air Force Knowledge Now (AFKN) web site which has recently received recognition as the

Air Force Center of Excellence for Knowledge Management by the Chief Information Officer (CIO) of the Air Force (Gilligan, 2004) .

According to the Knowledge Now web site a Community of Practice workspace:

> Provides a web-based collaborative environment where members of a group use shared information and administrative and communications tools to conduct business, manage a project, keep abreast of important group issues and solve group problems. You can choose your CoP capabilities, revise its structure, and manage your content (AFKN, 2004).

Establishing a Community of Practice (CoP) on AFKN would allow the following capabilities, anywhere and at anytime for the 738th (AFKN, 2004):

- Document posting/sharing (searchable)
- Discussion area (searchable)
- CoP points of contact email directory
- Search of CoP documents and selected websites
- Knowledge owner control/update of web links on CoP pages
- Calendar with daily/monthly/yearly views
- News ticker
- Mailing List
- Change alert feature
- Selective access option

These services would all be available to the squadron at no expense. It is suggested that a team of individuals be assembled, at least one from each section/element, to act as a knowledge team to identify knowledge needed for their prospective section/element and selected sources. This team would also ensure web links

and email directories in the CoP remain current. A key to remember, though, is that access from a network other than .mil would have to be through the AF Portal. Squadron members would need a Portal account.

Where feasible, everything that can be codified, or put into digital format, should be. It is recommended to have templates developed for common types of jobs with examples of how the package could be developed. To improve accessibility it is advised to have all operating instructions, technical orders, technical manuals, standard installation practices, and project reports centrally located. To improve procedures and processes a lessons learned and business best practices program could be implemented. It's recommended that each package developed by the project engineering team be digitally recorded on a squadron server that all squadron members have access to. The military officer engineer would be responsible for ensuring lessons learned are documented and started from the beginning of the project from the site survey, project package development, installation, and quality assurance report (if available).

Along with the codified material, the squadron could create a knowledge map of the organization and post it within the library or within the AFKN work area to assist in identifying tacit knowledge "repositories." Identify knowledgeable team chiefs, installers, civilians, and project engineers and post their background, their specialty, their picture, and a contact number.

Research Question Answered

The research question for this effort was:

How well does the Bower-Phillips decision framework support an organization's decision making process for selecting specific knowledge management (KM) projects?

The researcher and key case study subjects found the framework to be useful in identifying KM opportunities and potential projects in the real-world setting at the 738th EIS. It's important to note that most members interviewed had no previous background on the subject of knowledge management; however, each had a fair comprehension of the basics and an awareness of its importance.

The Bower-Phillips decision framework was extremely beneficial in focusing data collection efforts to determine knowledge management opportunities and potential projects for the AF organization under study. The *Key Factors Affecting the Decision Process* within each step were instrumental in identifying specific areas of investigation in pools of data. These key factors kept the focus of the investigator and key informants on track and the *Key Subtask* of each step ensured those participating in the study achieved the desired outcome of the overall step.

Upon reviewing the findings of the case study the commander of the 738th EIS stated that he was extremely pleased with the information the study provided and that he was interested in a few of its recommendations. Specifically this commander was "most interested in capturing organizational knowledge, establishing post-job formal feedback, and improving [quality assurance] QA information flow." The way the data were categorized using the framework appeared to support the decision capacity of this

commander. Therefore, within the context of this case study, the decision framework can, in fact, be useful to those organizations wishing to implement KM.

Each step encompassed the specifics of the practice of knowledge management consistent with current KM practice as detailed by practitioners and discovered in the initial literature review. When implemented in this case study, the framework supported the commander's process for identifying and selecting a KM project.

V. Discussion

Chapter Overview

This chapter will discuss the findings of the case study, address limitations specific to the study, and outline recommendations for future research.

Discussion

The Air Force has outlined knowledge management as one if it's goals as detailed in the Air Force's Transformation Flight Plan, Information Resources Flight Plan, and Information Strategy, but it falls short of providing any guidance to subordinate organizations (AF/CIO, 2002, 2004; HQ-USAF/XPXC, 2003). Absent an Air Force level knowledge strategy, knowledge management strategy, or knowledge management framework and as Air Force organizations look to implement knowledge management, commanders and managers need a comprehensive "roadmap" to assist in identifying potential KM opportunities.

It appears from this effort that the decision framework developed for identifying and selecting KM initiatives designed in March 2001 by the research effort of Captain William Bower and subsequent additions to the framework by 1st Lt Jeffrey Phillips can be used to assist the decision process to identify and select potential KM opportunities in an Air Force organization.

As stated previously the findings of this research were forwarded to the commander of the 738th EIS in an effort to elicit feedback on the usefulness of the results. This feedback process was deemed an appropriate measure given that the researcher was the primary instrument in this study. The framework appeared to aid the decision process of the researcher in identifying and selecting KM projects for the 738th

EIS, but it was believed that the study would hold greater value if the commander agreed with the researcher's conclusions. An agreement between the researcher and the commander could be considered credible evidence of the validity and usefulness of the framework. The commander and researcher were in agreement with the findings.

Observations on the use of the Bower-Phillips Framework

The key factors affecting decision process within each step were all supportive of focusing data collection and ensuring successful completion of each key subtask. Initially it seemed that there were too many key factors within each step, but as the interviews progressed and the raw data were placed into the matrices developed it became evident that the analysis became less difficult. Although some of the key factors affecting decision process seemed impossible to answer, for example in Step 1, *Future Knowledge Requirements*, and Step 2, *Value of Tacit and Explicit Organizational Knowledge*, they would at least invoke deep thought by the practitioner or user of the framework in a topic otherwise potentially overlooked or rarely considered.

As stated earlier, this framework, in essence, is itself a KM initiative; it incorporates the collective knowledge management principles and success factors relevant in current KM literature. The key factors appeared to agree with existing KM literature and existing KM frameworks found during the literature review. The overall usefulness in data collection in a real-word setting was supported by this effort.

The key factors found to be the most important within the framework were senior leadership interest and project sponsorship, analysis of current business processes, and organizational culture. These seemed to be the main focus throughout the data analysis

phase and without a good understanding of these three factors potential KM opportunities would be difficult to judge.

One general observation, and recommendation for future KM frameworks, would be to change the title *Key Subtask* of each step to *Step Objective*. The term *Key Subtask* is slightly misleading and leads the user to believe there are other subtasks to be completed when, in fact, it really isn't a key subtask it is the overall goal of the step.

Observations for Step 1:

It may be valuable to provide a more clear definition of a knowledge strategy. The knowledge strategy is the notion of a knowledge-based strategy or competitive strategy constructed around an organization's intellectual resources and capabilities (M. H. Zack, 2002).

It seems apparent that many military organizations, as found within this study, may equate the knowledge strategy more with their training policy. Without greater direction provided at the Air Force level it isn't surprising that a knowledge strategy remains a nebulous concept. If the knowledge strategy is basically defining what the organization needs to do with its knowledge resources to be more effective, then some focus and tie-in with the military organization's mission and vision is necessary. Rightfully so, establishing a knowledge strategy is the very first undertaking of this framework and it should guide any KM initiative.

It may prove beneficial to analyze current business processes in Step 1 instead of in Step 2. The key to knowing what knowledge an organization needs for the future will be dependent upon the organization's key processes. Identifying processes early in the model can also assist in identifying those processes that are candidates of re-engineering

to provide better value to the organization and customers (which the 738th actually has). It is also widely accepted that KM should focus more on the processes themselves than the end result (Bower, 2001).

Observations for Step 2:

The key factor entitled *Potential to Create a Learning Organization* is covered more in-depth in Step 3. It may be more practical for the practitioner to consider this with the other organizational culture factors in Step 3.

Observations for Step 3:

It is the belief of this researcher that this step is the ideal location to include a key factor for identifying a knowledge management strategy. Once the KM project has been identified the knowledge management strategy will guide and define the processes and infrastructure for managing knowledge (M. H. Zack, 2002). It is also advised that this knowledge management strategy ultimately tie back to achieving the knowledge strategy identified in Step 1.

The key factor entitled *Learning Initiative* is a repeat from the key factor entitled *Potential to Create a Learning Organization* in Step 2. As recommended above, this key factor can be removed from Step 2 since this rightfully falls within organizational culture.

Observations for Step 6:

This step included a key factor entitled *Employee Compensation Structured to Encourage Employee Utilization.* This step isn't realistic in a military organization if it's taken in the context of financial compensation. Other factors, however, can be implemented and include structuring performance reports and recognition awards to

fulfill this requirement. Therefore, it is recommended that the somewhat unsuitable title be changed to something like *Motivational Factors*.

Significance of Research

Using this theoretical framework in a real-world field environment demonstrated its usefulness. Each step of the framework encompassed the specifics of the practice of knowledge management consistent with current KM practice as detailed by practitioners and discovered in the initial literature review. In the absence of an Air Force level framework encompassing knowledge management, this framework will ensure those organizations looking to implement KM have a tool that may lead them through a successful initiative.

The step by step process and key factors within each step, clearly aided the researcher with data collection and analysis. It is believed the concepts of the framework can be utilized by commanders and senior level managers that possess a formal management education or background.

Limitations of the Research

It should be known that the researcher for this case study had previously been assigned to the 738th EIS as a project engineer. As prescribed by Yin, the researcher should give considerable effort to "be unbiased by preconceived notions" (2003). A certain level of bias may have been present although efforts were made to remain objective throughout this research.

Also, throughout this case study there was only one researcher. Yin states that numerous researchers are beneficial in data collection when:

1. a single case calls for intensive data collection at the same site, requiring a "team" of investigators;
2. a case study involves multiple cases, with different persons being needed to cover each site or rotate to the others sites; or
3. a combination of the first two conditions (Yin, 2003)

Only one researcher was available to travel to conduct this case study over what was scheduled to be one week, but turned out to be two days. All of the data collection and interviews were performed by the single researcher at the site selected for the study. Care was taken to carefully plan the site visit given that proponents of case study research agree that a single case study researcher may be sufficient if a sound methodology and a well designed case study exist prior to data collection (Yin, 2003). Additional researchers may have been beneficial during data gathering and analysis due to the time constraints encountered and the amount of information collected.

An additional limitation of this case study is replication. Although this effort used a framework that provides a set of parameters in which to gather data, the results achieved by another organization using the same framework may not be comparable to those obtained in this effort (Leedy & Ormrod, 2001).

Recommendations for Future Research

If the 738th EIS implements a proposed KM project as a result of this effort, it would be valuable to revisit the squadron and assess the success of its initiative. This will help guide future research on the model/framework and specifically Steps 4 and 5.

In this effort, the researcher investigated an organization and applied the data gathered to the steps of the framework. A follow-on case study could be one that the researcher observes an organization and its subjects as they perform an internal investigation using the same Bower-Phillips framework.

Further research needs to focus on the development of an overarching Air Force knowledge strategy and knowledge management strategy. Both are instrumental to the success of any KM effort. In the absence of these, no framework or initiative will have credibility without support from senior AF leadership.

Currently the Air Force relies heavily on the Air Force Knowledge Now (AFKN) site for KM implementation and Community of Practice (CoP) management. Further research needs to analyze how this framework compares to the theoretical basis of the AFKN Workshop. The Workshop is available to organizations wishing to implement a CoP; a team of experts from AFKN travels to the organization to assist with the development of a KM effort. Research should compare/contrast this framework with AFKN Methodology.

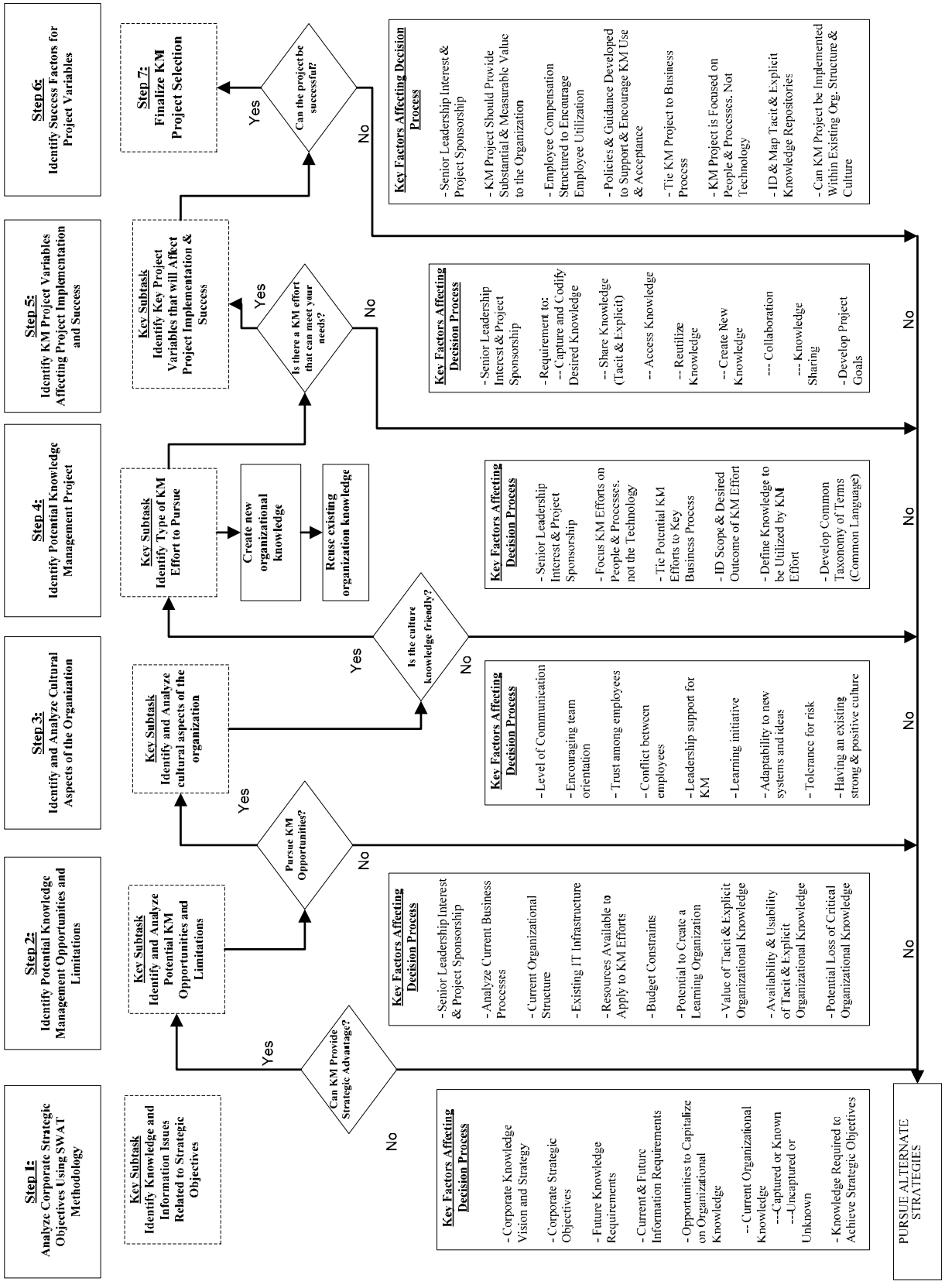
Finally, future research is needed on military and Air Force culture. More specifically, a review of factors that are within performance reports should be changed from an individual perspective to how that person shares, collaborates, mentors, etc. for the benefit of a group or organization. Since one of the major factors contributing to the success or failure of KM initiatives relies upon people and how people interact, efforts need to be made to encourage their participation while not preventing them from promotion and successful military or civilian careers.

Conclusion

The explanatory case study performed to test the theoretical foundation of the Bower-Phillips decision framework proved that the framework can be useful to an organization's decision makers in identifying and selecting KM opportunities. The

framework should *not* be considered all inclusive and should evolve and be updated as KM in the commercial industry, the Air Force, and the Department of Defense matures.

Appendix A: Bower-Phillips Decision Framework



Appendix B: Interview Guide and Questions

Overview

The purpose of this guide is to simply provide a "window" into how the interviewees were selected, the procedures and administration of the pre-interview process, and how the interviews were conducted. Also included is a list of the initial and follow-up interview questions.

Selection of Interviewees

Those selected to participate in this qualitative study were purposive rather than random (Miles & Huberman, 1994). The initial choice of informants was based upon the perceived openness of the informant to discuss the issues under study. These initial informants led the researcher to additional key participants. All participants were volunteers and their participation was confidential.

Pre-Interview Process

The researcher discussed the nature of the study and gave a simple overview of knowledge management with each individual informant. A handout covering the Bower-Phillips Model was provided and discussed in detail. Each participant was a volunteer and reassured they would remain anonymous throughout the study. They then read and signed the following (all documents are included as attachments):

- Informed Consent for Research on Identifying Potential Knowledge Management Opportunities for the 738th EIS
- Informed Consent for Quoting Interview

Conducting the Interviews

The interviews were conducted individually in a place comfortable to the informant (usually their office). The interview was audio tape-recorded to allow the researcher the opportunity to focus on what was being said, read facial expressions, and ask follow-up questions without having to stop to take notes. The researcher followed a combination of the unstructured general interview guide approach, in which the same general areas of information are collected from each informant, and the informal, conversational interview in which the researcher remained open and adaptable to the interviewee's nature and priorities (Valenzuela & Shrivastava, 2003). The length of each interview ranged from thirty (30) minutes to one (1) hour and thirty (30) minutes.

Initial Interview Questions

The interview questions were developed by the researcher to facilitate some of the data gathering and analysis on knowledge management (KM) without always using the term "knowledge management." Since KM is still not a widely known concept, a conscious effort was made to remove nebulous and confusing terms. The questions were carefully drafted based upon the researcher's intimate knowledge of the squadron and the concepts of KM contained within the Bower-Phillips Model. As recommended by Valenzuela & Shrivastava these were semi-structured interviews that contained questions that were asked to simply facilitate follow-on questions (2003). While some of the initial questions focused primarily on squadron demographics, mission, and work processes a number of questions focused on the usability of the Bower-Phillips Model.

Generic Demographic/Mission:

- When did you arrive at the 738th?
- When are you scheduled to leave the 738th? Do you plan to separate, retire, or PCS within 2yrs, 4yrs, 6 years?
- What is your AFSC?
- What flight/division do you work in? What is your function?
- Are you a team chief?
- How long did it take you to become a team chief? What is the process?
- Do you know of any fellow E&Iers that aren't TC but should be? Why are they being held up?
- Are you on a UTC?
- Have you attended the Lightning Force Program? Thoughts?
- Approx how many days were you TDY in the past year?
- Have you deployed in support of Operation's Enduring Freedom (OEF) or Iraqi Freedom (OIF)?
- Where were you deployed to? (Note all places with associated dates)
- Does E&I work independently of any deployed comm.?
- Were you aware of any Guard E&I units operating in close proximity to your unit? (If Yes, please list all, where they were and how you knew about them)
- Do you always have computer access when TDY?
- Did you have computer network capability at your deployed location?
- Did you have SIPRNET access? STU-III? SAT Phone (Irridium)?
- How quickly were you “on-line” after your arrival?
- Does E&I use a community of practice?
- What knowledge resources do you rely on most when deployed or TDY doing your job? TOs, people, other units, other comm./guard units?
- How often did you use actual SIPTOs/TOs for operations?
- What other sources of knowledge would have been most beneficial to you in the field?
- Have you ever been TDY, encountered a problem, to return home and realize somebody at the 738th had the answer?
- Did you file any kind of incident reports while you are TDY/deployed?
- Do you file an after actions report, lessons learned, etc., upon your return from TDYs/deployments? If so, where did it go and how is it shared with other flights/departments/Guard units?
- How did you file them and where did they end up?
- Do you have access to Guard units lessons learned?
- If you had access to other units reports, what main areas of the report would be of most value to you?
- What is the main reason for the completion of lessons learned/trip reports? In their current form/use do you believe they are useful?
- Did your commander or senior official advocate filing reports/lesson learned? Is it governed by policy?

- Do lessons learned/after action reports ever make it to the Lightning Force Program?
- How well did you communicate with Guard E&I units? What about when you're TDY?
- How did you train prior to deploying?
- Do you feel you were properly trained for the scenarios you encountered?
- What could have made your training better?
- When you personally have a question about something, where's the first place you go? People, TO, Intra/Internet, TOs, CDCs?
- How well do civilians/military interact? share knowledge?
- Are civilian needs different than military?
- Do civilians serve on UTCs? For what skills? How are they selected for UTCs?
- How often do military/civilians deploy/TDY together?
- Talk me through a typical day at the 738th.

Project Engineers:

- Whom do you seek out when engineering a package? Why?
- How long does it take to engineer project? Average?
- Why the current process of officers engineering projects? Does this process provide the most value to the customer/unit?
- How are projects prioritized?
- How is it determined whether or not project is to be engineered by enlisted TC/officer?
- How long (avg) has TC been doing E&I/comm.?
- How long (avg) has officer been doing E&I/comm.?
- Where does expertise in AutoCAD, MicroStation reside?
- Reference data for drawings? Is there still only one hard copy, do people know how to access them @ the 38th? Why not create a direct link from the Intranet site?
- How often do you re-use project support agreements/project packages?

Commander--Operations

- What is the mission of the 738th?
- Where do you see E&I in 5 years?
- How is E&I different from combat comm. units?
- How does what E&I does during peacetime prepare them for war?
- How does the 738th decide which projects to select from the TFG? Possibly limiting it's knowledge base?
- How is it determined what the 738th can/can't do?
- Who determines what TC/personnel will work on which projects?

- What are the decisions based on? Who makes the decision; what if they weren't available?
- Are projects that have found to be a challenge to E&I, either at war or home (through lessons learned/trip reports), reaccepted for additional projects? Are these targeted for additional training?
- Why is the organization structured the way it is?
- When is the 738th going to fall under ACC? What efforts are underway to account for this transition? (AFIs, ACCIs, etc)
- How will this effect AEF rotations?
- What AEFs does the 738th currently support? How many UTCs?
- QA reports--"best seen"/"unacceptable" practices shared throughout squadron? Briefed/Trained in Lightning Force Program?
- How many ECRAs per package (avg)? When officer engineers? When enlisted TC engineers?
- How many mistakes in past year? How did it/could it have cost the customer/738th?

Commander email Follow-up Questions

- Do you have a copy of the E&I Strategic Plan? (Can I possibly get a copy?)
- Do you foresee any budget cuts once the 738th transfers to ACC?
- Do you foresee any manning changes once the 738th transfers to ACC?
- What are your thoughts about placing civilians in charge of flights or other high level positions? What would be the main reason you wouldn't place civilians in charge?
- I've noticed all flights have an officer in charge. Is this mainly for the officer's professional development or do you feel more comfortable with having a military chain of command?
- What value do you place on civilian positions?
- Have you ever considered asking the 38th for additional civilian positions?
- Have you ever considered placing civilians in each section/flight for a long-term knowledge base?
- How well do you feel the squadron communicates across flights?
- How would you judge the current morale based upon the high ops tempo?
- Do you feel there's something the squadron should be able to perform that it currently isn't capable of performing? For example, is there any technology that the 738th currently can't support based upon lack of experienced personnel?
- Have you ever disciplined any squadron personnel for taking risks or making an error while on duty (other than gross negligence or serious discipline issues)? For example, ordering a wrong part on a project package or trying something new on an installation and something bad happens?
- Knowledge management (KM) relies heavily on senior level support for its success. Would you be willing to support a KM effort by encouraging its use and,

if necessary, incorporate policy or develop a knowledge team or knowledge owners to manage the squadron's effort?
- Do all squadron members have an Air Force Portal account?
- Were you aware of the Air Force's Knowledge Now website?
- Did you know that you can create a Community of Practice (CoP) on this site, *free* of charge, *unlimited* storage capacity (any type of files)? (This would allow collaboration among squadron members, worldwide, anytime through the AF Portal…)

Framework Specific Questions (General)

- What is your initial impression of the Model?
- What key factors affecting decision process within each step of the model are easiest to understand? Most difficult?
- If you were tasked to use this model to identify potential knowledge management opportunities for your squadron could you?
- What, if any, key factors affecting decision process can be added, modified, or removed for accuracy, clarity, and ease of use of the model in identifying potential knowledge management opportunities?
- Are any of the terms in the framework new to you?
- How can data collected using this framework influence your decision making ability?

These questions were prepared to facilitate discussion about specific steps of the framework if an interviewee needed clarification on the Key Aspects Affecting Decision.

Step 1-- Analyze Corporate Strategic Objectives Using SWOT

(Strengths, Weaknesses, Opportunities, Threats) Methodology

- What are the strategic objectives of the 738th?
- What knowledge do you feel is required to achieve these objectives?
- Do you know if the squadron has a corporate knowledge vision & strategy?
- What do you feel are the future knowledge requirements of the 738th?
- Where does the current organizational knowledge reside?
    - Captured or Known
    - Uncaptured or Unknown
- What are your current & future information requirements?
- Do you know of any specific opportunities to capitalize on organizational knowledge?

Step 2-- Identify & Analyze Potential Knowledge Management

Opportunities

- Do you feel senior leadership will be interested & sponsor a KM project?
- What current business processes are you involved with that can be a potential knowledge management opportunity?
- What do you feel are currently considered the most valuable sources of organizational knowledge? (tacit & explicit)
- In its current state how available & usable is this current organizational knowledge? (tacit & explicit)
- Where do you see the most threat for the potential loss of critical organizational knowledge?
- Do you feel the current organizational structure would support and utilize knowledge management initiatives?
- Is current organizational structure conducive to knowledge sharing?
- Analyze existing IT infrastructure:
    - How is Intranet organized? Taxonomy? Easy to use, private drives, how do you know which files are most current?
    - What resources are hard-copied but can be converted to e-copy for ease of use?
    - What's current storage capacity of network resources?
    - What's used most often, hard copy or electronic?
    - Are most proficient with computers?
    - Who makes the policy, and what is the policy, for permissions/rules for section folders? For example, who determines who should have READ or READ/WRITE permissions for EEEP files?
    - What is the hardware storage capacity for the 738th? How has it increased/decreased in past few years? Are there any changes coming up?
    - Does the 738th have an archival plan for digital files?
    - Please describe to me the structure of the 738th network. When I was there the network was routed through the base, is this still the case? Are 738th servers physically at the 738th? Any quality of service issues?
    - Any future plans for 738th network upgrades?
    - Does the 738th have VPN capability? Any plans for it in the future.
    - What's the annual budget for IT? Is there anything you need but haven't been able to purchase because of $$ or security issues? If so, what?
- Identify potential opportunity to transform organization into a knowledge-based, learning organization
- Identify organizational resources available for knowledge management initiatives
- Do you feel the 738th should pursue knowledge management opportunities?
- Do you feel the potential advantages of knowledge management outweigh any of the limitations identified in this step?
- Do you feel a particular initiative will help the 738th achieve its organizational strategic objectives and provide increased value?

Step 3--Identify and Analyze Cultural Aspects of the Organization

- Discuss/ask about (specific to squadron):
    - Communication
    - Team orientation
    - Trust
    - Conflict
    - Leadership support
    - Learning
    - Adaptability
    - Tolerance for risk
    - Strong and positive culture

- Do you feel valued for what you are able to contribute on a daily basis?
- Do you trust procedures provided to you by other team chiefs?
- What recommendations would you make to improve info/knowledge sharing? In garrison? Deployed? TDY?
- Based upon your rank, do you feel your opinions matter to those making decisions? In garrison? Deployed? TDY?
- Do you feel you are rewarded more for what you know or what you share? (EPR,OPR)
- What are the requirements for the Team Chief of the year award? Squadron awards/civilian awards?
- How open are people to sharing? Culture? Recognition for innovation "excellence in innovation."

Step 4-- Identify & Address Potential Knowledge Management Projects

- Do you feel senior leadership will support the project you've identified in the previous step?
- How can this potential KM effort support the key business process(es) identified in Step 2?
- Discuss the need to focus KM efforts on people & process(es), not technology.
- What do you feel should be the scope and desired outcome of potential knowledge management efforts/initiatives/projects we've identified?
- What specific knowledge do you feel should be utilized by this KM effort?
- How would you achieve the development of a common taxonomy of terms (common language) for this effort?

Step 5-- Identify & Address Knowledge Management Project

Variables Affecting Project Implementation & Success

- Who do you see as being the major user of this KM effort?
- What should be the requirements for this KM effort/project? (example: capture & codify desired knowledge, reusing past experiences, sharing knowledge (tacit & explicit), access to knowledge, reutilize knowledge, collaboration…)
- How would you determine if this effort is successful? (example: project goals, expected outcomes, performance measures, etc…)

Step 6-- Identify & Address Success Factors For Project

Variables Affecting the Successful Implementation of Knowledge Management Projects

- Discuss/question the need for:
    - Senior leadership interest, internal project sponsorship, continued active participation
    - Selected KM project should provide substantial & measurable value to the organization
    - Employee compensation (?) should be structured to encourage employee utilization (goal: institutionalize knowledge-based behavior into organization; compensation can include recognition on performance appraisals)
    - Policies & guidance to support & encourage knowledge management use and acceptance (goal: promote creation, sharing, & utilization of organizational knowledge bases)
    - Tie KM project to business process(es)
    - KM project(s) should be focused on people & processes, not technology
    - Factors that may potentially impact identification and mapping of knowledge repositories
- Can the knowledge management project be implemented with the existing organizational structure and organizational culture?

Attachment 1

Informed Consent for Research on
Identifying Potential Knowledge Management Opportunities for the 738th EIS

You are invited to participate in a research study of identifying knowledge management (KM) opportunities for the 738th EIS. This research is to be conducted by First Lieutenant Kevin Gabriel (Gabe) Budai. This research is in fulfillment of a Masters degree program under the Air Force Institute of Technology (AFIT) and has been sponsored by the 738 EIS Commander.

The objective of this research is to test the usability of a decision framework designed to assist organizations in identifying and selecting knowledge management projects. This will be accomplished by conducting a case study investigation of the 738th EIS. This investigation will assist in determining usefulness of the framework model while identifying any possible knowledge management opportunities that may exist to benefit the squadron. Finally, this approach also allows the evaluation of key party views on potential KM needs or opportunities that may otherwise be unknown to senior leadership.

Semi-structured interviews, approximately one hour in length, will be conducted with a sampling of squadron personnel. Organization documents, briefings, memos, etc. will also be evaluated in order to determine critical historical and foundational information pertinent to the research questions. Content analysis and pattern matching will be used to analyze the interview data and organizational documents in order to answer the research questions. The data collection will focus on the following research/investigative questions:

Research Question

How well does the Bower-Phillips decision framework support an organization's decision making process necessary to select specific knowledge management (KM) projects?

If you elect to participate, you may also consent to have the interview audio taped. You may further consent to be quoted. A copy of the interview transcripts will be made available to you for final approval and release prior to use if you consent to be quoted. Steps will be taken to protect the saved interview transcripts to include protected access to the saved files and labeling of the files by assigned numbers instead of names.

Your participation is **COMPLETELY VOLUNTARY**. Due to the nature of the interview questions, there is a small possibility of adverse repercussions from your statements. Your name will be protected in the final write-up unless you do not consent to be quoted. Your input is important to understand the academic support system implementation effort and key leader influence behaviors. You may withdraw from this study at any time without penalty, and your interview data will not be used in the

research. Your decision to participate or withdraw will not jeopardize your relationship with your department, the 738th EIS, the Air Force, or the Department of Defense

PRIVACY ISSUES: Records of my participation in this study may only be disclosed according to federal law, including the Federal Privacy Act, 5 U.S.C. 552a, and its implementing regulations (See Below).
If you have any questions concerning this research, please contact First Lieutenant Kevin Budai at 937-256-8100 or kevin.budai@afit.edu or Dr. Alan Heminger at alan.heminger@afit.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO PARTICIPATE.

_____ _____

Participant's Signature Date Investigator's Signature Date

I ALSO AUTHORIZE THE AUDIOTAPING OF MY INTERVIEW.

_____ _____

Participant's Signature Date Investigator's Signature Date

Privacy Act Statement

Authority: We are requesting disclosure of personal information, to include your Social Security Number. Researchers are authorized to collect personal information (including social security numbers) on research subjects under The Privacy Act-5 USC 552a, 10 USC 55, 10 USC 8013, 32 CFR 219, 45 CFR Part 46, and EO 9397, November 1943 (SSN).
Purpose: It is possible that latent risks or injuries inherent in this experiment will not be discovered until some time in the future. The purpose of collecting this information is to aid researchers in locating you at a future date if further disclosures are appropriate.
Routine Uses: Information (including name and SSN) may be furnished to Federal, State and local agencies for any uses published by the Air Force in the Federal Register, 52 FR 16431, to include, furtherance of the research involved with this study and to provide medical care.
Disclosure: Disclosure of the requested information is voluntary. No adverse action whatsoever will be taken against you, and no privilege will be denied you based on the fact you do not disclose this information. However, your participation in this study may be impacted by a refusal to provide this information.

Attachment 2

INFORMED CONSENT
FOR QUOTING INTERVIEW

For Research on
Identifying Potential Knowledge Management Opportunities for the 738th EIS

You have previously been provided the informed consent form that allowed you to elect to participate in a research study to identify potential knowledge management opportunities for the 738 EIS. If you have elected to participate, you were also given the opportunity to have your interview audio taped.

In addition to the above options, you are also now given the opportunity to elect to have certain portions of your interview "quoted". If you elect to do so, the transcripts of your interview will be returned to you for your approval prior to any use in the research. Quoting may add validity to the research and make the final research product more useful and understandable.

PRIVACY ISSUES: Records of my participation in this study may only be disclosed according to federal law, including the Federal Privacy Act, 5 U.S.C. 552a, and its implementing regulations (See Below).

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT TO ALLOW YOUR INTERVIEW TRANSCRIPTS TO BE QUOTED. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO PARTICIPATE.

_____ _____

Participant's Signature Date Investigator's Signature Date

Privacy Act Statement

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Attachment 3

738TH EIS PARTICIPANT HANDOUT FOR CASE STUDY:

ASSESSING THE USEFULNESS OF THE DECISION FRAMEWORK FOR IDENTIFYING AND SELECTING KNOWLEDGE MANAGEMNT PROJECTS

7-STEP KM PROJECT SELECTION DECISION PROCESS FRAMEWORK[1]	
Step 1	Analyze Corporate Strategic Objectives Using SWOT (Strengths, Weaknesses, Opportunities, Threats) Methodology
Step 2	Identify & Analyze Potential Knowledge Management Opportunities
Step 3	Identify and Analyze Cultural Aspects of the Organization[2]
Step 4	Identify & Address Potential Knowledge Management Projects
Step 5	Identify & Address Knowledge Management Project Variables Affecting Project Implementation & Success
Step 6	Identify & Address Success Factors For Project Variables Affecting the Successful Implementation of Knowledge Management Projects
Step 7	Finalize Knowledge Management Project Selection

[1] Bower, William D., Development of a Decision Framework for Knowledge Management Projects, Masters Thesis, Air Force Institute of Technology, 2001.
[2] Phillips, Jeffrey A., Incorporating Organizational Culture into a Decision Framework for Identifying and Selecting Knowledge Management Projects, Masters Thesis, Air Force Institute of Technology, 2003.

STEP 1 – Analyze Corporate Strategic Objectives Using SWOT Methodology

Key Factors Affecting Decision Process

- Corporate Strategic Objectives
- Knowledge Required to Achieve Strategic Objectives
- Corporate Knowledge Vision & Strategy
- Future Knowledge Requirements
- Current Organizational Knowledge
  - Captured or Known
  - Uncaptured or Unknown
- Current & Future Information Requirements
- Opportunities to Capitalize on Organizational Knowledge

STEP 2 – Identify & Analyze Potential Knowledge Management Opportunities

Key Factors Affecting Decision Process:

- Senior leadership interest & project sponsorship
  - Need senior mgmt/leadership involvement as knowledge management champion(s)
  - Will organizational leadership be active proponents of change and have they made a long-term strategic commitment to knowledge management
- Identify and analyze current business processes for potential knowledge management opportunities
  - Identify potential opportunities to apply knowledge management to existing business practices to achieve organizational strategic objectives while adding value to the organization
- Perform valuation process on current organizational knowledge (tacit & explicit) to determine current worth and potential to capitalize on existing knowledge to create more value for the organization (strategic advantage)
  - Base valuation on current business processes and corporate strategic objectives
- Availability & Usability of current organizational knowledge (tacit & explicit)
  - Should be part of initial valuation process
  - Identify opportunities for exploiting existing organizational knowledge to achieve strategic advantage and potential limitations if organizational knowledge is not readily available and usable in current state (i.e. tacit knowledge not identified or shared, explicit knowledge supporting core business processes not readily available to potential users.
- Evaluate potential loss of critical organizational knowledge
  - Personnel retire or switch employers
  - Processes not properly documented so explicit knowledge is not captured for future use

- No methodology in place for maintaining currency of existing organizational knowledge (primarily explicit, but can be tacit as well)

- Will current organizational structure support and utilize knowledge management initiatives
  - Is there great reluctance to share data or use other peoples' data
  - Will current organizational culture support the flow, transfer, and use of information across functional and organizational boundaries
- Is current organizational structure conducive to knowledge sharing
  - Will organizational boundaries limit or inhibit the flow and transfer of knowledge
- Analyze existing IT infrastructure
  - What level and type of knowledge management activities and initiatives will it support
  - Look at current state and future state based on IT strategic plan. Knowledge management initiatives are heavily reliant on IT for information gathering, storage, and transfer; infrastructure must support initial knowledge management initiatives and be robust/dynamic enough to meet future demand
- Identify potential opportunity to transform organization into a knowledge-based, learning organization
  - Organizational culture adjustment hardest obstacle to overcome
- Identify organizational resources available for knowledge management initiatives
  - Includes manpower, equipment (primarily IT), funding, a footprint (space), and funding
    - Will resources be dedicated for the duration of the knowledge management initiatives
  - ID current and future budget constraints
    - Will project be expected to achieve ROI before it is feasible

STEP 3 – Identify and Analyze Cultural Aspects of the Organization

Key Factors Affecting Decision Process:

- Address the following cultural issues:
  - Communication
  - Team orientation
  - Trust
  - Conflict
  - Leadership support
  - Learning
  - Adaptability
  - Tolerance for risk
  - Strong and positive culture

STEP 4 – Identify & Address Potential Knowledge Management Projects

Key Factors Affecting Decision Process:

- Senior leadership interest & project sponsorship
  - Need continued active participation and involvement from senior leadership
  - Need knowledge management champion and project sponsor
- Tie potential knowledge management efforts to key business processes identified in Step 2
- Focus knowledge management efforts on people & processes, not the technology
  - IT is just an enabler, the knowledge users and producers are the people and processes within the organization
- Identify scope and desired outcome of potential knowledge management efforts/initiatives/projects
- Define the knowledge to be utilized by the knowledge management effort
    - Definition of knowledge should be tied directly to knowledge valuation process performed in Step 2
- Develop common taxonomy of terms (common language)
  - Everyone needs to be operating off of the same page and have the same understanding of knowledge management definitions, desired outcomes, goals, milestones, metrics, and expectations.

STEP 5 -- Identify & Address Knowledge Management Project Variables Affecting Project Implementation & Success

Key Factors Affecting Decision Process:

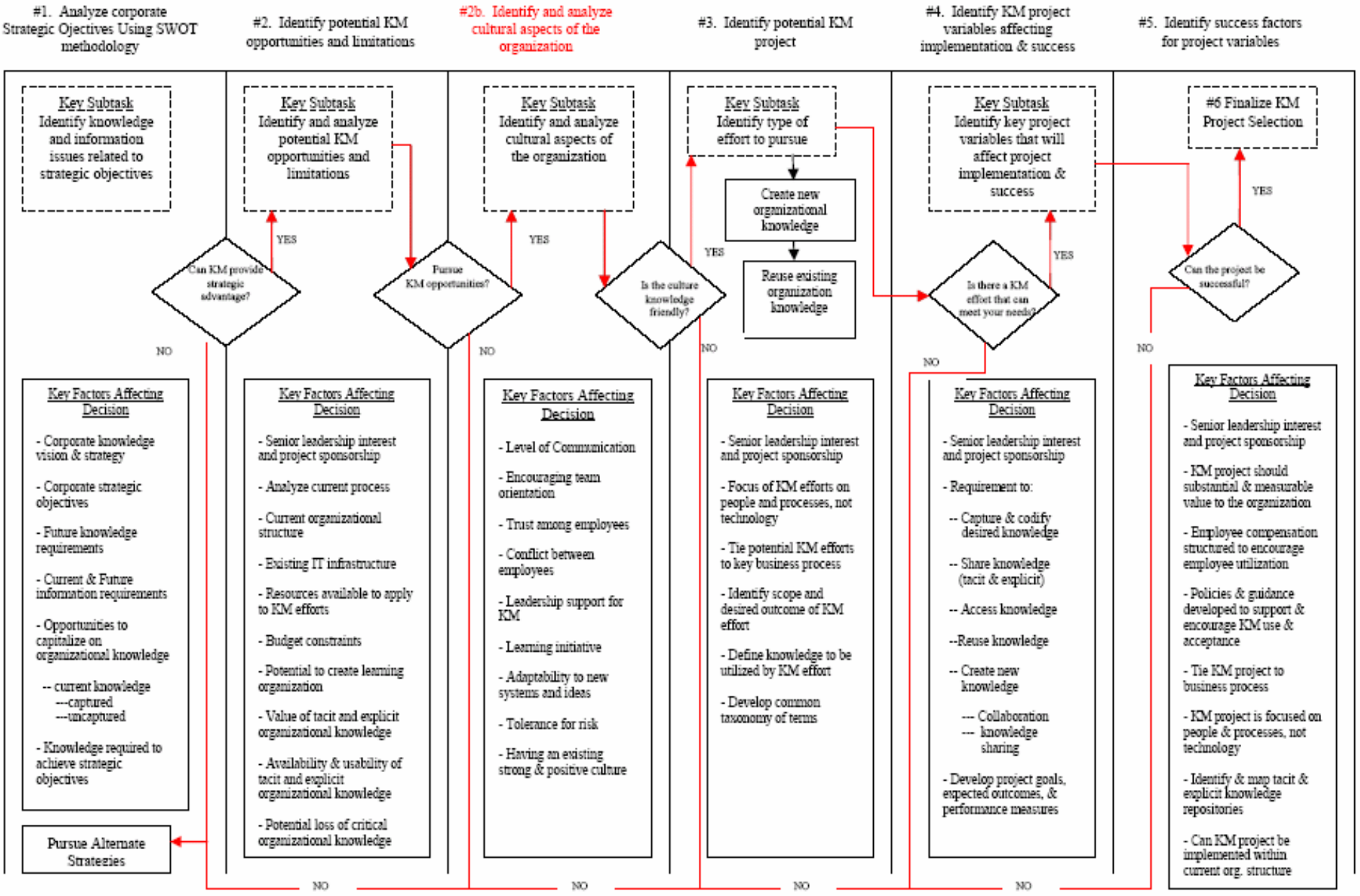
- Senior leadership interest & project sponsorship
  - Need continued a Need knowledge management champion and project sponsor active participation and involvement from senior leadership
- Identify customer(s)
- Define requirements of knowledge management effort/project
  - Capture & codify desired knowledge
    - Capturing & reusing past experiences
  - Share knowledge (tacit & explicit)
  - Access knowledge
  - Reutilize knowledge
    - Capturing & reusing past experiences
  - Create New Knowledge
    - Collaboration
    - Knowledge Sharing
- Develop project goals, expected outcomes and performance measures
  - Use performance measures/metrics to tie daily business activities to strategic objectives

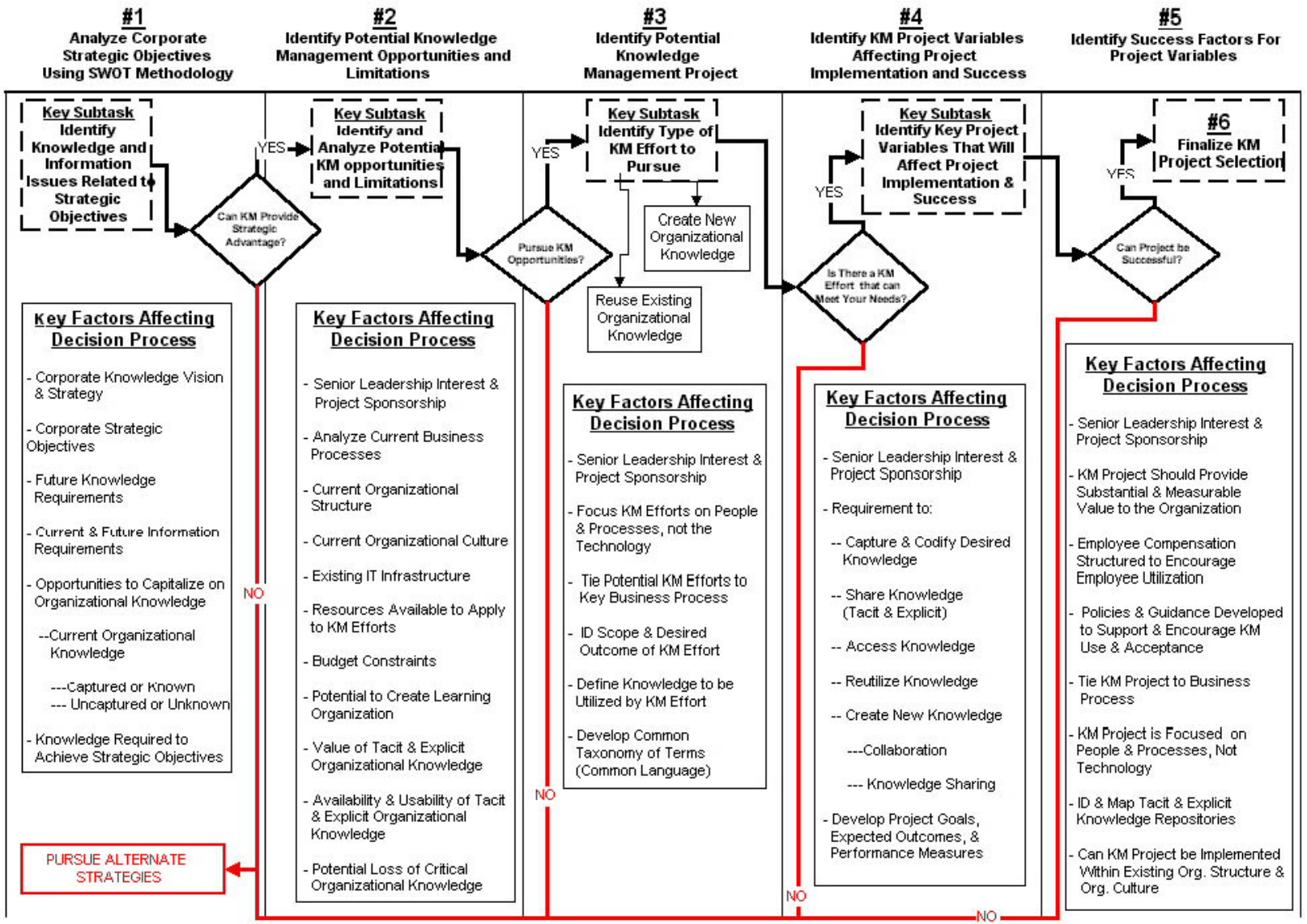
STEP 6 – Identify & Address Success Factors For Project Variables Affecting the Successful Implementation of Knowledge Management Projects

Key Factors Affecting Decision Process:

- Senior leadership interest & project sponsorship
  - Need continued active participation and involvement from senior leadership
  - Need knowledge management champion and project sponsor
- Knowledge management project should provide substantial & measurable value to the organization
- Employee compensation should be structured to encourage employee utilization
  - Goal should be to institutionalize knowledge-based behavior into organization
  - Compensation is not necessarily financial; can be any compensation, including recognition on performance appraisals, that promotes the sharing and utilization of organizational knowledge
- Policies & guidance developed to support & encourage knowledge management use and acceptance
  - Goal should be to develop and implement policies and guidance that promotes a knowledge-centric culture
  - Promote creation, sharing, & utilization of organizational knowledge bases
- Tie knowledge management project to business process
- Knowledge management projects should be focused on people & processes, not technology
- Identify factors that potentially impact the identification and mapping of knowledge repositories
- Can the knowledge management project be implemented with the existing organizational structure and organizational culture?

APPENDIX D – REVISED DECISION FRAMEWORK FOR IDENTIFYING AND SELECTING KM PROJECTS




#1
Analyze Corporate Strategic Objectives Using SWOT Methodology
#2
Identify Potential Knowledge Management Opportunities and Limitations
#3
Identify Potential Knowledge Management Project
#4
Identify KM Project Variables Affecting Project Implementation and Success
#5
Identify Success Factors For Project Variables
Key Subtask
Identify Knowledge and Information Issues Related to Strategic Objectives
Can KM Provide Strategic Advantage?
YES
NO
Key Subtask
Identify and Analyze Potential KM opportunities and Limitations
Pursue KM Opportunities?
YES
NO
Key Subtask
Identify Type of KM Effort to Pursue
Create New Organizational Knowledge
Reuse Existing Organizational Knowledge
Is There a KM Effort that can Meet Your Needs?
YES
NO
Key Subtask
Identify Key Project Variables That Will Affect Project Implementation & Success
Can Project be Successful?
YES
NO
#6
Finalize KM Project Selection
Key Factors Affecting Decision Process
- Corporate Knowledge Vision & Strategy
- Corporate Strategic Objectives
- Future Knowledge Requirements
- Current & Future Information Requirements
- Opportunities to Capitalize on Organizational Knowledge
--Current Organizational Knowledge
---Captured or Known
--- Uncaptured or Unknown
- Knowledge Required to Achieve Strategic Objectives
Key Factors Affecting Decision Process
- Senior Leadership Interest & Project Sponsorship
- Analyze Current Business Processes
- Current Organizational Structure
- Current Organizational Culture
- Existing IT Infrastructure
- Resources Available to Apply to KM Efforts
- Budget Constraints
- Potential to Create Learning Organization
- Value of Tacit & Explicit Organizational Knowledge
- Availability & Usability of Tacit & Explicit Organizational Knowledge
- Potential Loss of Critical Organizational Knowledge
Key Factors Affecting Decision Process
- Senior Leadership Interest & Project Sponsorship
- Focus KM Efforts on People & Processes, not the Technology
- Tie Potential KM Efforts to Key Business Process
- ID Scope & Desired Outcome of KM Effort
- Define Knowledge to be Utilized by KM Effort
- Develop Common Taxonomy of Terms (Common Language)
Key Factors Affecting Decision Process
- Senior Leadership Interest & Project Sponsorship
- Requirement to:
-- Capture & Codify Desired Knowledge
-- Share Knowledge (Tacit & Explicit)
-- Access Knowledge
-- Reutilize Knowledge
-- Create New Knowledge
---Collaboration
--- Knowledge Sharing
- Develop Project Goals, Expected Outcomes, & Performance Measures
Key Factors Affecting Decision Process
- Senior Leadership Interest & Project Sponsorship
- KM Project Should Provide Substantial & Measurable Value to the Organization
- Employee Compensation Structured to Encourage Employee Utilization
- Policies & Guidance Developed to Support & Encourage KM Use & Acceptance
- Tie KM Project to Business Process
- KM Project is Focused on People & Processes, Not Technology
- ID & Map Tacit & Explicit Knowledge Repositories
- Can KM Project be Implemented Within Existing Org. Structure & Org. Culture
PURSUE ALTERNATE STRATEGIES

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Vita

First Lieutenant Kevin Gabriel Budai graduated from Aztec High School in Aztec, New Mexico in May 1989. He entered the Air Force in October of 1989 and attended basic training at Lackland AFB, Texas. He spent the next eleven and a half years working as an Explosive Ordnance Disposal (EOD) Craftsman, deploying to various locations in support of Operations Desert Shield/Storm, Northern/Southern Watch, Provide Comfort, and Joint Endeavor. His final EOD assignment was the Naval School of Explosive Ordnance Disposal (NAVSCOLEOD) where he served as an Air Education and Training Command (AETC) master instructor, curriculum writer, and Instructor Supervisor. While there he attained the rank of Technical Sergeant. 1st Lt Budai earned an Associate of Science Degree from the Community College of the Air Force in Explosive Ordnance Disposal. He received his Bachelor of Science Degree in Computer and Information Sciences from Troy State University, graduating in 2000 with a 3.93 GPA and Summa Cum Laude honors. He was accepted to attend Officer Training School (OTS) in late 2000, entered OTS in April 2001 and graduated in June 2001.

Upon receiving his commission as a Communication and Information Officer he was assigned to the 738 Engineering and Installation Squadron (EIS), Keesler AFB, Mississippi as a Project Engineer. In August 2003, he entered the Graduate School of Engineering and Management, Air Force Institute of Technology to pursue a MS in Information Resource Management. Upon graduation, he will be assigned to the Integration Engineering Directorate, Dynamic Network Analysis (DNA) Division at the Air Force Communications Agency (AFCA), Scott AFB, Illinois.

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14. ABSTRACT

Knowledge management (KM) is becoming recognized as a valuable tool for the Department of Defense (DoD) in its effort to maintain a competitive, strategic advantage against its enemies in a new threat environment. Decision superiority is the ultimate end result and is only possible through the effective and efficient use of its chief key resource--knowledge. As the Air Force seeks to transform the way it does business the concept of knowledge management has made its way to the forefront of both the Air Force's Information Strategy and Information Resource Flight Plan. This research assesses the usefulness of a knowledge management decision framework previously designed for the Air Force by Captain William Bower (2001) and refined by 1st Lt Jeffrey Phillips (2003) referred to as the Bower-Phillips decision framework. Guided by the framework, a case study was undertaken at an Air Force organization to identify and address potential knowledge management opportunities. The framework was found to be useful in identifying possible KM opportunities.

15. SUBJECT TERMS

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