



**A COMPARATIVE ASSESSMENT OF KNOWLEDGE MANAGEMENT  
PROGRAMS ACROSS THE UNITED STATES ARMED SERVICES**

THESIS

Patrick L. Booker, First Lieutenant, USAF

AFIT/GIR/ENV/06M-03

**DEPARTMENT OF THE AIR FORCE  
AIR UNIVERSITY**

**AIR FORCE INSTITUTE OF TECHNOLOGY**

**Wright-Patterson Air Force Base, Ohio**

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Patrick L. Booker, BA

First Lieutenant, USAF

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Patrick L. Booker, BA  
First Lieutenant, USAF

Approved:

//Signed//

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SUMMER E. BARTCZAK, Lt Col, USAF, PhD (Chairman)  
Assistant Professor of Information Resource Management  
Department of Systems and Engineering Management

17 March 2006  
Date

//Signed// 1

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CAROLYN M. MACOLA, Maj, PhD (Member)  
 Assistant Professor of Engineering and Environmental Management  
 Department of Systems and Engineering Management

17 March 2006  
Date

---

//Signed//

MICHAEL R. GRMAILA, PhD (Member)  
 Assistant Professor of Information Resource Management  
 Department of Systems and Engineering Management

17 March 2006  
Date

### **Abstract**

Knowledge is a corporate resource that is required to accomplish business processes, to make decisions, and to improve efficiency and effectiveness. To completely take advantage of the benefits of knowledge, organizations must harvest and leverage the collective knowledge of the entire workforce. This can be achieved through effective knowledge management. Knowledge management involves processes to create, to store, and transfer knowledge to accomplish business objectives and to achieve a competitive advantage. The United States armed services have also recognized the benefits of knowledge management in meeting the emerging challenges of modern warfare. This study investigated knowledge management programs in the U.S. Army, Navy, and Air Force. Using a case study methodology, each of the service's knowledge management programs were assessed against Stankosky et al.'s (1999) "Four Pillar Framework" which outlines key elements of leadership, technology, organization/culture, and learning associated with robust knowledge management programs. Based on the evidence reviewed for this research, the results indicate each of the services are making progress albeit with slightly different approaches, towards a more mature KM program with the U.S. Army having the most complete approach according to the evaluation criteria. The research also revealed that there is much collaboration and work yet to be done among the services if the concepts of knowledge management are to be used to operate and fight more effectively as a joint force.

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Patrick L. Booker

## Table of Contents

|                                                              | Page |
|--------------------------------------------------------------|------|
| Abstract .....                                               | iv   |
| Acknowledgments.....                                         | v    |
| Table of Contents.....                                       | vi   |
| List of Figures .....                                        | viii |
| List of Tables .....                                         | ix   |
| I. Introduction .....                                        | 1    |
| Background .....                                             | 3    |
| Problem Statement .....                                      | 6    |
| Research Questions .....                                     | 7    |
| Methodology .....                                            | 7    |
| Assumptions/Limitations .....                                | 7    |
| Implications.....                                            | 8    |
| II. Literature Review .....                                  | 9    |
| Knowledge .....                                              | 9    |
| Knowledge Management .....                                   | 10   |
| Knowledge Management Frameworks .....                        | 13   |
| Factors Leading to Knowledge Project Success Framework ..... | 13   |
| The Four Enablers of Transfer Framework .....                | 16   |
| The Four Pillar Framework .....                              | 21   |
| Background on KM in the Military.....                        | 27   |
| III. Methodology .....                                       | 35   |
| Introduction.....                                            | 35   |
| Case Study Research .....                                    | 36   |
| Research Questions .....                                     | 37   |
| Proposition .....                                            | 38   |
| Unit of analysis .....                                       | 38   |
| Research Design.....                                         | 40   |
| The Framework to Guide the Assessment .....                  | 40   |
| Data Collection.....                                         | 41   |
| Data Analysis .....                                          | 45   |
| Research Design Quality.....                                 | 45   |
| Construct Validity .....                                     | 47   |
| Internal Validity .....                                      | 48   |
| External Validity .....                                      | 48   |

|                                                                             | Page |
|-----------------------------------------------------------------------------|------|
| Reliability .....                                                           | 48   |
| Case Study Limitations .....                                                | 49   |
| IV. Results and Analysis.....                                               | 51   |
| Description of Data Presentation .....                                      | 53   |
| The Department of the Army’s KM Program .....                               | 55   |
| The Department of the Navy’s KM Program.....                                | 65   |
| The Department of the Air Force’s KM Program.....                           | 73   |
| Comparison of the Services’ KM programs.....                                | 81   |
| Leadership Comparison .....                                                 | 82   |
| Organization/Culture Comparison .....                                       | 85   |
| Technology Comparison .....                                                 | 87   |
| Learning Comparison.....                                                    | 88   |
| V. Discussion, Recommendations, and Conclusion .....                        | 92   |
| Discussion .....                                                            | 92   |
| Recommendations for Future Research .....                                   | 96   |
| Conclusions .....                                                           | 96   |
| Appendix A: Background Paper on the Four Pillar Framework.....              | 100  |
| Appendix B: The Department of the Army’s KM Documents.....                  | 102  |
| Appendix C: The Department of the Navy’s KM Documents .....                 | 105  |
| Appendix D: The Department of the Air Force’s KM Documents .....            | 107  |
| Appendix E: The KM Practitioner Feedback from Army Respondent.....          | 109  |
| Appendix F: The KM Practitioner Feedback from Navy Respondent .....         | 110  |
| Appendix G: The KM Practitioner Feedback from Air Force Respondent #1 ..... | 111  |
| Appendix H: The KM Practitioner Feedback from Air Force Respondent #2 ..... | 112  |
| References.....                                                             | 113  |
| Vita .....                                                                  | 124  |

## List of Figures

|                                                                                 | Page |
|---------------------------------------------------------------------------------|------|
| Figure 1. Components of Knowledge Management .                                  | 11   |
| Figure 2. Factors Leading to Knowledge Project Success.....                     | 14   |
| Figure 3. The Enablers of Knowledge Transfer .....                              | 16   |
| Figure 4. The Four Pillar Framework .....                                       | 23   |
| Figure 5. The Criteria for Using a Case Study Strategy .....                    | 36   |
| Figure 6. Definitions of Quality Research Design Tests by Schwab .....          | 46   |
| Figure 7. Definitions of Quality Research Design Tests by Kidder and Judd ..... | 46   |
| Figure 8. The KM Framework for the Department of the Navy .....                 | 72   |
| Figure 9. KM Program Maturity across U.S. armed services.....                   | 98   |

## List of Tables

|                                                                               | Page |
|-------------------------------------------------------------------------------|------|
| Table 1. The Culture Enablers of Knowledge Transfer .....                     | 17   |
| Table 2. The Technology Enablers of Knowledge Transfer .....                  | 18   |
| Table 3. The Infrastructure Enablers of Knowledge Transfer .....              | 20   |
| Table 4. The Measurement Enablers of Knowledge Transfer .....                 | 21   |
| Table 5. The Leadership Elements of the Four Pillar Framework.....            | 24   |
| Table 6. The Organization/Culture Elements of the Four Pillar Framework ..... | 25   |
| Table 7. The Technology Elements of the Four Pillar Framework .....           | 26   |
| Table 8. Characteristics of this Study’s Research Design .....                | 39   |
| Table 9. Case Study Tactics for Four Design Tests.....                        | 47   |
| Table 10. Case Study Tactics.....                                             | 49   |
| Table 11. The Total Number of Documents Retrieved .....                       | 51   |
| Table 12. The Number of Documents Applicable to This Assessment.....          | 52   |
| Table 13. Example Data Capture Table.....                                     | 54   |
| Table 14. Elements of Leadership in the Army’s KM Program .....               | 55   |
| Table 15. Elements of Organization/Culture in the Army’s KM Program.....      | 58   |
| Table 16. Elements of Technology in the Army’s KM Program.....                | 61   |
| Table 17. Elements of Learning in the Army’s KM Program .....                 | 63   |
| Table 18. Elements of Leadership in the DON’s KM Program.....                 | 65   |
| Table 19. Elements of Organization/Culture in the DON’s KM Program .....      | 67   |
| Table 20. Elements of Technology in the DON’s KM Program .....                | 69   |

|                                                                               | Page |
|-------------------------------------------------------------------------------|------|
| Table 21. Elements of Learning in the DON’s KM Program.....                   | 71   |
| Table 22. Elements of Leadership in the Air Force’s KM Program.....           | 74   |
| Table 23. Elements of Organization/Culture in the Air Force’s KM Program..... | 77   |
| Table 24. Elements of Technology in the Air Force’s KM Program.....           | 79   |
| Table 25. Elements of Learning in the Air Force’s KM Program .....            | 80   |
| Table 26. Comparison of the Service’s Elements of Leadership.....             | 82   |
| Table 27. Comparison of the Service’s Elements of Organization/Culture.....   | 85   |
| Table 28. Comparison of the Service’s Elements of Technology .....            | 87   |
| Table 29. Comparison of the Service’s Elements of a Learning Enterprise.....  | 89   |

# A COMPARATIVE ASSESSMENT OF KNOWLEDGE MANAGEMENT PROGRAMS ACROSS THE UNITED STATES ARMED SERVICES

## **I. Introduction**

Knowledge is an essential corporate resource that is required at all echelons to accomplish processes, to make decisions, and to improve efficiency and effectiveness (Nonaka, 1991; Drucker, 1993; Bixler, 2005). Knowledge has the distinctive ability to produce benefits that other traditional corporate assets (e.g. land, labor, and capital) are incapable of producing (Drucker, 1993). Thus, the unparalleled benefits generated from knowledge, makes it a significant component of a firm's stability and productivity (Drucker, 1993; Davenport and et al., 1998). Knowledge is "information combined with experience, context, interpretation, and reflection" (Davenport and et al., 1998). This unique blend of individual-based information has the potential to provide organizations an edge over their competitors (Nonaka, 1991). In order to maintain the advantage, organizations must harvest and utilize the collective skills and knowledge of their entire workforce (Bixler, 2005). Leveraging an organization's intellectual assets requires methods to extract and to amass each worker's knowledge. However, procuring employees' knowledge can be a challenging task, because they have complete ownership of their knowledge and can take it with them whenever they leave the organization (Drucker, 1993). As a result, the possibility of losing valuable corporate knowledge has led organizations to begin managing knowledge resources like material assets (Davenport and Prusak, 1998). Consequently, managing organizational knowledge has become a

source of a competitive advantage. “Knowledge management refers to identifying and leveraging the collective knowledge in an organization to help the organization compete” (Alavi and Leidner, 2001, p. 113). Knowledge management (KM) involves creating, extracting, storing, and transferring information, personalized skills, and knowledge resources to accomplish business objectives (Davenport and Prusak, 1998; Tirpak, 2005). The collection of KM processes operate in an integrated fashion to form KM programs that are comprised of people, processes, tools, and strategy to create, use, and share the enterprise’s knowledge resources (Tirpak, 2005). However, enterprise-level KM programs must consist of strategic components to perform the necessary processes to manage an organizations’ intellectual property (Stankosky, 2000). To ensure KM programs contain the functionality required to manage knowledge resources, they should be designed using a defined framework or blueprint (Stankosky, 2000). Using a definitive framework to construct a KM program offers two advantages. KM frameworks provide criteria to assess the added value of the KM program, and they provide guidelines to assemble and to implement a KM program effectively (Stankosky, 2000).

Knowledge management research has led to the discovery of several KM frameworks. The Knowledge Project Success Framework, The Knowledge Transfer Framework, and The Four Pillar Framework are just three KM frameworks among several that are available to facilitate in the design and implementation of KM programs. Davenport and Prusak’s (1998) KM program framework, The Factors Leading to Knowledge Project Success, contains elements (components) of senior leadership

support, a knowledge-oriented organization, and nontrivial motivational aids that can indicate whether a KM project is successful or not (p.153). While The Enablers of Knowledge Transfer KM framework by O'Dell and Grayson (1998) focuses on creating the most supportive environment to transfer knowledge by aligning the enablers of culture, technology, infrastructure, and measurement. Finally, The Four Pillar Framework by Stankosky, Calabrese, and Baldanza (2000) is based on the premise that there are four principal elements (components) of a KM program. The four pillars include leadership, organization, technology, and learning that are critical to the peak performance of a KM program (Stankosky, 2000). Although popular, The Four Pillar Framework, The Factors Leading to Knowledge Project Success Framework and The Enablers of Knowledge Transfer Framework are only three frameworks among many organizations can use to develop their enterprise-level KM programs.

## **Background**

The Department of Defense (DoD) became interested in KM when it experienced a ten-year reduction in the department's workforce (Glennie and Hickok, 2003). The decrease in the DoD labor force resulted in, and still results in, a loss of valuable corporate knowledge (Glennie and Hickok, 2003). As a result, the DoD has realized it needs to retain, codify, and share the knowledge of its experts (Glennie and Hickok, 2003). Similarly, military leaders have recognized the added value of storing and sharing knowledge across the services to improve commander's decision-making ability (Department of Defense, 2004). Hence, Pentagon leaders have established joint policy, guidance, and procedures to facilitate the transformation of a U.S. Joint Force to improve

efficiency and effectiveness (Department of Defense, 2002). The *Net-Centric Environment—Joint Functional Concept* (2005) is a strategy for the U.S. armed services to exploit DoD resources to become an integrated military via shared knowledge and technical resources. The *Net-Centric Environment—Joint Functional Concept* (2005) is joint doctrine set forth by the office of the CJCS. Below is a brief explanation of the purpose for the *Net-Centric Environment—Joint Functional Concept* (2005).

The central idea this concept proposes is that if the Joint Force fully exploits both shared knowledge and technical connectivity, then the resulting capabilities will dramatically increase mission effectiveness and efficiency. (Department of Defense, 2005b, p.v)

The need to share information and knowledge as a U.S. joint force is also noted in the Capstone Concept for Joint Operations (2005), which describes a need for the services “to acquire, refine, and share knowledge” as a joint force (p. 12). It also states shared knowledge will provide joint force commanders (JFCs) the ability to “work within and across national and international sources to build and sustain the knowledge necessary to identify required actions and assess effects” (Department of Defense, 2005a, p.13). The Chairman of the Joint Chiefs of Staff, during 2005, stated his vision for a joint knowledge-based force:

The better we understand our own forces and capabilities, the adversary and the environment, the better we can employ and integrate joint force actions to create decisive effects. Knowledge must be timely, relevant, and accurate to be of value, and it must be acquired, prioritized, refined, and shared vertically (strategic, operational, and tactical) and horizontally (within the joint force and among interagency and multinational partners). (Department of Defense, 2005a, p.13).

Knowledge allows the joint force to see, understand, and act before operational needs go unmet in humanitarian crises. It is essential to the

identification, creation and assessment of effects (Department of Defense, 2005a, p.14).

Based on what is stated in joint doctrine, KM will have a more active role in U.S. warfighting capabilities in the global war on terrorism and modern conflicts in the future (Department of Defense, 2005). Therefore, KM has been recognized as one of the tenets necessary to bridge the gap between the different departments of the military in an effort to cultivate a U.S. Joint Force and each service has embarked on methods to manage their service's knowledge resources.

The Department of the Navy (DON) has implemented measures to harness the benefits of KM and has become a fundamental aspect of U.S. Naval operations (Lelic, 2005). The DON's KM initiatives include knowledge-based activities for Navy and Marine Corps personnel. The DON has developed a knowledge management portal, Navy Knowledge Online (NKO), which provides 24-hour access to training, educational tools, and professional development information (Walter, 2002). The U.S. Navy and the U.S. Marine Corps have formed the Navy Marine Corps Internet (NMCI) as a strategy for implementing network centric-warfare. The NMCI facilitates knowledge sharing and distance learning throughout the DON enterprise.

The U.S. Army has a comprehensive KM strategy to become a network-centric, knowledge-based force (Cuviallo, 2002). The Army has created an Army Knowledge Online KM portal that allows users around-the-clock access to Army knowledge, information, and services from anywhere in the world (Cuviallo, 2002). AKO is available to active duty, Army Reserve, Army National Guard, and Army retired

personnel. The Army's comprehensive KM program provides personnel a static e-mail address they use throughout the duration of their career (Department of the Army, 2005).

The Air Force has expressed a definite interest in KM and has a goal to "implement knowledge management practices and to assure knowledge is identified, captured, and shared" (Rouse, 2002, p. 8). The Air Force Knowledge Now (AFKN) website is currently the tool used to store and transmit information and knowledge electronically to support collaboration, e-learning, and information sharing. The AFKN portal provides access to Communities of Practices (CoPs) and lessons learned for several Air Force specialties. As further proof of the Air Force's interest in KM, the Air Force held its first annual KM conference in the Spring of 2005.

Preliminary evidence suggests that each service has taken a different approach in developing their service-level KM programs. Some have focused on e-learning, while others have developed knowledge portals and CoPs. Although the office of the CJCS has set forth a strategy to exploit knowledge and technology as a joint force to improve efficiency and effectiveness, the particular mechanisms and processes each service has implemented to achieve this military-wide objective is unknown.

### **Problem Statement**

To our knowledge, there has never been a comparative assessment of service-level KM programs across the U.S. armed services. Such an assessment can identify the primary elements (mechanisms or attributes) that comprise each department's (Army, Navy, and Air Force) service-level KM program. Stankosky's (2000) "Four Pillar" KM framework provides the best way to guide this assessment.

## **Research Questions**

Using Stankosky's "Four Pillar" KM program framework (Stankosky, 2000) as a guide, the following research questions provide the basis for investigating service-level KM programs across the U.S. armed services.

- IQ1. What elements of KM leadership can be identified?
- IQ2. What elements of organization/culture needed for KM can be identified?
- IQ3. What technology/tools are being used to support KM efforts?
- IQ4. What elements of a learning enterprise can be identified?
- IQ5. Using the KM pillar framework for the assessment, how do the services' KM programs compare?

## **Methodology**

A case study research design will be used to evaluate the three departments' (Department of the Army, Department of the Navy (includes the Marine Corps), and the Department of the Air Force) service-level KM programs. Each service will be treated as a separate case study. The unit of analysis is service-level KM programs and qualitative data will be collected from analyzing KM portals, documentation, and conducting KM practitioner interviews.

## **Assumptions/Limitations**

The results from this study will identify the elements of each service's KM program according to Stankosky's framework (2000). The results will be limited to the information available on each service's KM portal, locating relevant KM documentation,

and contacting persons significantly involved in executing service-level KM programs.

The results of this case study will not be generalizable outside of the DoD.

### **Implications**

This research will provide insight to the key elements (components) of each of the U.S. armed services KM program as well as provide a comparative assessment. Besides adding to the body of knowledge, this research may reveal the character and the nature of each organization's service-level KM program. The results may also provide a starting point for the three services to share and to learn from each other with regards to KM efforts.

## **II. Literature Review**

### **Knowledge**

According to Peter Drucker (1993), knowledge and information are the most important corporate resources in comparison to land, labor, and capital. Davenport and Prusak (1998) suggest that knowledge is different from other corporate assets, because knowledge creates a sustainable advantage as opposed to the more traditional material assets. Unlike tangible assets, knowledge resources increase with use and continue to generate an increasing return (Davenport and Prusak, 1998). Some authors argue that knowledge resources yield indefinite potential for growth, which is the reason why knowledge alone has the ability to leverage a lasting competitive advantage and is critical to an organization's success (Nonaka, 1991; Davenport and et. al, 1998; Davenport and Prusak, 2000). Knowledge provides organizations a competitive advantage in a number of ways. Bixler (2005) notes that organizations use knowledge to execute processes, to make decisions, to improve efficiency and effectiveness, and "simply to get things done" (p. 51). Thus, organizations use both explicit knowledge and tacit knowledge to execute and accomplish business objectives. Nonaka (1991) describes explicit knowledge as methodical, structured, and tangible which makes it easily communicated and shared because it exists in the form of books, publications, and other various hard and soft documents. On the other hand, tacit knowledge is more difficult to communicate and share because it is "highly personal and hard to formalized" (Nonaka, 1991, p. 27). Nonaka (1991) further explained that tacit knowledge is ingrained into an individual's

behavior, skills, and profession. As a result, tacit knowledge is difficult to identify and extract because it is “deeply rooted” in a person’s “know-how” (Nonaka, 1991, p. 28). Nonetheless, Davenport and Prusak (1998) assert that tacit and explicit knowledge are obtained and transferred through various channels such as casual conversation, person-to-person contacts, structured media, and business processes. To facilitate in the understanding of knowledge, several KM scholars have provided definitions. Each definition of knowledge has been defined from a slightly different perspective and is a contribution to knowledge management literature. The following definitions are just a sample of the existing definitions of knowledge:

- Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms. (Davenport and Prusak, 1998, p. 5)
- Knowledge is information possessed in the mind of individuals: it is personalized information (which may or may not be new, unique, useful, or accurate) related to facts, procedures, concepts, interpretations, ideas, observations, and judgments. (Alavi and Leidner, 2001, p. 109)
- The knowledge we now consider knowledge proves itself in action. What we now mean by knowledge is information effective in action, information focused on results. These results are seen outside the person—in society and economy, or in the advancement of knowledge itself. (Drucker, 1993, p. 46)

## **Knowledge Management**

Alavi and Leidner (2001) define knowledge management (KM) as the process of “identifying and leveraging the collective knowledge in an organization to help the

organization to compete” (p. 113). Davenport and Prusak (1998) explain that some KM processes require the extraction of information, skills, and knowledge from employees (Davenport and Prusak, 1998). Thus, managing intellectual property involves people, processes, tools, and strategy (Figure 1) (Tirpak, 2005).

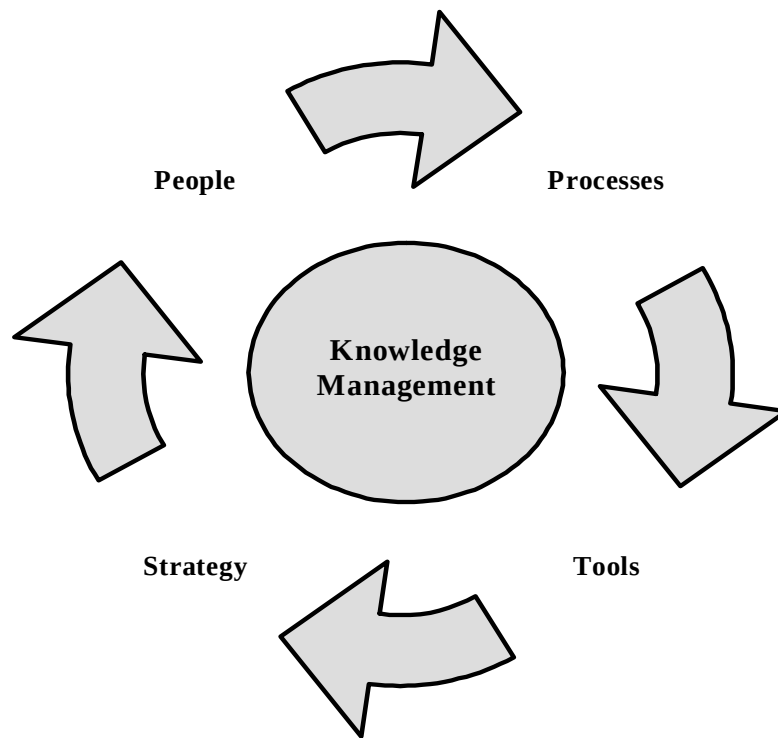


**Figure 1. Components of Knowledge Management (Tirpak, 2005).**

As Tirpak (2005) suggests, an integrated network of resources are required to effectively manage an enterprise’s knowledge resources, because according to Drucker (1993), knowledge is considered a corporate asset only if it is managed properly. Managing an organization’s intellectual capital can present challenges, because employees have complete ownership of the knowledge and can take it with them whenever they leave the

organization (Drucker, 1993). Therefore, in an effort to retain as much corporate knowledge as possible, Davenport and Prusak (1998) argue organizations should employ means to manage their collective knowledge and intellectual property in the same manner as tangible assets. Davenport and Prusak (1998) contend that knowledge resources only become a source of a competitive advantage when the workforce is able to access and transfer those resources. Similarly, Bixler (2005) claims that collective knowledge can improve the organization's performance and can provide an edge over rivals in a competitive market. However, Davenport and Prusak (1998) assert that in order to reap the full benefits of knowledge, organizations should manage and allocate resources for KM initiatives as they do for traditional assets. For instance, organizations could pursue a KM initiative to put corporate knowledge in a structured, document-based format that is easily accessible and transferable (Davenport, De Long, and Beers, 1998). As a result of making knowledge resources more accessible and transferable, more information and knowledge is available to managers to enhance their decision-making abilities (Davenport and Prusak, 1998). More importantly, KM initiatives and projects can help transform companies into knowledge-based organizations and achieve "higher levels of quality, creativity, and efficiency" (Davenport and Prusak, 1998, p. 17). Organizations can embark on a number of KM initiatives and projects to exploit their intellectual capital. KM scholars have provided several definitions of KM as evidence of the flexibility in how organizations can manage their knowledge resources. Calabrese (2005) defines KM as "the integration and balancing of leadership, organization, learning, and technology in an enterprise-wide setting" (p. 11). Holsapple and Joshi (2001) define KM

as a process of "getting the right knowledge to the right people at the right time so they can make the best decision" (p. 40). Lastly, Salisbury (2003) defines KM as the "deployment of a comprehensive system that enhances the growth of an organization's knowledge" (p. 128). The definitions of KM that have been provided by the three different authors are evidence that KM can have different roles/meanings in a particular context.

### **Knowledge Management Frameworks**

Knowledge management research has revealed an array of frameworks that can guide the development of KM programs. These frameworks can be classified into three categories: prescriptive, descriptive, or a combination of the two--hybrid frameworks (Rubenstein-Montano et al., 2001). Prescriptive frameworks (task-oriented frameworks) "provide direction on the types of knowledge management procedures can/should be accomplished." On the other hand, descriptive frameworks characterize or describe knowledge management (Rubenstein-Montano et al., 2001, p.7). Lastly, hybrid frameworks have characteristics of both prescriptive and descriptive frameworks. A discussion of three KM frameworks that were considered to guide this study is discussed below.

### **Factors Leading to Knowledge Project Success Framework (1998)**

Davenport and Prusak (1998) propose a framework to help organizations implement an effective KM program. The Factors Leading to Knowledge Project Success Framework is based on several aspects of a KM program that can indicate

whether it will be successful or not. The premise of their framework was derived from recognizing the most common factors present in what they considered “successful” KM programs. Their analysis resulted in the identification of nine common success indicators (Figure 2). Therefore, The Factors Leading to Knowledge Project Success Framework is considered a “descriptive” framework because it provides evidence of the types of things that lead to successful KM programs.

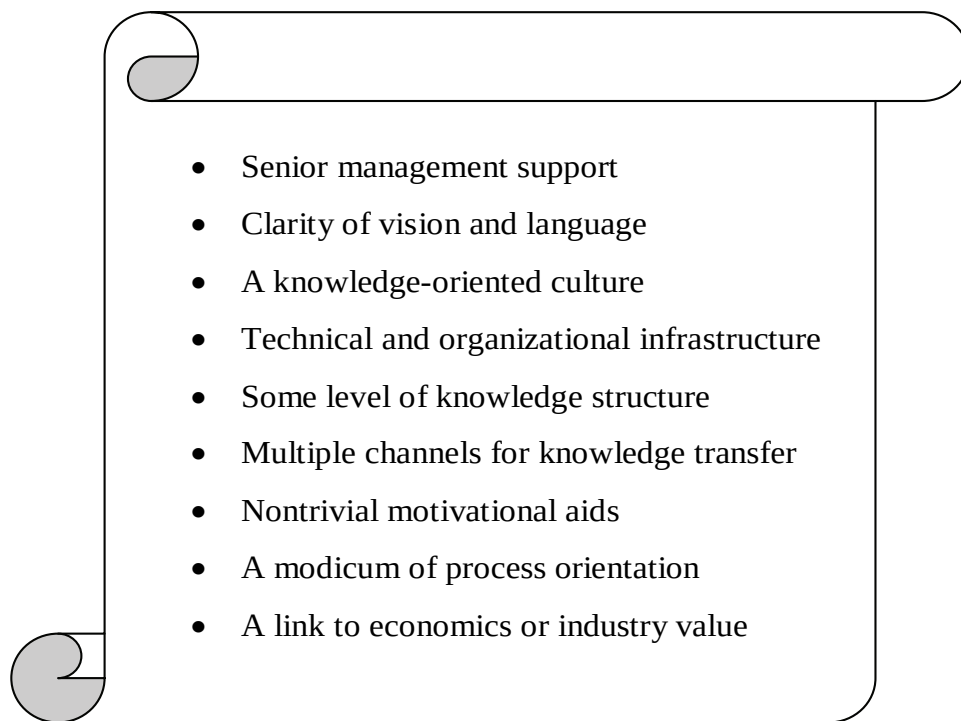


**Figure 2. Davenport and Prusak (1998) Factors Leading to Knowledge Project Success**

The Factors Leading to Knowledge Project Success Framework lists senior leadership support as a success indicator. According to Davenport and Prusak (1998), executive commitment is pivotal to the success of enterprise-level KM programs. Senior leaders’

ability to allocate resources for KM initiatives plays an important part in the survivability of KM programs. Additionally, senior management support is an indicator of KM success because leaders have an active role in establishing a clear strategy, vision, and culture that fosters the tenets of KM. As a result of establishing a clear strategy and vision the entire workforce understands, employees will be cognizant of the importance and benefits of KM and will begin to incorporate KM principles into business processes and procedures. However, a knowledge-based organization must be organized around processes to support KM efforts and have access to technical components to accomplish knowledge-based activities. A knowledge-oriented culture that utilizes technology and various communication tools to accomplish their duties promotes the likelihood of KM initiatives and projects success. Nonetheless, the technical infrastructure must be available and user-friendly to employees in order to completely exploit the capabilities of technology. The knowledge repositories that are made accessible by technology must be structured for “ease of use” and linked to multiple channels of to transfer knowledge to provide relevance to other knowledge areas in the organization. Managers can encourage employees to take advantage of the knowledge-based capabilities and processes by offering incentives. Moreover, having efficient and “user-friendly” processes encourages workers and customers to utilize the knowledge-based activities. As a result, successful KM projects can provide organizations the ability to reduce cost and increase profits. The next framework that will be discussed does not focus on indicators of success, but on elements to transfer knowledge.

## The Four Enablers of Transfer Framework (1998)

O'Dell and Grayson (1998) insist the most effective means to leverage an organization's knowledge resources is through efficient knowledge transfer. The Four Enablers of Transfer KM framework provides guidance for the best way to facilitate sharing knowledge throughout the enterprise. O'Dell and Grayson (1998) focus on creating a supportive environment for knowledge transfer by designing and aligning the right enablers. The four enablers of transfer are culture, technology, infrastructure, and measurement and all four enablers must work as a functional unit to achieve optimal knowledge transfer (Figure 3). The Enablers of Knowledge Transfer framework is considered to be a prescriptive framework because it provides direction on the types of enablers that should be in place to transfer knowledge. A description of each enabler is provided below.

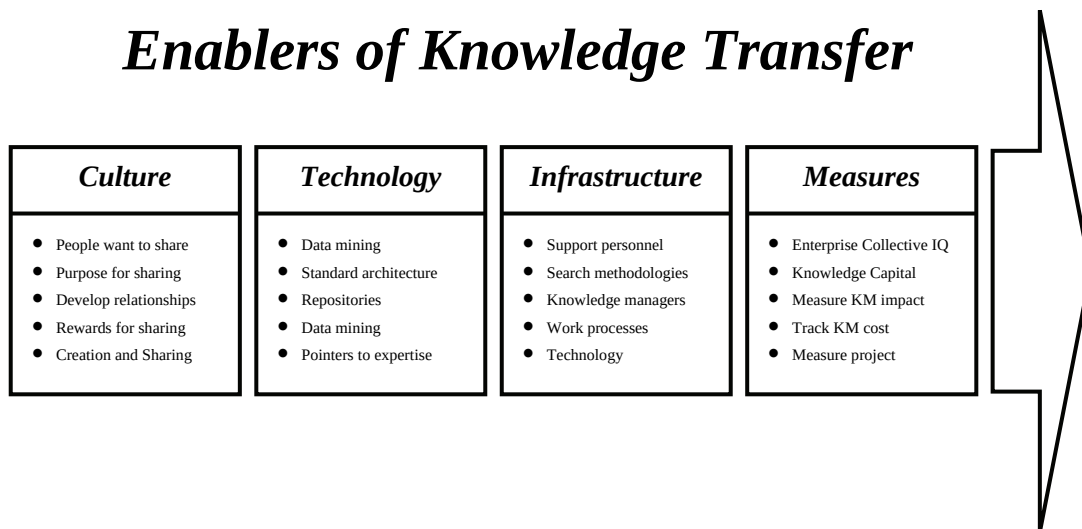


**Figure 3. The Enablers of Knowledge Transfer by O'Dell and Grayson (1998)**

## *Culture*

Organization culture is one of the most important components required to transfer knowledge. Managers have the responsibility to create a culture that understands the importance and benefits of sharing valuable corporate knowledge. Likewise, leaders are accountable for fostering an environment of people who have a responsibility to create and share knowledge. Management can influence its employees to participate in knowledge-sharing activities by developing a reward system. The reward system should encourage employees to take advantage of technology and processes to transfer corporate knowledge. Table 1 lists the culture component of the framework and its associated objectives. The objectives are actions an organization needs to take in order to support knowledge transfer.

**Table 1. The Culture Enablers of Knowledge Transfer by O'Dell and Grayson (1998)**

| <i><b>Enabler</b></i> | <i><b>Objectives</b></i>                                                                                                                                                                                                                                                                                           |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Culture               | Organizational leaders must believe employees want to share knowledge<br>Leaders must demonstrate the act of sharing and accessing knowledge<br>Develop collaborative relationships<br>Instill personal responsibility for knowledge creation and sharing<br>Provide reward for transferring and sharing knowledge |

## *Technology*

Technology has a key role in transferring corporate knowledge throughout the enterprise. Technology involves various devices (e.g. hardware, software, networks, and

other communication devices) to automate the knowledge transfer processes.

Technology can be used to store and transfer knowledge (both tacit and explicit knowledge) through mediums such as groupware, intranet, and databases. Technology also involves support and problem-solutions systems that can provide answers (knowledge) to employees in real-time. However, O'Dell and Grayson (1998) suggest standardizing the enterprise's architecture maximizes knowledge transfer throughput capabilities. A common architecture is an important component of the infrastructure necessary to transfer knowledge. Table 2 lists the technology component of the framework and its associated objectives. The objectives are actions the organization needs to take in order to support knowledge transfer.

**Table 2. The Technology Enablers of Knowledge Transfer by O'Dell and Grayson (1998)**

| <i><b>Enabler</b></i> | <i><b>Objectives</b></i>                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Technology            | A synergistic relationship between technology and KM<br>Collaborative groupware, internet, intranet, and database tools<br>Standardize enterprise architecture<br>Structure document repositories<br>Discussion databases<br>Pointers to knowledge experts<br>Document exchange and video infrastructure<br>Performance support systems<br>Data mining, decision support, and real-time intelligent data analysis |

### *Infrastructure*

A knowledge transfer infrastructure involves an intricate network of employees, technology, and processes working in concert to achieve a fluid transfer of knowledge. The infrastructure also includes the strategy to bring the people, processes, and technology together for knowledge transfer. The people component of the infrastructure consists of a variety of knowledge professionals that have a role in ensuring knowledge is transferred efficiently and effectively. Knowledge professionals include information services, help desks, knowledge managers, facilitators, and change agents working collectively to transfer knowledge. Moreover, the knowledge professionals must have access to the proper technology to transfer knowledge and knowledge professionals must also adhere to work processes to transfer organizational knowledge. Table 3 lists the infrastructure component of the framework and its associated objectives. The objectives are actions the organization needs to take in order to support knowledge transfer.

**Table 3. The Infrastructure Enablers of Knowledge Transfer by O'Dell and Grayson (1998)**

| <i><b>Enabler</b></i> | <i><b>Objectives</b></i>                           |
|-----------------------|----------------------------------------------------|
| Infrastructure        | Technology                                         |
|                       | Work processes                                     |
|                       | Networks of people                                 |
|                       | Organizational structure surrounding the processes |
|                       | Discussion databases                               |
|                       | Repositories                                       |
|                       | Autonomous agents                                  |
|                       | Search methodologies                               |
|                       | Information services                               |
|                       | Help desk                                          |
|                       | Communities of practice                            |
|                       | Knowledge managers                                 |
|                       | Knowledge integrators                              |
|                       | Facilitators                                       |
|                       | Change agents                                      |
|                       | Technical assistance                               |

### *Measurements*

O'Dell and Grayson (1998) suggest taking measures to determine the effectiveness of knowledge transfer. The first metric O'Dell and Grayson (1998) suggest taking is the organization's collective IQ. The organization's collective IQ is a measure to estimate the amount of intellectual capital in the organization that is available for knowledge transfer. Other metrics involve measuring the impact knowledge transfer has on decision-making ability, employee's performance, success of projects, and business processes as a result of implementing knowledge transfer capabilities. Lastly, the effectiveness of knowledge transfer can be determined by returns on the investments

made in KM. The costs invested in KM initiatives and projects can be tracked to determine the overall effectiveness of knowledge transfer. The KM initiatives should result in money saved or money earned for the organization. Table 4 lists the measurement component of the framework and its associated objectives. The objectives are actions the organization needs to take in order to support knowledge transfer.

**Table 4. The Measurement Enablers of Knowledge Transfer by O'Dell and Grayson (1998)**

| <i>Enabler</i> | <i>Objectives</i>                                                                                                                                                                                                                                                                                                                                                               |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measures       | Collective IQ of the enterprise<br>Knowledge capital of the company<br>Improved decision-making<br>Development of better products<br>Measure the impact KM has on performance<br>Measure the success of projects and business processes<br>Link KM outcomes to original value proposition<br>Measure KM through activities<br>Track actual cost of KM support and projects (IT) |

The next framework that will be discussed does not place less emphasis on transferring knowledge, but more on elements necessary to manage knowledge.

### **The Four Pillar Framework (1999)**

Stankosky, Calabrese and Baldanza (1999) propose a KM program framework to exploit and leverage organizational knowledge. The framework by Stankosky et al. (1999) suggests that “managing an organization’s knowledge assets can be more effectively achieved by designing a KM program that uses a defined framework” (p. 7).

Stankosky was motivated to discover a KM program framework because many KM programs were dysfunctional and resulted in underutilized and wasted resources (Stankosky et al., 1999). Therefore, he and his colleagues created a KM framework to provide organizations a way to determine the added value of their KM program, and to provide them a set of components to incorporate into the design and implementation of one. The framework by Stankosky et al. recommends that KM initiatives be aligned with the business strategy and must contain elements (components) of leadership, culture, learning, and technology to produce desired results. This "Four Pillar framework" contains a balance of each element in order to effectively leverage the enterprise's knowledge resources. It also alleviates the problem of placing too much emphasis on one aspect of a KM program while not exploiting the capabilities of another element.

Stankosky et al. grouped the four primary components into categories referred to as pillars, hence the name "Four Pillar" framework (Figure 4). The Four Pillars represent Leadership, Organization, Technology, and Learning and each pillar is comprised of sub-elements that support that particular pillar. The four pillars are the foundation of a fully functional KM program and reinforce each other for peak performance. All four pillars are equally important and must operate in a systematic fashion. Therefore, the Four Pillar framework contains characteristics of both a prescriptive and a descriptive framework because it provides direction on the types of KM elements that should be incorporated into an enterprise-level KM program, and it also describes the key elements and sub-elements of a KM program (Rubenstein-Montano et al., 2001).

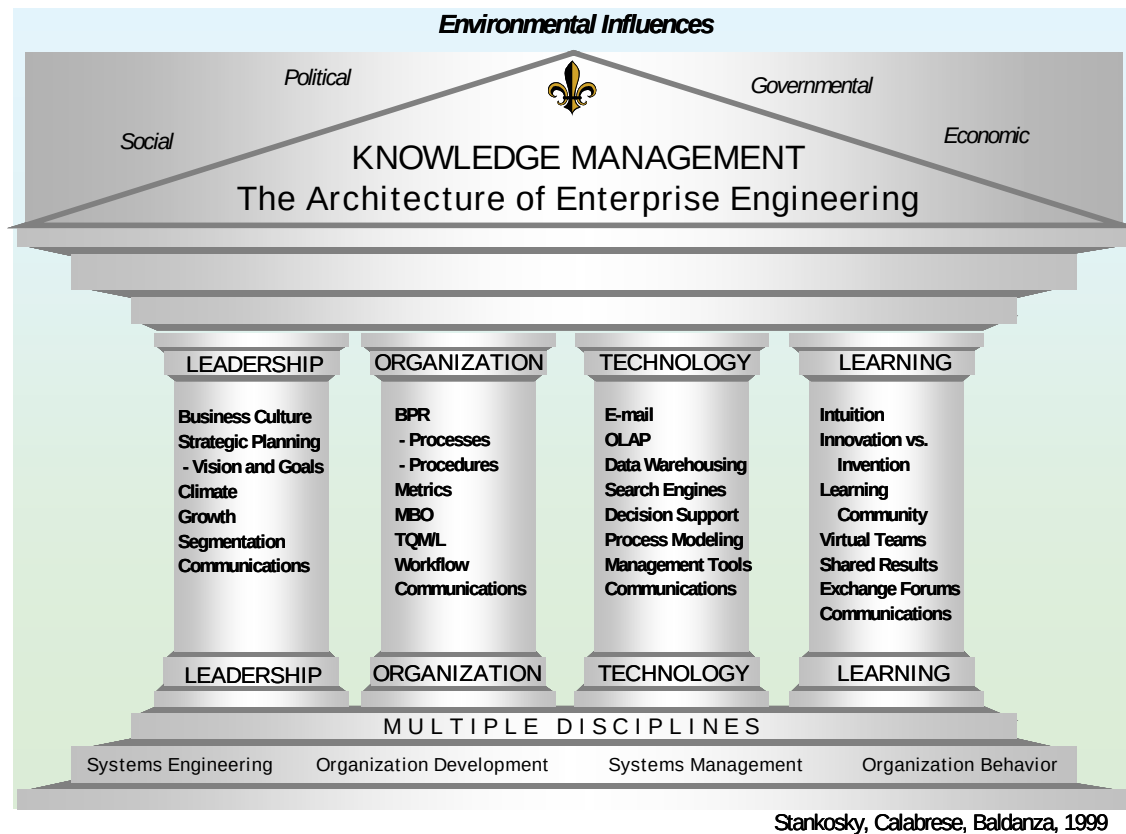


**Figure 4. The Four Pillar Framework by Stankosky, Calabrese, and Baldanza (1999)**

### *Leadership*

The leadership element of the Four Pillar framework “deals with the environmental, strategic, and enterprise-level decision-making processes that involves the values, objectives, knowledge requirements, knowledge sources, prioritization, and resources allocation of the organization’s knowledge assets” (Stankosky, 2005, p. 5). Senior management is also responsible for supporting KM initiatives and projects for the benefit of the enterprise (Stankosky, 2005). Listed below in Table 5 are the sub-elements that reinforce the leadership pillar.

**Table 5. The Leadership Elements of the Four Pillar Framework**

| <i>Key Element</i> | <i>Sub-Elements</i>                                                                                                                                                                                                                                              |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Leadership</i>  | Strategic Planning<br>Vision Sharing<br>Specific and general goals and objectives<br>Executive commitment<br>KM programs tied to metrics<br>Tangible rewards for use of KM<br>Special recognition for knowledge sharing<br>Performance criteria include KM items |

(Stankosky et al.)

### *Organization*

The organization element of the Four Pillar Framework “deals with the operational aspects of knowledge assets, including functions, process, formal and informal organizational structures, control measures, metrics, process improvement and business process reengineering” (Stankosky, 2005, p. 6). The organization component also identifies some cultural and environmental influences on KM programs. The organization’s culture has an influence on the approach taken to implement KM programs. Cultural influences can involve trust issues that can negatively impact sharing knowledge throughout the enterprise. Organizational influences can also negatively impact KM programs. For example some research suggests that hierarchical organizations that implement KM programs have a lower chance of success (Stankosky, 2005). Listed below in Table 6 are sub-elements that reinforce the organization/culture pillar.

**Table 6. The Organization/Culture Elements of the Four Pillar Framework**

| <i>Key Element</i>  | <i>Sub-Elements</i>                                                                                                                                                                                                                                                                                                                                                            |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Organization</i> | Process Work-flows<br>Operating Procedures for knowledge sharing<br>Business Process Reengineering (BPR)<br>Management by Objectives (MBO)<br>Total Quality Management (TQM)<br>Metric Standards<br>Hierarchical, Centralized, Decentralized Organizations<br>Matrix type organization<br>Open/Sharing<br>Closed/Power Based<br>Internal partnering vs. competing type culture |

(Stankosky et al.)

### *Technology*

The technology element of the Four Pillar Framework “deals with various information technologies peculiar to support and/or enabling KM strategies and operations” (Stankosky, 2005, p. 6). The technology pillar includes devices that facilitate the automation of KM functions. The choices of technological components used to support KM efforts within the enterprise are influenced by three aspects: the particular type of KM program implemented, the organization’s culture, and the organization’s environment (Stankosky, 2005). Listed below in Table 7 are the sub-elements that reinforce the technology pillar.

**Table 7. The Technology Elements of the Four Pillar Framework**

| <i>Key Element</i> | <i>Sub-Elements</i>                                                                                                                                                                                               |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Technology</i>  | Data Warehousing<br>Database Management software<br>Multi-media repositories<br>Groupware<br>Decision Support Systems<br>Corporate Intranet<br>Business Modeling Systems<br>Intelligent Agents<br>Neural Networks |

(Stankosky et al.)

### *Learning*

The learning element of the Four Pillar Framework “deals with organizational behavioral aspects and social engineering. The learning pillar focuses on the principals and practices to ensure that individuals collaborate and share knowledge to the maximum” (Stankosky, 2005, p. 6). Table 8 lists the sub-elements that reinforce the learning pillar.

**Table 8. The Learning Elements of the Four Pillar Framework**

| <i>Key Element</i> | <i>Sub-Elements</i>                                                                                                                                                                                                                                                                                                                        |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Learning</i>    | Tacit and explicit knowledge understood<br>Sharing vision/team learning<br>Management support for continuous learning<br>Knowledge Captured and distributed<br>KM values and principles formally encouraged<br>Virtual teams/exchange forums in use<br>Communities of practice/shared results<br>Innovation encouraged/recognized/rewarded |

(Stankosky et al.)

### **Background on KM in the Military**

The Chairman of the Joint Chiefs of Staff identified knowledge as one of the necessary actions to integrate the services into a seamless military force (Department of Defense, 2005b). The Capstone Concept for Joint Operations mandates that each service take necessary actions for “acquiring, refining, and sharing knowledge” as an U.S. Joint Force (Department of Defense, 2005a). The Capstone Concept for Joint Operations also states that the future joint force must be knowledge empowered (Department of Defense, 2005a). Paragraph 4.E.1., titled Knowledge Empowered, of The Capstone Concept for Joint Operations (2005a) states:

The future joint force will emphasize better decisions made faster throughout all levels of command. The fundamentals of this knowledge empowerment are experienced and empowered decision makers benefits from an enhanced understanding of the environment, potential adversaries and cultures, as well as enhanced collaborative decision-

making processes. Although we will never eliminate the fog of war, an increased level of understanding should empower leaders through the joint force. This will enable them to anticipate the act as opportunities are present, apply innovative solutions, mitigate risk, and increase the pace, coherence, and effectiveness of operations even in complex environments. A knowledge-empowered force, capable of effective information sharing across all agencies and partners, will be able to make better decisions quicker, increasing joint force effectiveness. (Department of Defense, 2005a, p.21)

The *Net-Centric Environment Joint Functional Concept* (2005b) specifies the role and benefits of knowledge in a joint military force.

The Net-Centric Environment Joint Functional Concept (NCE JFC) describes capabilities derived from the exploitation of the shared knowledge and technical connectivity of all Joint Force elements to achieve unprecedented levels of operational effectiveness and efficiency...Net-Centric capabilities focus directly on human interaction through knowledge sharing enabled by the dramatic advances in information technology. (Department of Defense, 2005b, p.1)

The *Net-Centric Environment Joint Functional Concept* (2005b) predict some of the benefits created by knowledge in an operational setting.

By removing the knowledge and technical barriers to the flow of information, the Joint Force and its mission partners will be able to operate with a significantly higher degree of agility and effectiveness as a result of their increased integration and constructive interdependence. (Department of Defense, 2005b, p. 19)

The different services have begun to execute KM practices to organize and share their knowledge.

### **U.S. Army**

The Army has made significant progress in implementing a strategy and goals to become a net-centric, knowledge-based organization. The Secretary of the Army and the

Chief of Staff of the Army have been key players in enforcing policy to transform the Army. The Secretary of the Army and the Chief of Staff of the Army have been involved with developing a vision, strategy and objectives to dramatically change the Army. The *Army Knowledge Management Strategic Plan* (2003) lists objectives to reengineer the Army into a knowledge-base organization. The objectives include efforts to:

- adopt governance and cultural changes to become a knowledge-based organization
- foster an enterprise-level understanding of the Army's Knowledge Management vision
- develop guidance and policies consistent with the Army KM Vision
- integrate knowledge management concepts such as knowledge sharing, e-learning, and collaboration into Army processes
- manage the infostructure as an enterprise to enhance capabilities and efficiencies in compliance with the Capstone AKEA (Army Knowledge Enterprise Architecture)
- institutionalize Army Knowledge Online as the enterprise portal to provide universal, secure access for the entire Army
- improve information availability and knowledge sharing
- harness human capital for the knowledge-based organization

The Army is diligently pursuing these objectives and has accomplished many of them. For instance, the Army has already created an enterprise-level knowledge portal and mandated that active duty, reserve, and National Guard make their processes available on the Army Knowledge Online portal (Department of the Army, 2001). The Army's senior leaders have been clear and consistent about the vision and purpose of KM. The

Secretary of the Army and the Chief of Staff of the Army released a memorandum that states:

Army Knowledge Management (AKM) is the Army strategy to transform itself into a network-centric, knowledge-base force. This effort is an integral part of Army Transformation. AKM is intended to improve decision dominance by our warfighters and business stewards—in the battlespace, in our organizations, and in our mission processes. (Department of the Army, 2001, p. 1).

The Secretary of the Army and the Chief of Staff of the Army have made the Army Knowledge Management Program a team effort. In doing so, leadership has made soldiers aware they are integral members in achieving the goals and objectives necessary to become a network-centric and knowledge-based organization. The Secretary of the Army and the Chief of Staff released a memorandum to Army personnel to solicit their support in the KM initiatives. The memorandum reads:

In support of AKM, we need your support in communicating our goals to your people and moving full speed ahead with us to institute best business practices, managing our infostructure at the enterprise level, tapping Army talent, and encouraging innovation. We expect your advocacy and full support as we collectively work through any challenges. As leaders of a more lethal and agile force, we must work together to achieve the enterprise AKO goals in support of Army Transformation. The Army CIO will establish a reporting format to track our progress towards these milestones and report the status to us quarterly. (Department of the Army, 2001, p. 2)

The Army has established goals and objectives to become a knowledge-base force and has made significant progress in changing the Army's culture. The Army has exploited the capabilities of technology to manage and transfer enterprise-wide knowledge. Web-based tools are the backbone of Army's KM (AKM) program. The AKM program

utilizes top secret networks for operations and intelligence. The Army Knowledge Online Secret (AKO-S) web-based tool is used to transfer secret content via secure web-mail on the SIPRNET, and the Army Knowledge Online (AKO), which is considered the “Army’s daily workhorse,” is used to transfer sensitive but unclassified information and knowledge (Cuviallo, 2002, p. 5). The AKM has several knowledge and web-based activities that are available via the AKO-S and the AKO that include: Logistics Knowledge Center, security clearance tracking, Army Mart e-commerce, Strategic Readiness System, and a host of other programs (Cuviallo, 2002). The AKO’s core capabilities include: universal e-mail address, military search engine, Army data warehouse, Army flow model, and secure architecture (Cuviallo, 2002).

### **The Department of the Navy (DON)**

The Department of the Navy has a four-person CIO team that includes one overall CIO and three deputy CIOs: Deputy CIO for Policy and Integration, Deputy CIO for the Navy, and Deputy CIO for the Marine Corps (Department of the Navy, 2006). Knowledge Management is among several offices the Deputy CIO for Policy and Integration is responsible for. The DON KM office executes KM processes for both the Navy and Marine Corps. The DON has a KM framework to manage their service’s knowledge resources. The DON KM framework consists of elements of process, culture, learning, technology, and content (Nox, n.d.). The Navy Knowledge Online and Virtual Knowledge Repository also comprise the technological component of the DON KM framework and provide 24-hour access to DON information, knowledge, best practices,

and problem solutions. Listed in the *Department of the Navy, Information Management and Information Technology Strategic Plan* (2006-2007) is a goal to “create, align, and share knowledge to enable effective and agile decision-making to achieve knowledge dominance” (Department of the Navy, 2006-2007, p. 15). The DON’s senior leaders announce a plan to become a more knowledge-centric force:

We will integrate technology and processes within FORCEnet that will transform our ability to rapidly and effectively provide assured, accurate, and timely information to the warfighter. This rapid exchange of all source knowledge will be critical to the effective employment of our vast intelligence capability, battlefield awareness insight, and weapons capabilities. Similarly, we will emphasize seamless knowledge transfer between both people and application in designing and deploying future support processes. We will move from a culture that rewards the retention of knowledge to one that rewards the effective transfer of knowledge. (p. 15)

Also listed in the *Department of the Navy, Information Management and Information Technology Strategic Plan* (2006-2007) are strategies to facilitate the transformation of a knowledge-based DON. The strategies include efforts to:

- create the knowledge culture and processes to operationalize the sharing of essential information
- implement a comprehensive standards-based content management strategy across the department
- establish single authoritative data sources across the department
- effectively manage records and continue the department-wide implementation of electronic records management

The Navy Marine Corp Intranet (NMCI) is also an extension of the DON’s KM initiatives. The NMCI is a milestone to achieving the DoD’s Joint Vision 2010 and Joint Vision 2020 by providing knowledge sharing across the globe. NMCI provide sailors

and Marines access to enterprise network-based information services around-the-clock. NMCI allows integrated voice, video, and data communication capabilities. Furthermore, the NMCI provides information throughout the DON via standard platforms to enhance optimal system interoperability.

### **The U.S. Air Force**

The Air Force portal and the Air Force Knowledge Now portal (AFKN) provide airmen access to an array of information and knowledge. The Air Force Knowledge Now portal is the focal point for Air Force knowledge resources, equipped with e-learning, virtual libraries, and communities of practice (CoPs). AFKN is constantly improving and promoting innovation to provide quality services to Air Force customers. The Air Force CIO recognizes KM has a role in “supporting our Air Force vision requires integrated information/knowledge to the decision-maker at all levels” (Gilligan, 2005, slide, 15). The Air Force CIO (during 2004) implemented a strategy to transform the Air Force Knowledge Now portal (AFKN) in an enterprise-level KM portal. In a memorandum signed by Mr. John Gillian (the Chief Information Officer at the time) stated his view on KM:

Knowledge Management is a key component in our Air Force strategy to enable effective net centric operators. That is, Knowledge Management enables transfer and retention of expertise and organization knowledge across boundaries. I have reviewed several Knowledge Management initiatives across the Air Force and determined the most mature and successful to date is the “Air Force Knowledge Now” that has been developed by AFMC...With your support, I would like to adopt the approach developed by Air Force Knowledge Now (AFKN) Air Force-wide. (Gilligan, 2004, p. 1)

Nguyen (2000) proposed a plan to create a knowledge-centric U.S. Air Force. Nguyen stated:

The Air Force must ensure that its warfighters have access to the knowledge they need, when they need it, and in the required form, in order to achieve desired mission outcomes and information superiority. To that end, it faces the challenge of implementing Knowledge Management (KM) principles and standards across the Air Force in order to retain the knowledge that exists in the minds of those who are leaving, so that it can be transferred to its younger and less-experienced personnel. (Nguyen, 2000, p. 1)

The Air Force is definitely underway to becoming a knowledge-based organization, which is aligned with Capstone Concepts of Joint Operations and the DoD Net-Centric Environment Joint Functional Concept.

### **III. Methodology**

#### **Introduction**

The office of the Chairmen of the Joint Chiefs of Staff (CJCS) has released several joint documents explaining the significance of operating as a joint military force (Department of Defense, 2005a, 2005b). The CJCS has goal to cultivate a U.S. joint force enabled by shared knowledge and technical resources (Department of Defense, 2005b). The CJCS has mandated that each service implement measures to organize and to share their knowledge resources as an integrated unit (Department of Defense, 2005a). The strategy and vision has been articulated to initiate the campaign for a joint knowledge-based military; however, explicit procedures on how to achieve this unified objective have not (Department of Defense, 2005a, 2005b). As a result, each service has some latitude on (1) how they are going to organize and share their knowledge as an enterprise and (2) how they are going to share their structured knowledge and information assets as a seamless coalition of U.S. military forces. Therefore, the purpose of this study is to provide a comparative assessment of KM programs across the U.S. armed services. The assessment was guided by The Four Pillar Framework (Stankosky, 2000) and the three primary military departments' (Army, Navy, and Air Force) KM programs were evaluated at the service (enterprise) level. A case study design was used to examine the content of each KM program. A discussion of the case study design, data collection process, and the methods taken to ensure design quality are presented in this chapter.

## Case Study Research

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, p. 13). Yin (2003) suggests using a case study design when investigating a contemporary event that offers little or no control over what is being studied. This assessment involved analyzing KM programs (a contemporary event) the military services currently use to manage their intellectual capital. The KM programs were analyzed in their “real-life context” and did not allow any manipulation from outside influences. The investigative questions posed to reveal the content of each service’s KM program were aligned with the case study framework. Generally “how” or “why” questions favor case studies, but due to overlaps among the different strategies, “what” questions were appropriate as well (Yin, 2003). Therefore, according to Yin (2003) the components of this assessment were congruent with using the case study methodology to understand the nature of U.S. military KM programs (Figure 5).

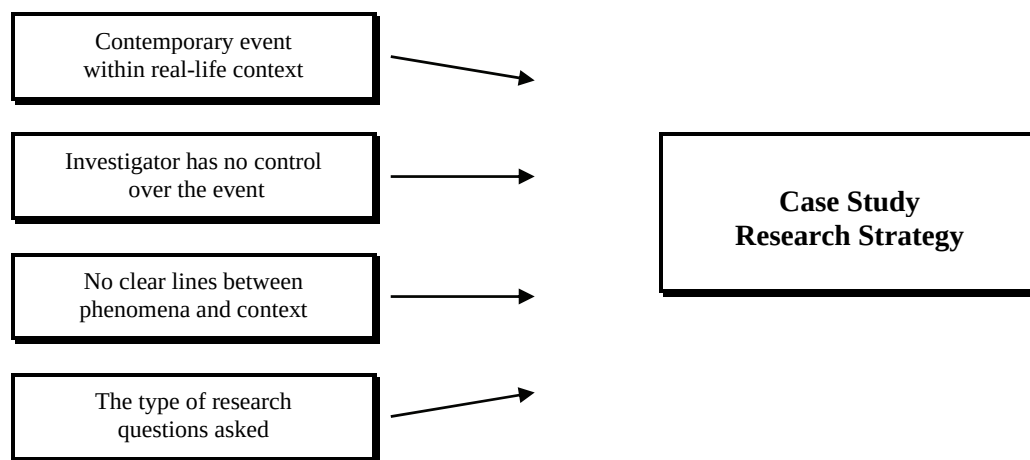


**Figure 5. The criteria for using a case study strategy (Yin, 2003)**

This descriptive case study revealed the character of each service's KM program and the mechanisms currently employed to manage intellectual property. Yin (2003) states that descriptive case studies, "illustrate certain topics within an evaluation" (p. 15). A case study design has the ability to address multiple objectives involved in research. "Case study as a research strategy comprises an all-encompassing method—covering the logic of design, data collection techniques, and specific approaches to data analysis" (Yin, 2003, p. 14). The research logic design, data collection, and data analysis are fundamental elements of research and are significant in executing case studies effectively. According to Yin (2003) the five necessary components of case study research are (Yin, 2003):

1. Research questions
2. Propositions
3. Unit of analysis
4. Data Collection/Analysis
5. Criteria for interpreting the data

A narrative of each component and how it relates to this case study is provided below.

### **Research Questions**

As stated earlier, ideally "how" or "why" questions are more in aligned with the case study strategy, but "what" questions are appropriate as well (Yin, 2003). "What" questions were effective in exploring the content of each service's KM program according to the framework used to guide this research. The overarching research question that guided this investigation was: "How do KM programs compare across the

U.S. armed services?” Investigative questions IQ1 – IQ4 were formulated to help answer the primary research question stated above.

IQ 1. What elements of KM leadership can be identified?

IQ 2. What elements of organization/culture needed for KM can be identified?

IQ 3. What technology/tools are being used to support KM efforts?

IQ 4. What elements of a learning enterprise can be identified?

The four investigative questions established the direction of this study.

### **Proposition**

A proposition is a statement that “directs attention to something that should be examined within the scope of study” (Yin, 2003, p. 22). The proposition helped to identify what to study and established boundaries of the assessment. The statement that helped isolate the focus of the investigation was: Using a standard of comparison, there will be similarities and differences between service-level KM programs. This proposition underscored what was to be concentrated on and identified the scope of this evaluation.

### **Unit of analysis**

The unit of analysis refers to the particular unit (or entity) being analyzed in research. In this study, the unit of analysis is also referred to as a “case.” A case can be an individual, group, organization, program or process (Schwab, 2005). The unit of analysis in this study was service-level KM programs and each case was treated as a separate study. This research required conducting an assessment across the U.S. armed

services' KM programs. Service-level KM programs consist of the mechanisms in place that help to manage and to exploit intellectual property throughout the enterprise. The enterprise (service) is defined at the department level, for instance, the Department of the Army, Department of the Navy, and the Department of the Air Force. Each department includes geographically separated units, divisions, commands, and functional areas. KM efforts present at organizational levels other than the enterprise level will not be included in this study. Therefore, this assessment entailed analyzing the "global nature" of each service-level KM program which makes this a multiple, holistic case study (Yin, 2003, p.41). Table 8 lists the characteristics of this research design. An explanation on how data was collected and analyzed will be discussed next.

**Table 8. Characteristics of this Study's Research Design**

| <i>Characteristic</i> | <i>Description of Characteristic</i>                                                                                                                                                 |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Case Study            | 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 |
| Descriptive           | Illustrates certain topics within an evaluation (Yin, 2003, p. 15)                                                                                                                   |
| Holistic              | A case study that only examines the global nature of an organization or program                                                                                                      |
| Multiple Cases        | A research design that involves more than one case                                                                                                                                   |

## **Research Design**

There are several definitions of research design and explanations of its role in research. Yin (2003) defines research design as, “A logical plan for getting from here to there, where here may be defined as the initial set of questions to be answered, and there is some set of conclusion (answers) about these questions” (p. 20). Nachmias and Nachmias (1992) define research design as:

A plan that guides the investigator in the process of collecting, analyzing, and interpreting observations. It is a logical model of proof that allows the researcher to draw inferences concerning causal relations among the variables under investigation (p. 77-78).

Philliber, Schwab, and Samsloss (1980) define research design as: “A blueprint of research, dealing with at least four problems: what questions to study, what data are relevant, what data to collect, and how to analyze the results” (as cited in Yin, 2003, p.21). The various definitions suggest that a research design ensures the researcher has a predetermined course of action to link evidence back to the initial research questions. A well thought-out plan guarantees the research methodology produces accurate conclusions that were derived from accurate data (Yin, 2003). The research design process for this research began with collecting data on the services’ KM program. The data collection process was guided by the Four Pillar Framework (Stankosky et al., 2000).

## **The Framework to Guide the Assessment**

Chapter II contains a description of three different KM frameworks: Factors Leading to Knowledge Project Success (Davenport and Prusak, 1998), Enablers of

Knowledge Transfer (O'Dell and Grayson, 1998), and the Four Pillar Framework (Stankosky, Calabrese, and Baldanza, 1999). As previously explained, the Four Pillar Framework was selected to guide this comparative assessment of the armed services' KM programs. The Four Pillar Framework is more robust than the Factors Leading to Knowledge Project Success Framework and the elements were more detailed than the Enablers of Knowledge Transfer Framework. Although the Enablers of Knowledge Transfer Framework was just as robust, its components were more difficult to identify than the elements of the Four Pillar Framework. In contrast to the Four Pillar Framework, the Enablers of Knowledge Transfer Framework focuses in some respect on the ability to measure the effectiveness of the KM program which is not applicable to this study due to the immaturity of service KM programs. Therefore, the elements of the Four Pillar Framework are more appropriate for assessing the military's efforts to implement enterprise-level KM programs.

### **Data Collection**

Case studies have the ability to deal with a variety of evidence—documents, artifacts, observations, and interviews (Yin, 2003). Data was collected on each department's KM program (Department of the Army, Department of the Navy, and the Department of the Air Force) by analyzing documentation, KM portals, and through KM practitioner interviews. A discussion on how each source of evidence was collected is provided below.

### *Documents*

Documents pertaining to each service's KM program were retrieved from sources other than KM portals. For example, documents were retrieved using "Google," (the web-based search engine), extracted from military websites (i.e. DON CIO website), and provided by KM practitioners. Microsoft Word, PowerPoint, and Adobe (PDF) documents were retrieved from the sources stated above. The following terms were entered into the "search window" of Google and military websites to locate KM documents:

"Service" = Army, Navy, Air Force and Marine Corps. For example, Army Knowledge Management, Navy Knowledge Management, etc...

1. "Service" Knowledge Management
2. "Service" Knowledge

The documents that were used in the investigation were labeled to denote where they were obtained and are listed in Appendices B - D.

### *KM Portal Documents*

The documents retrieved from each service's KM portal or information/knowledge repository were labeled KM Portal Documents. These documents were retrieved from the Army Knowledge Online (AKO) portal, Navy Knowledge Online (NKO) portal, and from the Air Force Knowledge Now (AFKN) website.

Obtaining a guest account on the AKO (<https://www.us.army.mil/suite/authenticate.do>) was necessary to gain access to the Army's knowledge and information content. The Army Knowledge Online portal has directions on how to apply for a guest account on its home page. The application process required a current AKO user to sponsor the guest account. After the guest account application was submitted with the sponsor's username and the guest's personal information, the AKO registration system generated an e-mail message that notified the sponsor a member has requested an account on the AKO. The AKO sponsor approved the request and the guest account was activated. The guest account provided limited access to Army knowledge and information. The guest registration process for the Navy Knowledge Online (NKO) portal was similar to the guest account procedures on the AKO.

The Navy Knowledge Online (NKO) (<https://wwwa.nko.navy.mil/portal/splash/index.jsp>) also provided a menu on its home page with directions on how to create a guest account. Similar to AKO, the NKO guest account procedures required sponsorship by a Navy affiliate (active duty, reservist, or Navy contractor) who currently has an account on the NKO. In contrast to the AKO, the NKO requires sponsors to have administrator privileges in order to sponsor guest accounts. Therefore, the NKO user had to request administrator privileges from the NKO system administrator. Once the guest account application was completed with the NKO sponsor's username and guest's personal information, the NKO registration system generated an e-mail message to that notified the NKO sponsor a member has requested an account on the NKO. The NKO sponsor approved the request for the guest account was activated. Like the AKO guest account,

the NKO guest account provided limited access to the DON's knowledge and information. The web-base tools provided access to KM information. Guest account procedures were not required to gain access to the Air Force Knowledge Now (AFKN) website.

The AFKN website (<https://rso.my.af.mil/afknprod/ASPs/CoP/Entry.asp?Filter=OO>) was also accessed for KM material. AFKN was accessed from computer terminals on the Air Force network. Several Microsoft Word, PowerPoint, and Adobe (PDF) documents were obtained from the AFKN portal.

#### *KM Practitioner Feedback*

KM practitioner feedback provided the third source of evidence. KM practitioners were identified as a source of evidence due to their familiarity with their service's KM program. A total of nine KM practitioners were desired to participate in this study—three KM practitioners from each department (Army, Navy, and Air Force). A background paper on the Four Pillar framework (Stankosky et al.) and a KM Practitioner Feedback Checklist (Microsoft Excel Spreadsheet) was e-mailed to each respondent. The background paper on the Four Pillar Framework (Stankosky et al.) explained the significance of using a framework to design and to implement an enterprise-level (service-level) program effectively (see Appendix A). The Four Pillar Framework checklist was composed of the four key elements (pillars), Leadership, Organization, Technology, and Learning along with their associated sub-elements. The checklist provided a space beside each element for the respondent to indicate if that particular sub-element is present their service's KM program. The KM practitioners

completed the checklists and returned them with data pertinent to their service's KM program.

### **Data Analysis**

Pattern-matching was used to analyze the data obtained from documents, KM portals, and KM practitioner feedback by linking “several pieces of information from the same case to a theoretical” framework (Yin, 2003, p. 26). The pattern-matching technique was accomplished by examining each department's KM program (Department of the Army, Department of the Navy, and the Department of the Air Force) and linking those elements to the Four Pillar Framework (Stankosky et al.). A cross-case synthesis was used to make the link between the pieces of information and theoretical framework by analyzing multiple cases. The cross-case analysis required that each individual case be treated as a separate case study to allow for the aggregation of findings across the individual studies (Yin, 2003). As Yin (2003) suggests, cross-case synthesis was achieved by creating “tables that displayed the data from the individual cases according to a uniform framework” (p. 134). The researcher created these tables in the form of a data collection matrix which will be discussed in detail in the results and analysis section. An analysis of the entire collection of populated tables provided the ability to draw cross-case conclusions about the KM programs' character. A series of design quality checks were performed to ensure quality research design and data analysis.

### **Research Design Quality**

Research design quality refers to how well the researcher executed the plan for collecting and analyzing data. The following checks were performed to ensure the design

quality: construct validity, internal validity, external validity, and reliability (Yin, 2003).

Two sets of definitions are listed below to provide a different perspective in understanding each test. One set of definitions is by Schwab (2005) and the other set of definitions are by Kidder and Judd (1986). The set of definitions by Schwab (2005) are from a general research perspective, including both qualitative and quantitative research (Figure 6). On the other hand, the definitions that have been provided by Kidder and Judd (1986) have been defined from a case study research perspective (Figure 7).

- ▶ **Content Validity** when a measure is judged to construct valid, usually by individuals who are thought to be subject matter experts
- ▶ **Internal Validity** present when variation in scores on a measure of an independent variable is responsible for variation in scores on a measure of a dependent variable
- ▶ **External Validity** present when findings obtained in a research study, other than statistical generalization, are correctly generalized
- ▶ **Reliability** the consistency of measurement. Formally, it is the ratio of systematic score variance to total variance.

Figure 6. Definitions of quality research design tests by Schwab (2005, p. 300 – 306)

- ❖ **Construct Validity** establishes correct operational measures for the concepts being studied
- ❖ **Internal Validity** establishes a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships
- ❖ **External Validity** establishes the domain to which a study's finding can be generalized
- ❖ **Reliability** demonstrates that the operations of a study—such as the data collection procedures—can be repeated, with the same results

Figure 7. Definitions of quality research design tests by Kidder and Judd (1986, p. 26-29)

An explanation of the case study tactic used to satisfy each test is provided below. Yin (2003) offers the following list of case study tactics to ensure a quality research design (Table 9).

**Table 9. Yin (2003) Case Study Tactics for Four Design Tests**

| <i>Tests</i>       | <i>Case Study Tactic</i>                                                                                                    | <i>Phase in Research</i>                                         |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Construct Validity | *Use multiple sources of evidence<br>*Establish chain of evidence<br>*Have key informants review draft of case study report | data collection<br>data collection<br>composition                |
| Internal Validity  | *Do pattern-matching<br>*Do explanation-building<br>*Address rival explanations<br>*Use logic models                        | data analysis<br>data analysis<br>data analysis<br>data analysis |
| External Validity  | *Use theory in single-case studies<br>*Use replication logic in multiple-case studies                                       | research design<br>research design                               |
| Reliability        | *Use case study protocol<br>*Develop case study database                                                                    | data collection<br>data collection                               |

### **Construct Validity**

Construct validity establishes correct operational measures for the concepts being studied (Kidder and Judd, 1986). The objective of this study is to provide a comparative assessment of KM programs across the U.S. armed services. The character of each KM program was revealed by analyzing the three sources of evidence, documents, KM practitioner feedback, and KM portal documents. The three sources of evidence indicated that knowledge-based activities are being practiced in each service. Multiple sources of evidence were used in order to achieve good construct validity. The sources

for all the documents and other data used in this research are also listed in the appendices in order to provide a clear chain of evidence.

### **Internal Validity**

“Internal validity is only a concern for causal (or explanatory) case studies, in which an investigator is trying to determine whether event  $x$  led to event  $y$  (Yin, 2003, p. 36). As stated earlier, this research is a descriptive case study that involves conducting an assessment of KM programs across the U.S. armed services. Therefore, internal validity is not applicable to this study.

### **External Validity**

Literal replication logic was the tactic used to achieve external validity in this study. The research design of this study involved looking for patterns across the three department’s KM programs. Each case was evaluated for the same elements (leadership, organization/culture, technology, and learning) and compared across the three cases to identify any patterns.

### **Reliability**

The reliability of research “demonstrates that the operations of a study—such as the data collection procedures—can be repeated with the same results” (Kidder and Judd 1986, p. 26-29). The goal of reliability is to ensure “if a later investigator followed the same procedures as described by an earlier investigator and conducted the same case study all over again, the later investigator should arrive at the same finding and conclusions” (Yin, 2003, p. 37). According to Yin, one method to ensure research has

reliability is to document the procedures the earlier researcher used to obtain the data and conclusions. The case study protocol is described in detail in this chapter in order to guarantee that succeeding investigators can follow the same procedures and achieve the same results (Yin, 2003). Data collection procedures and full disclosure of methods were extensively documented in this thesis in accordance with case study protocol (Yin, 2003). The case study tactics exercised in this specific study to achieve a quality research design are listed in Table 10.

**Table 10. Yin (2003) Case Study Tactic**

| <i>Tests</i>       | <i>Case Study Tactic</i>                                                                                                                                                                 |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Construct Validity | <ul style="list-style-type: none"> <li>- Used multiple sources of evidence (documentation, KM portals, and KM practitioner feedback)</li> <li>- Established chain of evidence</li> </ul> |
| Internal Validity  | - None—Not applicable                                                                                                                                                                    |
| External Validity  | - Used replication logic in multiple case studies                                                                                                                                        |
| Reliability        | - Used case study protocol to explain procedures                                                                                                                                         |

### **Case Study Limitations**

The amount of data collected and the depth of analysis was limited due to the ability of one researcher as opposed to multiple researchers and insights. KM is an immature discipline within the military. Therefore, the services may not have recorded all of their KM efforts or made them available to others outside the KM or their service community. The analysis provided in this research is also based solely on the evidence found in the sources mentioned. It is likely that there are developments, circumstances,

happening, and/or facts the researcher was not aware of or did not have access to which may limit accuracy. Access to certain documents and information was restricted on the AKO and NKO due to guest account privileges. The KM practitioner feedback was received from very few individuals directly involved with KM and not any was received from Chief Information Officers (CIOs) or Chief Knowledge Officers (CKOs). Chief Information Officers and Chief Knowledge Officers were the targeted audience because they are integral leaders in defining the strategy, vision, mission, and resources for executing KM in their service. However, members on their staff (the CIOs and CKOs staff) provided data relevant to their service's KM program.

## IV. Results and Analysis

### Overview

The purpose of this study is to provide a comparative assessment of KM programs across the U.S. armed services. Again, it is important to remind readers that the available documents were subjectively interpreted by the researcher. On the other hand, the KM practitioner feedback data was objectively recorded based on the responses of the subject matter experts.

This assessment began by investigating the nature of each department's KM program and then comparing each of their respective characteristics of leadership, organization, technology, and learning. The character of each service's KM program was determined by analyzing the three sources of evidence: documents, KM practitioner feedback, and KM portal documents. The analysis phase began by reviewing a total of 114 KM documents (documents obtained from KM portals and documents obtained from military websites, Google, and data provided by KM practitioners) on all three service KM programs (Table 11).

**Table 11. The total number of documents retrieved on each service's KM Program**

| <i>Services</i>             | <i>KM Documents Retrieved</i> |
|-----------------------------|-------------------------------|
| Department of the Army      | 39                            |
| Department of the Navy      | 45                            |
| Department of the Air Force | 30                            |
| <b><i>TOTAL</i></b>         | <b><i>114</i></b>             |

After conducting a preliminary analysis, not all 114 KM items were applicable to this assessment. The preliminary analysis consisted of first determining if the documents were evidence of KM efforts at the enterprise level. Second, the analysis consisted of evaluating the KM documents for elements of leadership, organization, technology, and learning. Table 12 lists the final number of KM documents that were determined to be applicable to this study.

**Table 12. The number of documents applicable to this assessment**

| <i><b>Service</b></i>       | <i><b>Number of KM Documents Applicable</b></i> |
|-----------------------------|-------------------------------------------------|
| Department of the Army      | 30                                              |
| Department of the Navy      | 28                                              |
| Department of the Air Force | 15                                              |
| <i><b>TOTAL</b></i>         | <i><b>73</b></i>                                |

All the documents and their sources that were determined to be relevant to assessing the nature of each service-level program are listed in Appendices B - D.

The targeted number of KM practitioners to contact for this study was nine—three KM practitioners from each department (Army, Navy, and Air Force). However, only four practitioners provided data for this study. The four KM practitioners consisted of three service-level (headquarters) members and one command-level member involved with executing KM in their service. The three service-level practitioners were one Army respondent, one Navy respondent, and one Air Force respondent who all are located at the Pentagon. The command-level respondent was an Air Force member that is assigned

to the Center of Excellence for Knowledge Management (an Air Force Material Command organization) located at Wright-Patterson AFB, Ohio.

All three sources of evidence were analyzed for elements of leadership, organization, technology, and learning to answer the investigative questions on each case. The investigative questions that guided this assessment were:

IQ1. What elements of KM leadership can be identified?

IQ2. What elements of organization/culture needed for KM can be identified?

IQ3. What technology/tools are being used to support KM efforts?

IQ4. What elements of a learning enterprise can be identified?

IQ5. Using the KM pillar framework for the assessment, how do the services' KM programs compare?

Investigative questions (IQ1 - IQ4) will be answered on each case (service-level program) and IQ5 will be answered after questions IQ1 – IQ4 have been addressed on each case.

### **Description of Data Presentation**

KM practitioners provided feedback to this study using the KM Practitioner Checklist (see Appendices E – H for data) and also provided some additional written responses. The practitioner's objective responses are indicated in the "Feedback" column of each table (see next page) that was used to capture the "elements" of each service's KM program. Each table is composed of five columns: a column that lists the specific elements that are identified by the framework, general documents reviewed, practitioner feedback received, KM portal documents reviewed, and a column that lists the sources for the document-based data. To further explain, an example of the table used to capture

the sources of evidence is located below (Table 13). The data on each case will be presented using the same format as in the example data capture table below (Table 13).

**Table 13. Example Data Capture Table**

| Elements of Leadership                    | Documents | Feedback | KM Portal Documents | Source (See Appendix B) |
|-------------------------------------------|-----------|----------|---------------------|-------------------------|
| Business Culture                          |           | x        |                     |                         |
| Strategic Planning                        | x         |          | x                   | a,b                     |
| Specific and general goals and objectives |           |          |                     |                         |
| Vision Sharing                            | x         | x        |                     | 7                       |
| Executive Commitment                      |           |          |                     |                         |
| KM programs tied to metrics               |           |          |                     |                         |
| Tangible rewards for use of KM            |           |          | x                   | j                       |
| Special Recognition for knowledge sharing |           |          |                     |                         |
| Performance criteria include KM items     | x         | x        |                     | 1                       |

To further explain, the first column, “Elements of Leadership” in Table 13 lists the key-element and the sub-elements (i.e. Business Culture, Strategic Planning, etc...) of the Four Pillar Framework. The second column, the “Documents” column indicates (if there is an “x” in the column) that documents were the source of evidence that provided proof that particular sub-element is present in the service’s KM program (i.e. a document obtained from Google, a military website, or from a KM practitioner addressed the strategic planning). The third column, the “Feedback” column in each table reflects the KM practitioners’ (objective) responses to the presence of that particular element in their service’s KM program. The fourth column, the “KM Portal Documents” column in each table reflects the documents that were obtained from each service’s KM portal (AKO, NKO, and AFKN website). The KM portal documents provided evidence on the presence of that particular element in the respective service’s KM program. The fifth column, the “Source (see Appendix)” column in each table lists the source(s) for the document(s) that addressed that particular sub-element. The characters (the numbers and

letters) listed in the “Source (see Appendix)” column have been provided to reference the specific documents (documents obtained from KM portals and documents obtained from alternate sources) that provide evidence that particular element is present in the respective service’s KM program.

### **The Department of the Army’s KM Program**

The Army KM practitioner provided feedback to this study using the KM practitioner feedback checklist (Appendix E) and also provided some additional written responses. The elements of leadership that were identified in the Army’s KM Program are listed in Table 14. The numbers and letters listed in the “Source (See Appendix B)” column correspond to the documents listed in Appendix B.

**Table 14. Elements of Leadership in the Army’s KM Program**

| Elements of Leadership                    | Documents | Feedback | KM Portal Documents | Source (See Appendix B)                |
|-------------------------------------------|-----------|----------|---------------------|----------------------------------------|
| Business Culture                          | x         | x        | x                   | 1,4,5,12,b,g                           |
| Strategic Planning                        | x         | x        | x                   | 1,2,3,4,5,9,12,13,e,f                  |
| Specific and general goals and objectives | x         | x        | x                   | 1,2,4,5,9,10,12,13,e,f,g,o,q           |
| Vision Sharing                            | x         | x        | x                   | 1,2,3,5,8,12,13,c,e,f,g,q              |
| Executive Commitment                      | x         | x        | x                   | 1,2,3,4,5,6,8,10,11,13,e,f,h,j,k,l,m,n |
| KM programs tied to metrics               |           | x        |                     |                                        |
| Tangible rewards for use of KM            |           | x        | x                   | j                                      |
| Special Recognition for knowledge sharing |           | x        |                     |                                        |
| Performance criteria include KM items     | x         | x        | x                   | 7,13,e,f,                              |

#### **1. What elements of KM leadership can be identified?**

The sources of evidence indicate the Army’s KM program contains the following elements of leadership: business culture, strategic planning, specific goals and objectives, vision sharing, executive commitment, tangible rewards for using KM, special recognition for knowledge sharing, and performance criteria. The respondent confirmed the Army’s KM program has all the elements of leadership listed in Table 14. The

practitioner states, “The Army’s CIO/G-6 500 Day Plan, a forceful statement of senior leadership involvement, has all of these attributes.”

KM is the strategy currently implemented to transform the Army and the way soldiers conduct business “in the battlespace, organization, and mission processes” (Department of the Army, 2002, p.1). Army leaders are committed to institutionalizing KM throughout the enterprise to posture the organization for a period of uncertainty and unpredictability in the 21<sup>st</sup> Century (Winkler, 2005). For instance, Army leaders have sought the capabilities of KM to prepare and to enable soldiers to meet the challenges of a higher tempo, more modern and global warfare. As stated in Army Regulation 25-1 *Information Management: Army Knowledge Management and Information Technology*, Army Knowledge Management (AKM) “will deliver improved information access and sharing while providing “infostructure” capabilities across the Army so that warfighters and business stewards can act quickly and decisively” (Department of the Army, 2005, p.2). In support of AKM, the Secretary of the Army and the Chief of Staff of the Army have been projecting their vision to transform the Army into a knowledge-centric, knowledge-based force (Shinseki and White, 2001). Additionally, the Army Chief Knowledge Officer (CKO) also embraces the vision of cultivating a knowledge-based force and recognizes KM as a performance criterion to fight the increasing threat of terrorism (Winkler, 2005). The actions of the Army’s CKO are in line with the vision for AKM as stated in the *Army Knowledge Management Strategic Plan* (2003). The *Army Knowledge Management Strategic Plan* states, “The Army force will conduct prompt and sustained combat operations on land with a skilled, knowledge-base force, exploiting the

revolutionary potential of information superiority and networked sensors, shooters, supporters and decision-makers” (Department of the Army, 2003, p.1). As further justification for the Army’s motives for pursuing the benefits of KM, the Army CKO argues that the enemies in the Global War on Terrorism (GWOT) are “highly educated and trained terrorists, who are engineers, technicians, and have PhDs” (Winkler, 2005, p. 3). Therefore, Army leadership recognizes soldiers must be empowered with knowledge just as their enemies are.

In addition to articulating the vision for Army Knowledge Management (AKM), the Secretary of the Army and the Chief of Staff of the Army have also been focused on efforts to cultivate a business culture that is empowered by KM. Their efforts include ventures to integrate AKM and the AKO into as many business processes as possible to improve efficiency and effectiveness (Department of the Army, 2005). To facilitate the enterprise transformation of becoming a knowledge-based organization, Army leadership has established an “iPod Give-Away Program” to encourage soldiers to exploit AKM and its supporting IT functions (Department of the Army, 2005d).

The KM practitioner indicated the Army’s KM program is tied to metrics and offers special recognition for knowledge sharing; however, the respondent did not provide any additional specific comments to how these two elements of leadership were executed.

## **2. What elements of organization/culture needed for KM can be identified?**

The elements of organization/culture that were identified in the Army’s KM Program are listed in Table 15.

**Table 15. Elements of Organization/Culture in the Army's KM Program**

| Elements of Organization/Culture               | Documents | Feedback | KM Portal Documents | Source (See Appendix B)             |
|------------------------------------------------|-----------|----------|---------------------|-------------------------------------|
| Process Work-flows                             |           | x        |                     |                                     |
| Operating Procedures for Knowledge sharing     | x         | x        | x                   | 5,9,10,i,j,k,l,m,n                  |
| Business Process Reengineering (BPR)           | x         | x        | x                   | 1,2,4,5,6,7,9,12,13,b,f,e,f,g,k,o,q |
| Management by Objectives (MBO)                 |           | x        |                     |                                     |
| Total Quality Management (TQM)                 |           | x        |                     |                                     |
| Metric Standards                               |           | x        |                     |                                     |
| Hierarchical, Centralized, Decentralized       |           | x        |                     |                                     |
| Matrix type organization                       |           | x        |                     |                                     |
| Open / Sharing                                 | x         | x        | x                   | 1,2,4,13,a,f,g,p                    |
| Closed / Power Based                           |           |          |                     |                                     |
| Internal partnering vs. competing type culture | x         | x        |                     | 2,4,a,g                             |

The evidence suggests the Army's KM program contains the following elements of organization/culture: process work-flows, operating procedures for knowledge sharing, business process reengineering, management by objectives, total quality management, metric standards, open/sharing culture, closed power base, internal partnering, and has characteristics of a hierarchical/centralized/decentralized and matrix type organization.

The Army's CIO and CKO have identified a business transformation initiative to develop an infrastructure for a knowledge-centric, knowledge-based organization (Winkler, 2005). The Army's CIO and CKO plans for transforming the culture is also stated in Army Regulation 25-1 *Information Management: Army Knowledge Management and Information Technology* that lists a goal to "adopt governance and cultural changes to become a knowledge-based organization (Department of the Army, 2005a, p. 2). *The Army Knowledge Management Strategic Plan* also addresses cultural change in the Army for implementing KM.

The AKM Strategic Plan is applicable to the total Army enterprise: Active Army, DA Civilians, Army Reserves, and National Guard, during peace and wartime. It applies to all mission areas, whether in support of the institutional Army or the tactical Army, "factory to foxhole" and

“space to mud.” The vision of a network-centric knowledge based force is for soldiers, civilians, field units, Commanders, HQDA staff elements, and major Army Commands. The goals are to be achieved at all levels across the enterprise, with an emphasis on standardized, enterprise-level mission and business practices. (Department of the Army, 2003a, p. 3)

As part of the initiative to transform the culture, the Army has provided a definition for KM to assist in its efforts to understand what KM means and how it will be applied in the Army. The Army defines KM as an “Army-wide effort to transform the Army into a net-centric self-learning organization that will improve operational and mission performance” (Department of the Army, 2005a, p. 104). Thus, the Army values the application of knowledge management concepts and its systems across the Army as important Army resources (Department of the Army, 2005a,). Additionally, Army Regulation 25-1 *Information Management: Army Knowledge Management and Information Technology* (2005) and *The Army Knowledge Management Strategic Plan* (2003) promote a culture that participates in collaboration activities and working groups to share and transfer operational knowledge quickly and decisively throughout the enterprise (Department of the Army, 2005a; 2003a). The Army is also concerned about sharing information and knowledge in a joint environment. The KM practitioner states, “Army KM occurs within the context of the Army CIO/G-6 500 Day Plan, delivering a joint net-centric information enterprise in support of the Army Campaign Plan.” The Transformation Campaign Plan is described in *The Army Knowledge Management Strategic Plan* as:

...a mechanism for integrating and synchronizing the implementation of the Army vision within the Army. It contains a level of detail required to synchronize Army-wide transformation efforts and maximize the effectiveness and efficiency of those efforts. At the same time, it is

designed to allow maximum flexibility for innovation and initiative throughout the Army, by focusing our collective efforts on achieving a common goal – the Army’s transformation objective. (Department of the Army, 2003a, p. 41)

In addition to transforming the culture, the Army has also taken steps to improve its processes. According to Army Regulation 25-1 *Information Management: Army Knowledge Management and Information Technology*, “process improvement encompasses such areas as business/functional process improvement, process innovation, and business process re-engineering (BPR)” (Department of the Army, 2005a, p. 17). Moreover, Army business processes will also undergo process analyses to eliminate redundant and nonvalue-adding tasks (Department of the Army, 2005a).

The KM practitioner also indicated the Army KM program is supported by management by objectives, total quality management, metric standards, has characteristics of a hierarchical/centralized/decentralized and matrix type organization; however, the respondent did not provide any additional specific comments on how these elements of organization/culture were executed.

### **3. What technology/tools are being used to support KM efforts?**

The elements of technology that support KM efforts in the Army’s KM Program are listed in Table 16.

**Table 16. Elements of Technology in the Army's KM Program**

| Elements of Technology    | Documents | Feedback | KM Portal Documents | Source (See Appendix B)             |
|---------------------------|-----------|----------|---------------------|-------------------------------------|
| Process Modeling          |           | x        |                     |                                     |
| Search engines            | x         | x        | x                   | 1,8,d,f,o                           |
| E-mail                    | x         | x        |                     | 1,8,10,12                           |
| OLAP                      |           | x        |                     |                                     |
| Data Warehousing          | x         | x        | x                   | 8,13,d,f                            |
| Database Management       | x         | x        | x                   | 6,8,10,d                            |
| Multi-media Repositories  | x         | x        | x                   | 1,2,3,8,11,d,f                      |
| GroupWare                 | x         | x        |                     | 8                                   |
| Decision Support Systems  |           | x        |                     |                                     |
| Corporate Intranet        | x         | x        | x                   | 1,2,3,4,5,8,9,10,11,12,13,a,f,g,h,p |
| Business Modeling Systems |           |          |                     |                                     |
| Intelligent Agents        |           |          |                     |                                     |
| Neural Networks, etc.     |           |          |                     |                                     |

Evidence suggests the Army's KM program contains the following elements of technology: process modeling, search engines, e-mail, online analytical processing (OLAP), data warehousing, database management, multimedia repositories, groupware, decision support systems, and a corporate intranet.

The Secretary of the Army announced the importance of technology in its role to support a knowledge-based organization. The Secretary of the Army stated "...a network centric capable force is one that is robustly networked, fully interoperable, shares information and collaborates by means of a communication and information infrastructure that is global, secure, real time, reliable, internet-based, and user-driven" (Winkler, 2005, p. 5). As a result of the pivotal role technology has in the Army's KM program, the Army adopted an electronic Army (e-Army) initiative to "employ IT to provide products, services, and knowledge to intended users—whether they are customers, constituents, internal operations employees, information providers, or business partner—that results in enhanced value to the user" (Department of the Army, 2005a, p. 108). The e-Army initiative has led to the automation of self-service

applications on the AKO, such as “web services, enterprise resources planning systems, e-content, e-record, and e-publications, e-commerce activities, digital signature, and automated processes that facilitate knowledge exchange” (Department of the Army, 2005a, p. 109). Many of the Army’s electronic initiatives are supported by the AKO and AKO-S.

The AKO and AKO-S (Secret) are primary infrastructure elements of the e-Army initiative. The AKO is a robust tool used to automate KM activities and provides a single point of entry to gain access to enterprise systems and sub-portals (Department of the Army, 2003a). AKO provides the enterprise with web mail, instant messaging, instant chat, video teleconferencing (groupware), and access to Army-wide content (Department of the Army, 2003a). Army information and knowledge is collected, stored, managed, and made available on the AKO. The AKO also has search engine functionality to locate military documents stored in databases and multi-media repositories (Cuviallo, 2002).

The Army Knowledge Online-secret (AKO-S) on the SIPRNET is the Army’s intranet to transmit sensitive information and knowledge throughout the enterprise (Cuviallo, 2002). “The Army Knowledge Online-secret Internet protocol router network (SIPRNET), (AKO-S), permits maximum sharing of Army information and knowledge across the enterprise and reduces the need for investment in duplicative IT resources” (Department of the Army, 2005, p. 2). The AKO and the AKO-S provide access to the Army Battle Command, Logistics Knowledge Center, Army Flow Model, Leave and Earning Online, LOG MOD, Intel, universal e-mail and a host of other automated processes/activities (Cuviallo, 2002).

The KM practitioner indicated that the Army KM program is supported by online analytical processing (OLAP) and decision support systems; however, the practitioner did not provide any additional specific comments on how these elements of technology were being specifically utilized in the Army's KM program.

#### 4. What elements of a learning enterprise can be identified?

The elements that suggest the Army is a learning enterprise are listed below in Table 17.

**Table 17. Elements of Learning in the Army's KM Program**

| Elements of Learning                                | Documents | Feedback | KM Portal Documents | Source (See Appendix B)       |
|-----------------------------------------------------|-----------|----------|---------------------|-------------------------------|
| Tacit and explicit knowledge understood             | x         | x        | x                   | 11,f,p                        |
| Sharing vision / team learning                      | x         | x        | x                   | 1,2,3,5,7,10,11,13,f,g,k,o    |
| Management support for continuous learning          | x         | x        | x                   | 1,2,7,9,10,11,13,e,f,g,p      |
| Knowledge captured and distributed                  | x         | x        | x                   | 1,4,7,8,9,12,13,d,g           |
| KM values and principles formally encouraged        | x         | x        | x                   | 1,2,3,4,5,10,12,13,a,e,g      |
| Virtual teams / exchange forums in use              | x         | x        | x                   | 2,7,8,9,10,d,f,g,k            |
| Communities of practice / shared results are active | x         | x        | x                   | 1,7,9,10,11,12,13,d,e,f,g,k,p |
| Innovation encouraged / recognized / rewarded       | x         | x        |                     | 2,4,5,b,k,i                   |

The evidence suggests the Army's KM program contains the following elements of a learning enterprise: tacit and explicit knowledge is understood, shared vision/team learning, management supports continuous learning, knowledge captured and distributed, KM values and principals formally encouraged, virtual teams/exchange forums in use, communities of practice/shared results are active, and innovation encouraged, recognized, and rewarded.

Knowledge Management training and education have been critical enablers in accomplishing the Army's goal to become a knowledge empowered force (Department of the Army, 2003a). The KM practitioner reported, "The Army's Battle Command

Knowledge System (BCKS) is the Army's premier learning enterprise and is accessible through the Army Knowledge On-Line Portal." The Army Chief Knowledge Officer shares the Army's vision for the Army's Battle Command Knowledge System (BCKS) by stating it

...will develop transformed processes and business rules to ensure that the knowledge generation-processing-applications cycle is institutionalized to provide ongoing, near real-time support to the Army's battle command, doctrine development, leader development and education and training program. (Winkler, 2005, p. 23)

In addition to the BCKS, soldiers are also trained on the tenets of KM and the basic concepts of data, information, and knowledge, which include explicit knowledge and implicit knowledge (Winkler, 2005; Nappi and Ullman, n.d). Furthermore, Army personnel are trained on how to perform KM activities in a knowledge-base organization such as methods on how to capture and to distribute information and knowledge (Department of the Army, 2003b). According to the *Army Knowledge Management Strategic Plan*, "everyone is a teacher and everyone is a learner" in support of its vision for team learning (Department of the Army, 2003a, p.3). As further evidence that the Army is a learning enterprise, soldiers are also encouraged to think of innovative ways to exploit the capabilities of the AKO to increase productivity and effectiveness. The nature of the Army's KM program has been discussed—now the focus will shift to the Navy's KM program.

## The Department of the Navy's (DON) KM Program

The data on the DON's KM program is presented in the same manner as was previously described for the Department of the Army analysis. The elements of leadership that were identified in the DON's KM Program are listed in Table 18.

**Table 18. Elements of Leadership in the DON's KM Program**

| Elements of Leadership                    | Documents | Feedback | KM Portal Documents | Source (See Appendix C) |
|-------------------------------------------|-----------|----------|---------------------|-------------------------|
| Business Culture                          |           | x        |                     |                         |
| Strategic Planning                        | x         | x        | x                   | 2,4,5,a,b,d,h,m         |
| Specific and general goals and objectives |           | x        | x                   | a,b,g,h,l               |
| Vision Sharing                            | x         | x        | x                   | 1,2,4,5,a,b,d,f,h,m     |
| Executive Commitment                      | x         | x        | x                   | 4,a,e,k,m               |
| KM programs tied to metrics               |           |          |                     |                         |
| Tangible rewards for use of KM            |           |          |                     |                         |
| Special Recognition for knowledge sharing |           |          |                     |                         |
| Performance criteria include KM items     | x         |          | x                   | 4,i,j                   |

### 1. What elements of KM leadership can be identified?

The sources of evidence indicate the DON's KM program contains the following elements of leadership: business culture, strategic planning, specific and general goals and objectives, vision sharing, executive commitment, and performance criteria.

*The Department of the Navy Information Management and Information Technology Strategic Plan* (2006) (supported by the Chief of Naval Operations, Secretary of the Navy, Commandant of the Marine Corp and the CIO team) lists a goal to “create, align, and share knowledge to enable effective and agile decision-making to achieve Knowledge Dominance” (Department of the Navy, 2006, p. 8). DON leadership identified the following objectives that are listed in *The Department of the Navy Information Management and Information Technology Strategic Plan* to assist in efforts to implement and institutionalize KM in the DON:

- Create the knowledge culture and processes to operationalize the sharing of essential information.
- Implement a comprehensive standards-based content management strategy across the Department
- Establish single authoritative data sources across the Department.
- Effectively manage records and continue the Department-wide implementation of electronic records management (Department of the Navy, 2006, p. 15).

A year prior to the publication of *The Department of the Navy Information Management and Information Technology Strategic Plan* (2006), the DON CIO declared a similar vision, “to create, capture, share, and reuse knowledge to enable effective and agile decision-making, increase the efficiency of task accomplishments, and improve mission effectiveness” throughout the enterprise (Wennergren, 2005, p.1). The DON CIO also identified objectives to implement KM enterprise-wide. These objectives included efforts to:

- Broaden and expand Departmental awareness of KM concepts
- Encourage commands to implement KM programs, structures, pilots, and methodologies as part of process improvement efforts
- Assist commands with KM experiences, lessons learned, and results to foster collaboration, enable shortened learning cycles, and assist other efforts
- Assist commands embarking on new implementations and build upon the experiences and resources of others. (Wennergren, 2005, p. 2)

The DON embarked on this KM initiative to meet the demands and “challenges encountered in battlefield awareness, intelligence, and warfighting capabilities” (Department of the Navy, 2006, p.16). Similarly, the DON CIO confirmed a performance criterion for KM by stating, “The DoD’s tenets of Network-Centric Warfare call for improved information sharing, enhanced quality of information, shared situational awareness, and collaboration that will result in increased mission effectiveness (Wennergren, 2005, p. 1). In efforts to launch the KM strategy, the DON created a

business renovation team to implement KM across the enterprise and to integrate KM practices into operational and business processes (Wennergren, 2005). To assist in this enterprise KM endeavor, the KM practitioner stated: “The DON has developed a program to encourage organizations to exercise KM activities by presenting them with a DON IM/IT Excellence Award in Knowledge Superiority.”

## 2. What elements of organization/culture needed for KM can be identified?

The elements of organization/culture that were identified in the DON’s KM Program are listed in Table 19.

**Table 19. Elements of Organization/Culture in the DON’s KM Program**

| Elements of Organization/Culture               | Documents | Feedback | KM Portal Documents | Source (See Appendix C) |
|------------------------------------------------|-----------|----------|---------------------|-------------------------|
| Process Work-flows                             |           | x        |                     |                         |
| Operating Procedures for Knowledge sharing     |           | x        | x                   | l                       |
| Business Process Reengineering (BPR)           | x         | x        | x                   | 3,5,a,b,j               |
| Management by Objectives (MBO)                 |           | x        |                     |                         |
| Total Quality Management (TQM)                 |           |          |                     |                         |
| Metric Standards                               |           | x        |                     |                         |
| Hierarchical, Centralized, Decentralized       |           | x        | x                   | k                       |
| Matrix type organization                       |           | x        |                     |                         |
| Open / Sharing                                 |           | x        | x                   | 3,4,5,b,c,d,e,f,h,i,m,n |
| Closed / Power Based                           |           |          |                     |                         |
| Internal partnering vs. competing type culture |           | x        |                     |                         |

Evidence suggests the DON’s KM program contains the following elements of organization/culture: process work-flows, operating procedures for knowledge sharing, business process reengineering, management by objectives, metric standards, open/sharing culture, internal partnering, and characteristics of a hierarchical /centralized/ decentralized and matrix type organization.

As stated in *The Department of the Navy Information Management and Information Technology Strategic Plan* (2006), the DON lists an objective to create a knowledge-based culture (Department of the Navy, 2006). Senior leaders are currently pursuing

initiatives to transform the Navy, its processes, and the tools needed to support a knowledge-based force. As such, the DON has established programs to cultivate a “knowledge-centric culture where trust and respect facilitate information sharing and organizational learning in our operational and business environment” (Department of the Navy, n.d-c., p. 2). As part of the transformation to create a knowledge-based organization, the DON developed a KM team.

The DON’s KM team has developed procedures and guidelines to assist the organization in performing knowledge-based processes to capture, disseminate, and use knowledge resources (Department of the Navy, 2004). Those KM procedures and guidelines contain a definition of KM to facilitate in the enterprise’s understanding of KM. The DON defines KM as the processes that “systematically bring together people and processes, enabled by technology, to facilitate the exchange of operationally relevant information and expertise to increase the organization’s performance” (Nox et al., n.d., p.4). The DON’s KM procedures also encourage Navy personnel to develop working relationships and share information and knowledge as a team in efforts to cultivate a knowledge-based workforce (Knox, n.d.). The Navy KM practitioner confirmed the DON practices internal partnering by promoting “teamwork and sharing” among Navy personnel. Additionally, the practitioner stated the Navy has instances of all three forms of organizations, hierarchical/centralized/ decentralized, and stated that “Many Navy commands are matrix type organizations.” The KM practitioner also indicated the DON’s KM organization conducts process work-flows, management by objectives, and

has metrics/standards; however, the respondent did not provide any additional specific comments to how these elements of organization/culture are executed.

### 3. What technology/tools are being used to support KM efforts?

The elements of technology that support KM efforts in the DON's KM Program are listed in Table 20.

**Table 20. Elements of Technology in the DON's KM Program**

| Elements of Technology    | Documents | Feedback | KM Portal Documents | Source (See Appendix C) |
|---------------------------|-----------|----------|---------------------|-------------------------|
| Process Modeling          |           | x        |                     |                         |
| Search engines            |           | x        | x                   | o                       |
| E-mail                    |           | x        | x                   | b                       |
| OLAP                      |           | x        |                     |                         |
| Data Warehousing          | x         | x        | x                   | 1,c,o                   |
| Database Management       |           | x        | x                   | c,o                     |
| Multi-media Repositories  |           | x        | x                   | b,n,o                   |
| GroupWare                 |           | x        | x                   | 4                       |
| Decision Support Systems  |           | x        |                     |                         |
| Corporate Intranet        | x         | x        | x                   | 1,2,3,4,5,a,b,f,n       |
| Business Modeling Systems |           | x        |                     |                         |
| Intelligent Agents        |           | x        |                     |                         |
| Neural Networks, etc.     |           | x        |                     |                         |

Evidence suggests the DON's KM Program contains the following elements of technology: process modeling, search engines, e-mail, online analytical processing (OLAP), data warehousing, database management, multimedia repositories, groupware, decision support systems, corporate intranet, business modeling systems, intelligent agents, and neural networks.

The Navy Marine Corps Intranet (NMCI), FORCEnet, and the NKO are the primary technical components of the DON's KM program. "The NMCI is a tool to that provides performance-based, secure, end-to-end connectivity for warfighting and business functions" (Department of Navy, n.d.-b, p. 1). The NMCI provides sailors and

Marines the ability to engage in network-centric warfare and joint information and knowledge sharing across DoD (Department of the Navy, 2006).

The NKO provides access to virtual knowledge repositories (VKR) and search tools to locate an array of information and knowledge (Knox, n.d.). NKO users have the capability connect with others professionals in their specialty to share information and knowledge on the Information Professional Knowledge Network (IPKN) (Knox, n.d.). The NKO also provide sailors access to distance services such as e-mail, instant messaging, white pages directory, databases, and repositories while at sea (Department of the Navy, 2006). Additionally, the NKO provides users the capability to conduct virtual meetings to transfer information and knowledge in support of Navy KM.

The KM practitioner indicated that the DON's KM program is supported by process modeling, online analytical processing (OLAP), decision support systems, business modeling systems, intelligent agents, and neural networks; however, the respondent did not provide any additional specific comments on how these elements of technology are being utilized to execute KM.

#### **4. What elements of a learning enterprise can be identified?**

The elements that suggest the DON is a learning enterprise are listed below in Table 21.

**Table 21. Elements of Learning in the DON's KM Program**

| Elements of Learning                                | Documents | Feedback | KM Portal Documents | Source (See Appendix C) |
|-----------------------------------------------------|-----------|----------|---------------------|-------------------------|
| Tacit and explicit knowledge understood             |           | x        | x                   | b,d,f,i,m               |
| Sharing vision / team learning                      | x         |          | x                   | 3,5,a,b,c,d,f,h,m       |
| Management support for continuous learning          |           | x        | x                   | 4,5,a,b,c,d,f,g,h,i,m   |
| Knowledge captured and distributed                  |           |          | x                   | 5,a,b,j,n,o             |
| KM values and principles formally encouraged        |           | x        | x                   | 5,a,b,f,g,h,i,m         |
| Virtual teams / exchange forums in use              |           | x        | x                   | 4                       |
| Communities of practice / shared results are active | x         | x        | x                   | 3,5,a,b,j,i,n,o         |
| Innovation encouraged / recognized / rewarded       |           | x        | x                   | c                       |

The sources of evidence indicate the DON's KM program contain the following elements of a learning enterprise: tacit and explicit knowledge understood, sharing vision/team learning, management supports continuous learning, knowledge captured and distributed, KM values and principals formally encourage, virtual teams/exchange forum in use, communities of practice/shared results are active, and innovation encouraged, recognized, and rewarded.

The DON CIO has identified training and education as primary attributes to the successful implementation of KM. The DON CIO stated:

...the consistent application of KM concepts, techniques, tools, and technologies will improve knowledge identification, sharing, and re-use. In turn, this will help optimize decision-making, improve efficiency and effectiveness of task accomplishment, and empower the Naval warfighter. (Wennergren, 2005, p. 1)

As a result, the DON has incorporated "learning" into its KM framework (Figure 8).

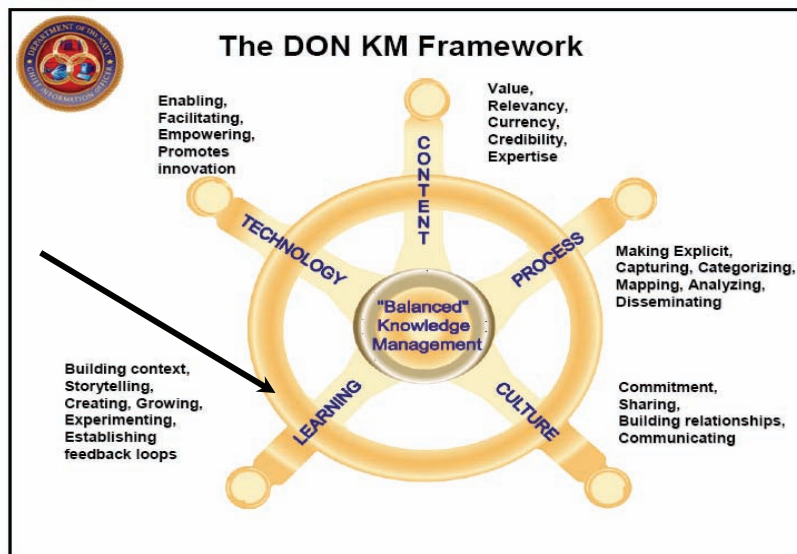


**Figure 8. The KM Framework for the Department of the Navy (Nox, n.d.)**

The learning component of the DON KM framework consists of KM workshops and training programs to educate personnel on the basics of KM (Knox et al., n.d.).

The DON CIO has considered several options to educate and train sailors on the fundamental concepts of KM. The DON CIO stated:

Two approaches for training and education will be pursued. First, KM courses will be develop and offered...The Afloat Knowledge Management Course ...prepares Information Professional Officers to fill the Knowledge Officer role on carrier strike group staffs. The Command Knowledge Management Course, currently offered by the Department of the Navy Chief Information Officer (DON CIO), introduces KM concepts and provides instruction on KM tools commands can implement immediately...The Naval Postgraduate School offers a two course series on knowledge management that is available through distance learning... Navy E-learning (accessible via Navy Knowledge Online) contains introductory courses on KM and is available to DON military and civilians. (Wennergren, 2005, p. 3)

The DON CIO has also considered exploiting the capabilities of “adding instruction on KM principles and concepts to all levels of professional training (e.g. basic officer courses, CPO/NCO indoctrination, Staff NCO Academy, senior executive courses, Leadership Development Courses, Civil Services courses, etc.)” (Wennergren, 2005, p. 3).

As further evidence that the DON is a learning enterprise, the NKO also assists in team learning via its distance learning capabilities that allow offshore sailors access to e-learning and communications services while at sea. On the other hand, the NMCI has a role in providing a platform for virtual teams by providing sailors and marines a line of communication make possible by distance learning and video teleconferencing (Department of the Navy, 2006). The nature of the DON’s KM program has been discussed—now the characteristics of the Air Force’s KM program will be discussed next.

### **The Department of the Air Force’s KM Program**

The elements of leadership that were identified in the Air Force’s KM Program are listed in Table 22. Two Air Force KM practitioners provided feedback to this assessment. KM practitioner #1(Appendix G) provided only written responses which have been incorporated into the description of the elements of leadership, organization/culture, and learning. KM practitioner #2 (Appendix H) responses are annotated in the “Feedback” column of each table.

**Table 22. Elements of Leadership in the Air Force's KM Program**

| Elements of Leadership                    | Documents | Feedback | KM Portal Documents | Source (See Appendix D) |
|-------------------------------------------|-----------|----------|---------------------|-------------------------|
| Business Culture                          |           |          |                     |                         |
| Strategic Planning                        | x         | x        | x                   | 2,6,a,b,c,d             |
| Specific and general goals and objectives | x         | x        |                     | 3,6,                    |
| Vision Sharing                            | x         | x        | x                   | 5,6,a,b,e,f,h,i         |
| Executive Commitment                      |           | x        |                     |                         |
| KM programs tied to metrics               |           | x        |                     |                         |
| Tangible rewards for use of KM            |           | x        |                     |                         |
| Special Recognition for knowledge sharing |           | x        |                     |                         |
| Performance criteria include KM items     |           |          |                     |                         |

### **1. What elements of KM leadership can be identified?**

The evidence suggests the Air Force's KM program contains the following element of leadership: strategic planning, specific and general goals and objectives, vision sharing, executive commitment, KM programs tied to metrics, tangible rewards for use of KM, and special recognition for knowledge sharing.

The *Air Force Knowledge Based Operations (KBO) Strategic Plan* describes an interest in sharing information as an enterprise. The KBO states, "the management of information is a critical element of military, government, and industry operations and involves every facet of an organization because the need for timely, reliable, trusted, and accurate information is central to the successful mission of any organization" (Department of the Air Force, 2006, p.2). The *Secretary of the Air Force Office of Warfighting Integration and Chief Information Officer Strategic Plan* (2005) also states a vision for sharing information enterprise-wide. The document reads, "An innovative integration team leading the Air Force to exploit the power of information to...shape enterprise investments and enable Airmen to share and exploit accurate information any place, and time" (Department of the Air Force, 2005, p. 1). The *Knowledge Based Operations Strategic Plan* also acknowledges a requirement to secure executive

commitment in efforts to implement enterprise-wide procedures for sharing information.

The *Knowledge Based Operations Strategic Plan* states: “To meet the KBO objectives, the following are the near term areas of focus: Securing leadership commitment and emphasis to long-term transformation efforts required for KBO implementation”

(Department of the Air Force, 2006, p. 8). The Air Force has identified several goals to accomplish its vision to effectively manage information. *The Secretary of the Air Force Office of Warfighting Integration and Chief Information Officer Strategic Plan (2005)*

lists the following goals to manage and share information:

Goal 1: Provide decision makers and all Air Force personnel with on-demand access to authoritative, relevant, and sufficient information to perform their duties efficiently and effectively

Goal 2: Ensure worldwide, real-time, and secure access to information via a single integrated global network environment through a robust digital communications infrastructure

Goal 3: Protect Air Force Information resources from attack and/or intrusion by both outside forces and internal disruption

Goal 4: Ensure that Air Force integrated information systems are constructed to enable modular, platform-independent information management capabilities and are interoperable with the Department of Defense’s and other government information systems

Goal 5: Leverage information technology to support and improve Air Force processes to increase both efficiency and effectiveness

Goal 6: Ensure the Air Force takes advantage of state-of-the-art information technology and best commercial practices

Goal 7: Implement knowledge management practices and technologies to assure knowledge is identified, captured, and shared

Goal 8: Empower a focused, well-trained, and motivated workforce prepared to continually search out and embrace new information-based capabilities for the Air Force

Goal 9: Ensure responsible stewardship of Air Force financial resources spent on information management and related information technology (Department of the Air Force, 2005, p.2).

Now that the Air Force has established specific goals and objectives for information, it has recognized a need to link information and knowledge to perform its business functions. As stated in a presentation by Gilligan (2005), “Supporting our Air Force vision requires integrated information and knowledge that is available to decision-makers at all levels (p. 15). Likewise, Air Force KM practitioners state that the Air Force has begun to develop a strategy to integrate information and knowledge. In support of the Knowledge Based Operations concept, the *Knowledge-Centric Operations* (KCO) initiative is an attempt to share knowledge across the Air Force (Sasser, 2006). The “Knowledge-Centric Operations (KCO), complements KBO by adding implicit and tacit knowledge assets gained through person-to-person interactions and collaboration” (Sasser, 2006, p. 1).

The comments by Gillian (2005) and the attempts to manage and share information/knowledge are evidence that the Air Force is attempting to foster a information/knowledge-empowered business culture. As further evidence of the Air Force’s attempts promote a knowledge-focused culture, KM practitioner # 1 stated, “The AF is trying to operate more like a business and its use of ERP [Enterprise Resource Planning] is one example of it.” KM practitioner #1 also stated the “Air Force provides some recognition for knowledge sharing” as a motivational aid to encourage others to share their information and knowledge. The KM practitioner indicated that the Air Force’s KM program is supported by executive commitment, tied to metrics, offers

tangible rewards for use of KM, and provides special recognition for knowledge sharing; however, the respondent did not provide any additional specific comments on how these elements of leadership are executed.

## 2. What elements of organization/culture needed for KM can be identified?

The elements of organization/culture that were identified in the Air Force's KM Program are listed in Table 23.

**Table 23. Elements of Organization/Culture in the Air Force's KM Program**

| Elements of Organization/Culture               | Documents | Feedback | KM Portal Documents | Source (See Appendix D) |
|------------------------------------------------|-----------|----------|---------------------|-------------------------|
| Process Work-flows                             |           | x        |                     |                         |
| Operating Procedures for Knowledge sharing     |           | x        |                     |                         |
| Business Process Reengineering (BPR)           |           | x        | x                   | a,b,c                   |
| Management by Objectives (MBO)                 |           |          |                     |                         |
| Total Quality Management (TQM)                 |           |          |                     |                         |
| Metric Standards                               |           | x        |                     |                         |
| Hierarchical, Centralized, Decentralized       |           | x        |                     |                         |
| Matrix type organization                       |           |          |                     |                         |
| Open / Sharing                                 |           |          |                     |                         |
| Closed / Power Based                           |           |          |                     |                         |
| Internal partnering vs. competing type culture |           | x        |                     |                         |

According to KM practitioner feedback and KM portal documents, the Air Force's KM Program contains the following elements of organization/culture: process work-flows, operating procedures for knowledge sharing, business process reengineering, metric standards, open/sharing culture, closed power base, internal partnering, and characteristics of a hierarchical/centralized/decentralized and matrix type organization. There were not, however, a lot of publicly available documents that addressed elements of organization/culture of the Air Force's KM program.

The Air Force Material Command (AFMC) is the lead command for executing KM in the Air Force (Sasser, 2006). The Center of Excellence for Knowledge Management (an AFMC organization) has and is constantly making attempts to

institutionalize KM across the Air Force. The Center of Excellence for Knowledge Management is also involved in cultivating a knowledge-sharing culture and working on efforts to implement KM activities and processes across the Air Force (Sasser, 2006). The Center of Excellence for Knowledge Management efforts are aligned with the vision set forth in the *Knowledge Based Operations Strategic Plan* (KBO) which is “to share effective, efficient, trustworthy, and accurate information for all Air Force personnel” (Department of the Air Force, 2006, p. 2). The Knowledge Based Operations concept also recognizes that the Air Force must be transformed in order to support information sharing activities. For instance, it identified a requirement to change workers mindset to share their information with the rest of the enterprise (Department of the Air Force, 2006). Likewise, *The Knowledge Based Operations Strategic Plan* fosters internal partnering by stating, “the success of the KBO initiative requires that each MAJCOM and Functional be represented and an active participate in this effort. We encourage everyone’s support in ensuring that the Air Force successfully reaches its vision for Knowledge Based Operations” (Department of the Air Force, 2006, p. 2).

The KM practitioners (both respondents) indicated the Air Force uses operating procedures for knowledge sharing, to enforce metric standards, practices internal partnering, has a closed power base, and possesses characteristics of a hierarchical/centralized/ decentralized and matrix type organization; however, the respondents did not provide any additional specific comments to how these elements of organization/culture are executed in the Air Force’s KM program.

### 3. What technology/tools are being used to support KM efforts?

The elements of technology that support KM efforts in the Air Force's KM Program are listed in Table 24.

**Table 24. Elements of Technology in the Air Force's KM Program**

| Elements of Technology/Tools | Documents | Feedback | KM Portal Documents | Source (See Appendix D) |
|------------------------------|-----------|----------|---------------------|-------------------------|
| Process Modeling             |           | x        |                     |                         |
| Search engines               |           | x        | x                   | d,g                     |
| E-mail                       |           | x        |                     |                         |
| OLAP                         |           |          |                     |                         |
| Data Warehousing             |           | x        | x                   | a                       |
| Database Management          |           | x        |                     |                         |
| Multi-media Repositories     |           | x        | x                   | 5                       |
| GroupWare                    |           | x        |                     |                         |
| Decision Support Systems     |           | x        |                     |                         |
| Corporate Intranet           |           | x        | x                   | 1,a,b,c,                |
| Business Modeling Systems    |           |          |                     |                         |
| Intelligent Agents           |           |          |                     |                         |
| Neural Networks, etc.        |           |          |                     |                         |

Evidence indicates the Air Force's KM Program contains the following elements of technology: process modeling, search engines, e-mail, online analytical processing (OLAP), data warehousing, database management, multimedia repositories, groupware, decision support systems, and corporate intranet.

The Air Force CIO recognizes a need for a single and reliable source of data, a common data representation (extensible markup language, XML) and the need to establish data repositories and data warehouses to provide accessible and relevant information (Gilligan, 2005). The Air Force CIO has plans to implement a "single global information network that provides access to robust data warehousing and data repositories" (Gilligan, 2005, p. 6). Currently, the Air Force Knowledge Now (AFKN) website is the primary KM tool to access and transfer information and knowledge throughout the Air Force. The AFKN website has search engine capabilities and provides access to CoPs and e-learning. However, the Air Force has a goal to develop

other knowledge sharing systems as stated in the *Warfighting Integration and Chief Information Officer Strategic Plan* (Department of the Air Force, 2005).

The KM practitioners indicated the Air Force's KM program is supported by process modeling, e-mail, groupware, and decision support systems; however, the respondent did not provide any additional specific comments to how these elements of technology are executed.

#### 4. What elements of a learning enterprise can be identified?

The elements that suggest the Air Force is a learning enterprise are listed below in Table 25.

**Table 25. Elements of Learning in the Air Force's KM Program**

| Elements of Learning                                | Documents | Feedback | KM Portal Documents | Source (See Appendix D) |
|-----------------------------------------------------|-----------|----------|---------------------|-------------------------|
| Tacit and explicit knowledge understood             |           | x        | x                   | d                       |
| Sharing vision / team learning                      | x         | x        | x                   | 2,b,c,d                 |
| Management support for continuous learning          |           | x        | x                   | i                       |
| Knowledge captured and distributed                  |           | x        | x                   | 5,b,d,g                 |
| KM values and principles formally encouraged        |           | x        | x                   | d                       |
| Virtual teams / exchange forums in use              |           | x        | x                   | b,d                     |
| Communities of practice / shared results are active | x         | x        | x                   | 2,c,d,g                 |
| Innovation encouraged / recognized / rewarded       |           | x        |                     |                         |

Evidence suggests the Air Force's KM program contains the following elements of a learning enterprise: tacit and explicit knowledge understood, vision sharing /team learning, management supports continuous learning, knowledge captured and distributed, KM values and principals are formally encouraged, virtual teams/exchange forums in use, communities of practice/shared results are active, and innovation encouraged.

Members of the Air Force Center of Excellence for Knowledge Management office have been involved with educating personnel on the importance and on the foundational tenets of KM. Their KM briefings explain the differences between data, information, and knowledge as well as the differences between explicit and implicit knowledge (Sasser, 2006). *The Air Force Knowledge Based Operations Strategic Plan* states the importance of providing education and training in efforts to implement the Knowledge Based Operations initiative:

Education and training are critical parts of institutionalizing the KBO Strategic Plan information, task and process centric environment. Air Force technical training school houses for officer, enlisted and civilians must start planning now for the coming changes...enterprise-wide information sharing must be inserted into the curriculum today. Knowledge-based courses will also be imperative to train the existing force. As force adjustments and reshaping occurs, Job Qualification Standards and detailed adjustments to technical training must reflect the reshaped force. (Department of the Air Force, 2006, p. 15)

Therefore, the Air Force recognizes that the key to transformation and efforts to implement enterprise-level programs (IM, KBO, and KCO) can be facilitated by education and training. The nature of the Air Force's KM efforts, along with the Army's and Navy's KM program have been discussed, now the services will be compared across various elements of their KM program.

### **Comparison of the Services' KM programs**

**IQ5. Using the KM pillar framework for the assessment, how do the services' KM programs compare?**

This question will be answered by comparing elements of leadership, organization, technology, and learning of the three departments' KM programs as uncovered in the case study process.

### Leadership Comparison

The Department of the Army, Navy, and Air Force elements of leadership are listed in Table 26.

**Table 26. Comparison of the Service's Elements of Leadership**

| Elements of Leadership                    | Army      |          |           | Navy      |          |           | Air Force |          |           |
|-------------------------------------------|-----------|----------|-----------|-----------|----------|-----------|-----------|----------|-----------|
|                                           | Documents | Feedback | KM Portal | Documents | Feedback | KM Portal | Documents | Feedback | KM Portal |
| Business Culture                          | X         | X        | X         |           | X        |           |           |          |           |
| Strategic Planning                        | X         | X        | X         | X         | X        |           | X         | X        |           |
| Specific and general goals and objectives | X         | X        | X         |           | X        |           | X         | X        |           |
| Vision Sharing                            | X         | X        | X         | X         | X        |           | X         | X        |           |
| Executive Commitment                      | X         | X        | X         | X         | X        |           |           | X        |           |
| KM programs tied to metrics               |           | X        |           |           |          |           |           | X        |           |
| Tangible rewards for use of KM            |           | X        | X         |           |          |           |           | X        |           |
| Special Recognition for knowledge sharing |           | X        |           |           |          |           |           | X        |           |
| Performance criteria include KM items     | X         | X        | X         | X         |          |           |           |          |           |

From the evidence collected in this research, it appears the Department of the Army has a robust KM program that is supported by the Secretary of the Army and the Chief of Staff of the Army. The Army has strong advocates in implementing KM across the Army. The Secretary of the Army and the Chief of Staff of the Army have been involved with defining, executing, and enforcing the vision and policies for KM. Army KM supporters have been diligent in their efforts to foster a knowledge-sharing culture that is enabled by the AKM strategy and the AKO portal. The success of KM in the Army has been significantly influenced by Army decision-makers' ability to develop strategic plans and clearly define goals and objectives to implement AKM enterprise-

wide. Army leaders have exemplified strong executive commitment and have been steadfast in their efforts in implementing a comprehensive KM program Army-wide. The Army has also been successful in motivating soldiers to assist in its efforts to implement AKM throughout the enterprise by offering them tangible rewards.

In comparison to the Army's KM support system, the DON KM program has support from the Chief of Naval Operations, Secretary of the Navy, and the Commandant of the Marine Corps. The DON senior leadership has taken steps to implement an enterprise-level KM program by articulating its vision to "create, align and share knowledge" as an enterprise (Department of the Navy, 2006, p.8). The DON has also announced its strategy to become a knowledge-based force and has identified several goals and objectives to implement KM throughout the department. However, the extent of executive commitment in supporting an enterprise effort to implement KM cannot be determined from DON KM documentation reviewed in this study. Nevertheless, DON KM documentation indicates that the department is interested in promoting a business culture equipped with the capabilities of KM and KM supporting technical components. As compared, to the Army, the Navy also offers tangible rewards to organizations for their participation in knowledge-based activities.

In contrast to the Army and Navy, the Air Force does not appear to have the same level of executive commitment or leadership support based the documentation reviewed for this research. Knowledge management does not appear to be supported with the same fervor in comparison to the Army. Knowledge management in the Air Force is supported by the Warfighting Integration and Chief Information Officer SAF/XC (a three-star

general) who has dual roles and responsibilities. The *Warfighting Integration and Chief Information Officer Strategic Plan* (2005b) lists a strategy, vision, and objectives for implementing information and knowledge processes Air Force-wide. However, the nine-point plan consists of only one goal to implement knowledge-based initiatives throughout the Air Force. As a result, the Air Force does not appear to have a comprehensive strategy for implementing KM practices throughout the Air Force. In contrast to the Army's KM program, Air Force executive commitment is not apparent and cannot be determined based on the Air Force KM literature reviewed in this assessment. The Air Force appears to have concentrated its efforts on making information more accessible and transferable to support its warfighters.

The leadership structure for KM in the Air Force is also different from the leadership structure for the Army's KM program and the Navy's KM program. Based on the Army's Office of the Chief Information Officer/G-6 organization chart, the Army KM program is supported by a "Governance, Acquisition and Chief Knowledge Office" division which has a sub-department for "Knowledge Management." On the other hand, the DON CIO organization structure has a "Knowledge Management" department which is a sub-organization underneath the Deputy CIO for Policy and Integration division. Lastly, according to the Warfighting Integration and Chief Information Officer (SAF/XC) organizational chart, the lines of supervision between the Warfighting Integration and Chief Information Officer and the major command-based Center of Excellence for Knowledge Management cannot be determined. What is obvious is that there is no KM

leadership and/or organization at the highest levels of the Air Force organization. The services will next be compared on elements of organization/culture characteristics.

### Organization/Culture Comparison

The Departments of the Army, Navy, and Air Force elements of organization are listed in Table 27.

**Table 27. Comparison of the Service's Elements of Organization/Cultural**

| Elements of Organization/Culture               | Army      |          |           | Navy      |          |           | Air Force |          |           |
|------------------------------------------------|-----------|----------|-----------|-----------|----------|-----------|-----------|----------|-----------|
|                                                | Documents | Feedback | KM Portal | Documents | Feedback | KM Portal | Documents | Feedback | KM Portal |
| Process Work-flows                             | X         | X        | X         |           | X        |           |           | X        |           |
| Operating Procedures for Knowledge sharing     | X         | X        | X         |           | X        | x         |           | X        |           |
| Business Process Reengineering (BPR)           | X         | X        | X         | X         | X        | x         |           | X        | X         |
| Management by Objectives (MBO)                 |           | X        |           |           | X        |           |           |          |           |
| Total Quality Management (TQM)                 |           | X        |           |           |          |           |           |          |           |
| Metric Standards                               |           | X        |           |           | X        |           |           | X        |           |
| Hierarchical, Centralized, Decentralized       | X         | X        |           |           | X        | x         |           | X        |           |
| Matrix type organization                       |           | X        |           |           | X        |           |           |          |           |
| Open / Sharing                                 | X         | X        | X         |           | X        | x         |           |          |           |
| Closed / Power Based                           |           |          | X         |           |          |           |           |          |           |
| Internal partnering vs. competing type culture | X         | X        |           |           | X        |           |           | X        |           |

The Army, Navy, and Air Force are interested in KM to improve business processes, enhance decision-making abilities, and to support warfighters. However, the services differ in their approach to harnessing the benefits of KM. The Army has taken an aggressive approach to transforming its organization and to reengineering its business processes in efforts to become a knowledge-based organization. The Army performs process analysis on its business processes to search for ways to remove redundancy and to eliminate non-value adding functions. Per the researcher view, the cultural change that is currently taking place in the Army was energized by comprehensive and effective operating procedures. The operating procedures for AKM foster an environment that allows individuals to freely share information and knowledge through collaboration and

internal partnering. Army leaders predict that AKM will transform the organization into a more decentralized force as soldiers become empowered with knowledge at “the edge.”

The DON is attempting to transform its culture by training and education. The DON offers several formal training opportunities to its personnel to inform them on the benefits and the processes of KM. The DON has taken an enterprise approach to cultivating a knowledge-based organization with hopes that Navy personnel will incorporate knowledge-based activities into their daily duties. The DON also makes KM literature (written by renowned KM scholars) available on its NKO portal so users can educate themselves on the fundamental aspects of KM. Additionally, the Navy has the Information Professional Knowledge Network (IPKN) that provides personnel the means to share information and knowledge freely.

The Air Force is attempting to transform its culture through KM education and training on a more limited basis. Instead of taking an enterprise approach to training and education like the Navy, the Air Force Center of Excellence for Knowledge Management provides education and training on the concepts of KM to personnel at the command-level and base-level on request. The Center of Excellence for Knowledge Management has experienced some success in its attempt to create a culture of internal partnerships to share information and knowledge through its CoP program which is in use across the Air Force.

The Navy’s and Air Force’s KM programs share some common characteristics of organization/culture. For instance, both services are searching for effective ways to transform its organization into a knowledge-based force. Unlike the Army, the Navy and

the Air Force lack specific operating procedures for knowledge sharing and guidance for executing knowledge-based activities. The Navy and the Air Force are interested in streamlining processes, but based on the documents reviewed in this study, the Army is the only service that has taken pragmatic steps to realign its processes within a KM context. The services will be compared on elements of technology next.

### Technology Comparison

The Departments of the Army, Navy, and Air Force elements of technology are listed in Table 28.

**Table 28. Comparison of the Service's Elements of Technology**

| Elements of Technology/Tools | Army      |          |           | Navy      |          |           | Air Force |          |           |
|------------------------------|-----------|----------|-----------|-----------|----------|-----------|-----------|----------|-----------|
|                              | Documents | Feedback | KM Portal | Documents | Feedback | KM Portal | Documents | Feedback | KM Portal |
| Process Modeling             |           | X        |           |           | X        |           |           | X        |           |
| Search engines               | X         | X        | X         |           | X        | X         |           | X        | X         |
| E-mail                       | X         | X        |           |           | X        | X         |           | X        |           |
| OLAP                         |           | X        |           |           | X        |           |           |          |           |
| Data Warehousing             | X         | X        | X         | X         | X        | X         |           | X        | X         |
| Database Management SW       | X         | X        | X         |           | X        | X         |           | X        |           |
| Multi-media Repositories     | X         | X        | X         |           | X        | X         |           | X        | X         |
| GroupWare                    | X         | X        |           |           | X        | X         |           | X        |           |
| Decision Support Systems     |           | X        |           |           | X        |           |           | X        |           |
| Corporate Intranet           | X         | X        | X         | X         | X        | X         |           |          | X         |
| Business Modeling Systems    |           |          |           |           | X        |           |           | X        |           |
| Intelligent Agents           |           |          |           |           | X        |           |           |          |           |
| Neural Networks, etc.        |           |          |           |           | X        |           |           |          |           |

The departments of the Army, Navy, and Air Force have dedicated lines of communication to access and to transfer information and knowledge. The Army and the Navy have KM portals and the Air Force has the AFKN website; however, all three web-based tools have “search engine” capabilities. The AKO, NKO, and AFKN website are also linked to repositories that have been provided by data warehousing and database management. However, the AKO and NKO are slightly different from the AFKN

website. The AKO and NKO are similar in that they not only act as a portal but also provide access to collaboration tools such as group mail, web mail, video teleconferencing and instant messaging. Moreover, the AKO are provides users access to the Army Knowledge Collaboration Center and messaging services such as chat and instant messenger. The Army is also planning to incorporate calendaring, white-boards, improved document collaboration and sharing capability, XML forms, digital signature integration, workflow management, and wireless access functionality to the AKO (Department of the Army, 2005f).

The Army and Navy also have dedicated intranets to transfer information and knowledge, for example, the AKO-S and the NMCI. The documentation analyzed on Air Force's KM efforts did not include any information on the use intranets to support its KM efforts. However, the AFKN website does provide access to CoPs for various Air Force specialties. The AFKN website also provides access to discussion forums, Air Force documents (publications, forms, etc...) and links to web-based services. The services will be compared on elements of a learning organization next.

### **Learning Comparison**

The Departments of the Army, Navy, and Air Force elements of a learning organization are listed in Table 29.

**Table 29. Comparison of the Service's Elements of a Learning Enterprise**

| Elements of Learning                                | Army      |          |           | Navy      |          |           | Air Force |          |           |
|-----------------------------------------------------|-----------|----------|-----------|-----------|----------|-----------|-----------|----------|-----------|
|                                                     | Documents | Feedback | KM Portal | Documents | Feedback | KM Portal | Documents | Feedback | KM Portal |
| Tacit and explicit knowledge understood             | X         | X        | X         |           | X        | X         |           | X        | X         |
| Sharing vision / team learning                      | X         | X        | X         | X         |          | X         | X         | X        | X         |
| Management support for continuous learning          | X         | X        | X         |           | X        | X         |           | X        | X         |
| Knowledge captured and distributed                  | X         | X        | X         |           |          | X         |           | X        | X         |
| KM values and principles formally encouraged        | X         | X        | X         |           | X        | X         |           | X        | X         |
| Virtual teams / exchange forums in use              | X         | X        | X         |           | X        | X         |           | X        | X         |
| Communities of practice / shared results are active | X         | X        | X         | X         | X        | X         | X         | X        | X         |
| Innovation encouraged / recognized / rewarded       | X         | X        |           |           | X        | X         |           | X        | X         |

Again, all three departments recognize training and education as primary objective to transform their service. Army knowledge managers and knowledge specialists share the Army's vision for AKM with soldiers as well as educate them on the differences between tacit and explicit knowledge. The Army views learning and collaboration as important components of AKM. As stated in the *Army Knowledge Management Strategic Plan*:

People are the lifeblood of the Learning Organization. Those who work within such organizations are characterized by an awareness of who they are and how their specific work unit fits into the wider organization. They are masters at working cooperatively as a team, as our soldiers must when engaged in Joint or Combined combat operations. They are focused on lifelong learning, and on ensuring the success of their organization. As such, they are constantly looking for ways in which they and their colleagues can develop professionally, allowing them to enhance their value to the organization. The Army Knowledge Enterprise will provide the culture, framework and enabling technologies to increase their opportunities to work cooperatively and achieve mission success.

Perhaps most important of all, Learning Organizations instill in their people a sense of shared values. For the Army, such values include: Loyalty, Duty, Respect, Selfless Sacrifice, Honor, Integrity, and Personal Courage. (Department of the Army, 2003a, p. 28)

As part of the Army learning organization, soldiers form virtual teams to share information and knowledge for problem solving. The Army also has plans to develop CoPs as method to share information and knowledge in an effort to spark innovation.

The Navy has developed KM workshops to educate and train personnel and publicly shares KM literature on the NKO. Similar to KM training in the Army and Air Force, Navy personnel are trained on the difference between tacit and explicit knowledge. Leaders in the DON have developed innovative ways to provide education and training to the entire enterprise. The DON has plans to incorporate topics on KM into officer, enlisted, and civilian formal training. Training plans includes distance learning initiatives on KM and courses accessible via the NKO. Navy personnel currently have procedures in place to form virtual teams in support of problem solving.

The Air Force, however, has not pursued a formalized KM training program at the enterprise-level. Practitioner feedback (Air Force practitioner #1) confirmed that tacit and explicit knowledge is not completely understood in the Air Force. The practitioner stated, “There is too much confusion between KM and IM...Not enough people understand this and its importance.” Air Force leaders’ support for KM education and training cannot be determined from the documents that were reviewed in this study. Based on the review of KM documents/feedbacks for this study, it does not appear the Air Force has promoted the same level of vision sharing and team learning as the Army, nor has the Air Force advanced its efforts in developing virtual teams or encouraging innovation. Nonetheless, the Air Force has experienced success in distributing

knowledge through its robust CoP program. The services have been compared on elements on leadership, organization/culture, technology, and learning.

## **V. Discussion, Recommendations, and Conclusion**

The *Capstone Concept for Joint Operations, Net-Centric Environment: Joint Functional Concept*, *Joint Vision 2010*, and *Joint Vision 2020* are documents set forth by the Office of the Joint Chiefs of Staff that address a need for the military to manage and share their knowledge resources as an integrated and cohesive force. Therefore, a comparative analysis of each service's KM program was performed to discover what practices each service has implemented to manage its intellectual capital. The comments noted in this chapter were derived from a subjective analysis of elements of leadership, organization/culture, technology, and learning associated with each of the service's KM programs. This analysis was based solely on the documentation cited as a basis for this research as well as pertinent practitioner feedback.

### **Discussion**

#### **Army**

The Army has implemented a comprehensive KM program that is supported and enforced by senior Army leaders. The Army Knowledge Management (AKM) program contains most of the elements of leadership Stankosky, Calabrese, and Baldanza (1999) suggests for an effective KM program. For example, the Army has defined a KM vision, exhibits strategic planning, has established goals and objectives, exhibits characteristics of a business culture, and has identified performance criteria for its KM program. Arguably, strong leadership support is the most important aspect of trying to implement an enterprise-level KM program because leaders have a strong influence on the allocation of resources and guidance on the components of knowledge management. The Secretary

of the Army and the Chief of Staff of the Army have been active participants in promoting the strategic vision for KM and enforcing KM policies and guidance. As a result of executive commitment, the Army has been able to experience a great deal of success with respect to KM. Army leaders have been in positions of authority to execute a top-down approach to implementing KM in the Army and to encourage soldiers to support KM efforts. Furthermore, the Secretary of the Army and the Chief of Staff of the Army has given soldiers a stake in the AKM initiative by allowing them the opportunity to provide inputs on AKO improvements and functionality.

The Army is in a league of its own in making information and knowledge available to soldiers 24 hours a day. Military leaders talk about making their military (service) documents, information, and knowledge more accessible via commercial search engines (i.e. Google) but the Army is actually making it happen. Information and knowledge is also more retrievable on the AKO. The AKO is a more user-friendly KM portal, in comparison to the NKO and AFKN website. The taxonomy used to organize documents on the AKO is designed for “ease of use.” Therefore, based on the cross-case analysis, the Army has one of the more effective enterprise-level programs in the U.S. armed services.

## **DON**

Knowledge management in the DON appears to be in a developmental stage, but is beginning to emerge. Senior leaders have identified an initiative to manage and share knowledge as an enterprise in the *Department of the Navy Information Management and Information Strategic Plan* (2006). The exact extent of leadership support was difficult

to decipher from the KM documents analyzed in this study. Based on these documents, the Navy does not appear to have a comprehensive KM strategy with specific goals and objectives that explain the course of action it plans to implement for an enterprise-level KM program. However, the Navy has made significant progress in educating and training its personnel on KM concepts and practices. The DON KM workshops train personnel on the use of the NKO, how to form virtual teams, and how to share information and knowledge as an enterprise. Therefore, the DON has a good foundation to launch KM throughout the enterprise, especially with support from its team of CIOs. The DON's CIO team provides the Navy and Marine Corps with the leadership ability to implement an effective KM program that has much future promise.

### **Air Force**

The Air Force has taken a different approach to implementing KM across its service. Unlike the Army's top-down approach to KM, Air Force KM practices began at the command-level. As a result, Air Force KM advocates have been trying to gain support from senior leadership to implement KM enterprise-wide. The documentation reviewed for this research suggests that senior leadership support and executive commitment for KM is relatively scarce in the Air Force. Perhaps the Air Force's CIO structure has an influence on how KM is executed throughout the enterprise. The Air Force does not have the same CIO structure as the Army and Navy. For example, the Army and Navy have CIOs with clearly defined titles/duties. On the other hand, the Air Force CIO has dual responsibilities (i.e. Warfighting Integration and Chief Information Officer duties). As stated earlier, the lines of authority/supervision are not obvious

between the SAF/XC and the Center of Excellence for Knowledge Management (AFMC) that is responsible executing day-to-day operations for KM. Therefore, leadership is one of the most important elements in attempting to implement a service-level KM program because it is the leaders who can have a strong influence on the people, processes, tools, and strategy required to manage an organization's knowledge resources. The Air Force's *Knowledge Based Operations Strategic Plan* (2006b), a document released by the Office of Warfighting Integration and Chief Information Officer (SAF/XC), gives the impression that Air Force commanders' support an enterprise-level KM initiative. Similarly, Air Force leaders appear to support the Communities of Practice (CoPs) program that provides access to Air Force knowledge across the service. According to the Four Pillar Framework (Stankosky et al.), however, CoPs are only one element of an enterprise-level KM program. In addition to identifying elements of leadership to support KM efforts in the Air Force, there is also a need to address elements of technology.

The Air Force's *Knowledge Based Operations Strategic Plan* and feedback from the Air Force KM (practitioner #1) acknowledges a need for the Air Force to manage the technology that supports KM and IM. The *Knowledge Based Operations Strategic Plan* states that the Air Force "exists in a systems-based environment, as evidenced by the number of stovepipe legacy systems. Much of the Air Force is locked into many repositories of unused data (digital landfills) and it is difficult to discover, authenticate, and retrieve information" (Department of the Air Force, 2006b, p. 9). Air Force KM practitioner #1 confirmed that the Air Force has "more than we need [in regards to

database management]...Everybody has their own DBMS [database management system], but the Air Force is trying to shepherd the enterprise towards a single data structured repository.” Therefore, the Air Force is aware of the need to align the people, processes, tools, and strategy to execute information and knowledge management initiatives throughout the enterprise. A discussion has been provided on each service’s KM program—now recommendations for future research will be stated next.

### **Recommendations for Future Research**

This study offers three recommendations for future research. First, this study should be replicated by conducting “practitioner feedback-based” investigation on the same topic. This would be valuable research as it would be “richer” in detail and accuracy than what was available through the documentation review. Second, future research should be conducted for a more in-depth investigation on each “pillar” area (leadership, technology, organization/culture, and learning) for a deeper understanding of the particular elements in each KM program. Third, future research should be conducted by comparing the services KM programs using a knowledge management maturity model framework as a beginning theoretical foundation.

### **Conclusions**

This research revealed the character of each service’s KM program and the elements they have employed to better organize and share knowledge. Guidance released from the Office of the Joint Chiefs of Staff task each service to organize and to share their knowledge resources as a joint force; however, according to the documentation

analyzed in this study, the Army appears to have taken a more aggressive approach to implementing knowledge management in its service. The Army has implemented an effective KM program that contains many of the elements Stankosky, Calabrese, and Baldanza (1999) suggest in an enterprise KM program. Navy leaders have identified a roadmap for implementing KM that consists of goals and objectives and appear to be in the process of implementing a comprehensive KM program. On the other hand, the Air Force has expressed more of a requirement to share and transfer information than it has knowledge. The Air Force has to obtain the support from senior leadership before it can begin to effectively manage either corporate resource effectively.

The results from this comparative assessment suggest that one service has made more progress towards organizing and sharing its intellectual capital than others. As a method to gage each service's advancements in implementing a service-level KM program, a knowledge management maturity model by Uday and Louis (2003) was subjectively applied the services' KM programs. The KM maturity model by Uday and Louis's (2003) is based on five levels of development that are described below:

- Level 1: "Possible"—the organization has a willingness to share knowledge; those who understand the value of it, do it
- Level 2: "Encouraged"—the value of knowledge assets is recognized by the organization; the culture encourages all activities with respect to sharing; sharing is reward/recognized
- Level 3: "Enabled/Practiced"—knowledge sharing is practiced; KM activities are a required part of normal workflow
- Level 4: "Managed"—Employees find it easy to share knowledge; employees expect to locate knowledge; KM activities are easy to use

- Level 5: “Continuously Improved”—Mechanisms and tools to leverage knowledge assets are widely accepted

The criteria of each level of maturity as defined by Uday and Louis (2003) were compared to the characteristics of each service’s KM program as uncovered by this research. The maturity level of each service’s KM program is notionally depicted below in Figure 9.

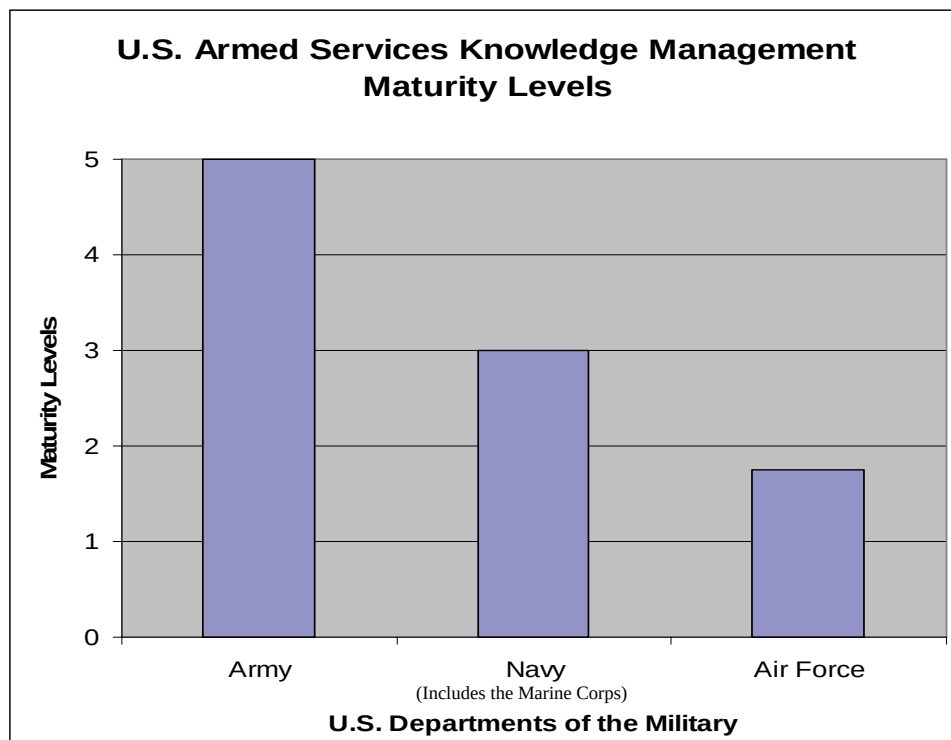


**Figure 9. KM Program Maturity across U.S. armed services**

Therefore, based on the criteria of KM maturity stated by Uday and Louis (2003), the Army’s KM program is assessed at Level 5, “Continuously Improved.” The Navy’s KM program is assessed at Level 3, “Enabled/Practiced.” Finally, the Air Force’s KM program is assessed to be between Level 2 & 3, (between “Encouraged and Enabled/Practiced”).

In closing, each service has shown interest in organizing and sharing its knowledge resources. The next step for the U.S. armed services in regards to KM is to work towards conducting KM across the services. This investigation revealed that each service needs to improve the processes and mechanisms in place to share information and knowledge within its own service as well as a joint military force. Currently, there is no convenient way for one service member from one service to gain access to information and knowledge of another service, even though all are members of the United States armed services. As stated in the *Capstone Concepts of Joint Operations*, the military must continue to take the necessary actions to “acquire, refine, and share knowledge” as a joint force (Department of Defense, 2005b).

## **Appendix A: Background Paper on the Four Pillar Framework**

### ***A Comparative Assessment of Knowledge Management Programs across the U.S. Armed Services***

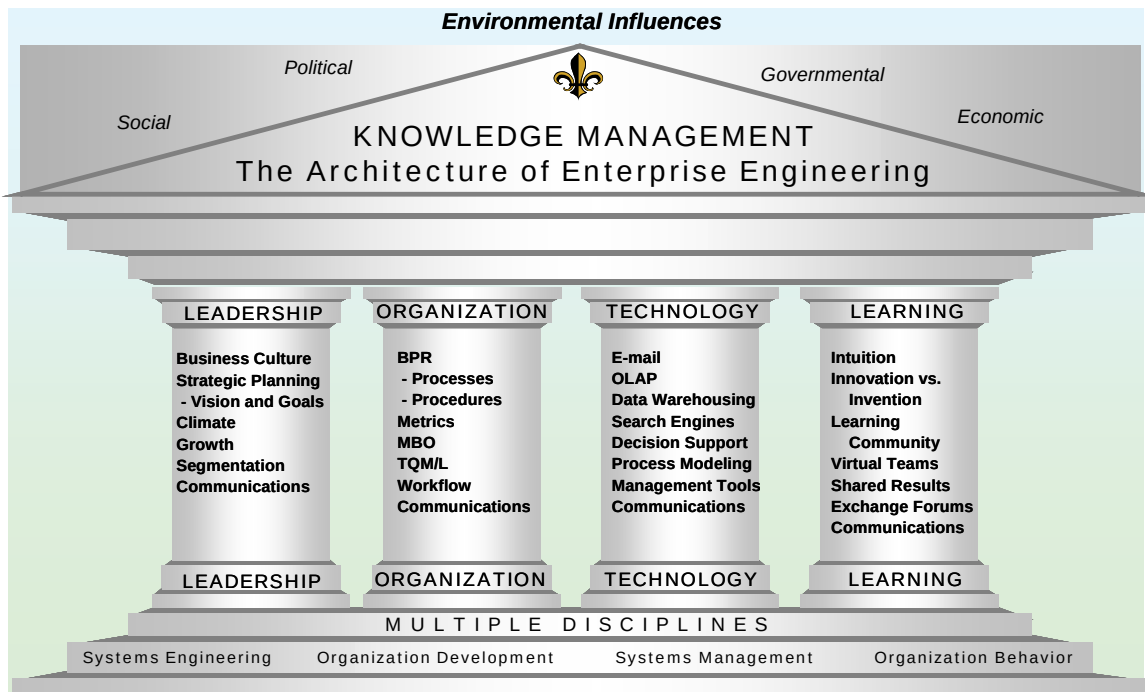
*Directions:* Please read the background paper on the “Four Pillar” Framework that is located below. After reading the background paper, please open the attached spreadsheet and indicate your responses by placing an “X” beside the components relevant to your service’s KM program. When you have finished annotating your responses, please e-mail the spreadsheet to [patrick.booker@afit.edu](mailto:patrick.booker@afit.edu). Your participation is greatly appreciated in an effort to understand the presence of Knowledge Management (KM) within the armed services.

### **Background Paper On The “Four Pillar” KM Program Framework**

The elements (components) listed in the spreadsheet are from the “Four Pillar” framework by Stankosky, Calabrese, and Baldanza (1999). The “Four Pillar” framework is a blueprint to help organizations design and implement a service-level KM program and consists of four principal components which are Leadership, Organization, Technology, and Learning. Each pillar is composed of supporting sub-elements critical to the effectiveness and integrity of that particular pillar. The four pillars are considered

to be foundational elements of a KM program and all four pillars must work in concert with each other for optimal functionality (Stankosky, 1999). Therefore, the elements of Leadership, Organization, Technology, and Learning, along with their supporting sub-elements, can lead to the development and implementation of a successful KM program. A successful KM program can provide organizations the ability to manage and exploit intellectual property more effectively (Stankosky, 1999). Therefore, the questions posed will provide insight to the different elements of Leadership, Organization, Technology, and Learning present in your service's KM program. Located below is a graphical representation of the "Four Pillar" framework and key elements (see Figure 1).

### ***The Four Pillar Framework***



Stankosky, Calabrese, Baldanza, 1999

## **Appendix B: The Department of the Army's KM Documents**

This appendix lists the Army's KM documents that were evaluated for elements of leadership, organization/culture, technology, and learning. The list of documents is divided into two sections, a section of documents that were retrieved from KM Portals and a section of documents that were obtained from alternate sources (Google, military websites, and KM practitioners). The numbered documents indicate they were obtained from alternate sources and the documents that are marked with letters indicate they were obtained from KM portals.

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***The following documents were retrieved from Google during the months of October 2005 - December 2005.***

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### ***Documents retrieved from Google*** (<http://www.google.com/>)

1. Army Knowledge Online (AKO) Information Paper: Strategically Transforming How The Army Does Business (Department of the Army, 2002)  
[http://www.army.mil/ako/downloads/Infopaper/AKO\\_Info\\_Paper.pdf](http://www.army.mil/ako/downloads/Infopaper/AKO_Info_Paper.pdf)
2. Army Knowledge Management (AKM)...the Strategic Transformer for the Internet Age Army to connect people, knowledge, and technologies (Cuviallo, 2005).  
[http://www.chips.navy.mil/archives/02\\_fall/index2\\_files/Army\\_Online.htm](http://www.chips.navy.mil/archives/02_fall/index2_files/Army_Online.htm)
3. Army Knowledge Management enters next phase in transforming (Cuviallo, 2002a)  
[http://www.dcmilitary.com/army/stripe/7\\_30/commentary/](http://www.dcmilitary.com/army/stripe/7_30/commentary/)

### ***Documents retrieved from the Army CIO website*** (<http://www.army.mil/ciog6/akm.html>)

4. Army Knowledge Management (AKM) Guidance: Memorandum Number 1 (Shinseki and White, 2001) <http://www.army.mil/ciog6/docs/SACSAMemo8Aug01.pdf>
5. Army Knowledge Management (AKM) Guidance: Memorandum Number 2 (Shinseki and White, 2002) <http://www.army.mil/ciog6/docs/AKMGuidanceMEMO2.pdf>
6. Army Knowledge Management (AKM) Guidance: Memorandum Number 3 (Shinseki and White, 2003) <http://www.army.mil/ciog6/docs/AKMMemorandum3.pdf>
7. Warrior Knowledge Network and the Semantic Web: Building the Self-Aware, Adaptive Leaders of the Future; Transforming the Army into a Learning and Knowledge Sharing Organization (Morris, 2001) <http://cvs.daml.org/2001/06/swday-call/call.ppt>
8. Army Knowledge Management: The Interoperability Enabler (Cuviallo, 2002b)  
<http://www.dtic.mil/ndia/2002interop/cuviallo.pdf>
9. How the Army Runs: Chapter 16: Army Knowledge Management (Department of the Army, n.d.-a) <http://www.carlisle.army.mil/usawc/dclm/linkedtextchapters/CHAPTER16.pdf>

10. Army Knowledge Management (Winkler, 2005a) [http://www.e-gov.com/events/2005/km/downloads/KM05\\_Keynote\\_Winkler.pdf](http://www.e-gov.com/events/2005/km/downloads/KM05_Keynote_Winkler.pdf)
11. A Methodology for Capturing Tacit Knowledge (Nappi and Ullman, n.d.) [http://www.e-gov.com/events/2005/km/downloads/KM05\\_T-2\\_Nappi\\_Ullman.pdf](http://www.e-gov.com/events/2005/km/downloads/KM05_T-2_Nappi_Ullman.pdf)
12. Army Regulation 25-1: Information Management: Army Knowledge and Information Technology (Department of the Army, 2005f) <http://www.fas.org/irp/doddir/army/ar25-1.pdf>
13. The Army Knowledge Management Strategic Plan Version 2.1 (Department of the Army, 2001) [http://www.amc.army.mil/amc/ci/matrix/documents/army\\_level/akm\\_strat\\_plan\\_2\\_1.pdf](http://www.amc.army.mil/amc/ci/matrix/documents/army_level/akm_strat_plan_2_1.pdf)

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***The following documents (a – q) were retrieved from the Army Knowledge Management Portal, Army Knowledge Online (AKO), during the months of October 2005 – January 2006.***

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***\*\*The AKO (<https://www.us.army.mil/suite/authenticate.do>) is a restricted website that requires a username and password for access.***

- a. AKO Requirements Management Process (Department of the Army, 2003a)
- b. DOD and Army Business Initiatives Council: A Way to Get Best Practices Approved For Enterprise-wide Use (Smith, 2002)
- c. Think Enterprise: Empowering the Command Through the Use of Information Technology (Fecteau, n.d.)
- d. A 'Way Ahead' to Integrate Companycommand.com in AKO (Maliszewski and Thomas, 2003)
- e. The Knowledge-Based Force: Concepts for Understanding (Department of the Army, 2003-c)
- f. The Army's Transformation to a Network-centric, Knowledge-based Force (Krieg, Cuvillo, Maliszewski and Kilner; 2002)
- g. The Army Knowledge Management Strategic Plan (2<sup>nd</sup> Ed) (Department of the Army, 2003b)
- h. The Enabling Structure: Warrior Knowledge Network (Morris, 2002)
- i. AKO Challenge – Official Rules (Department of the Army, 2005e)
- j. AKO iPod Giveaway – Official Rules (Department of the Army, 2005d)
- k. AKO Terms of Use / Terms of Service (Department of the Army , 2005c)

- l. Behind AKO (Department of the Army, 2005b)
  - m. Inside AKO (Department of the Army, 2005a)
  - n. The User's Guide to AKO Authentication (Department of the Army, 2004)
  - o. Managing Transformation with a new Learning Model (Evans, 2002)
  - p. CompanyCommand.com PlatoonLeader.army.mil: A Community of Professionals in the Army Providing Exceptional Leadership at the Company Level (Department of the Army, n.d.-b)
  - q. Army Knowledge Management: NCO.mil (Dates, 2002)
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## **Appendix C: The Department of the Navy's KM Documents**

This appendix lists the DON's KM documents that were evaluated for elements of leadership, organization/culture, technology, and learning. The list of documents is divided into two sections, a section of documents that were retrieved from KM Portals and a section of documents that were obtained from alternate sources (Google, military websites, and KM practitioners). The numbered documents indicate they were obtained from alternate sources and the documents that are marked with letters indicate they were obtained from KM portals.

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***The following documents were retrieved from Google and the DON CIO Office website during the months of October 2005 - December 2005.***

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***\*\* The DON Chief Information Office website***

([http://www.doncio.navy.mil/\(2h14y3rnbgeuteyhran23n55\)/main.aspx](http://www.doncio.navy.mil/(2h14y3rnbgeuteyhran23n55)/main.aspx)) and Google website (<http://www.google.com/>) are public websites that do not require a username or password for access

***Documents retrieved from Google***

1. Department of the Navy: Knowledge Management (Nox, J., Bunch, T., Erickson, B., & Preissler, M. (n.d.). [http://www.e-gov.com/events/2005/km/downloads/KM05\\_1-6\\_DON%20Panel.pdf](http://www.e-gov.com/events/2005/km/downloads/KM05_1-6_DON%20Panel.pdf)
2. Navy Marine Corps Intranet (Department of the Navy, n.d. -b) [http://www.e-gov.com/events/2004/gsf/downloads/GSF04\\_1-4\\_Munns\\_NMCI%20\\_1.1\\_.pdf](http://www.e-gov.com/events/2004/gsf/downloads/GSF04_1-4_Munns_NMCI%20_1.1_.pdf)
3. NMCI and the U.S. Marine Corp (Filippi, 2003)  
[http://hqpub.hqmc.usmc.mil/c4/Briefings/NMCIandtheMarineCorps\\_16Jun.ppt](http://hqpub.hqmc.usmc.mil/c4/Briefings/NMCIandtheMarineCorps_16Jun.ppt)

***Documents retrieved from the DON Chief Information Office Website***

4. Department of the Navy Information Management and Information Technology Strategic Plan (Department of the Navy, 2006)  
<http://www.doncio.navy.mil/FY06StratPlan/>
5. U.S. Marine Corps: Marine Corps Enterprise Information Technology (MCEITS) Concept of Operations (United States Marine Corps, 2004).  
[http://www.doncio.navy.mil/\(13ufizn2sy1drc2exkhn2dnj\)/PolicyMatrix/download.aspx?id=189a454a-006b-498e-8101-293fe836e7c0](http://www.doncio.navy.mil/(13ufizn2sy1drc2exkhn2dnj)/PolicyMatrix/download.aspx?id=189a454a-006b-498e-8101-293fe836e7c0)

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***The following documents (a- o) were retrieved from the Navy's Knowledge Management Portal, the Navy Knowledge Online (NKO) portal during the month of January 2006.***

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***\*\*The NKO (<https://www.nko.navy.mil/portal/splash/index.jsp>) is a restricted website that requires a username and password for access.***

- a. Department of the Navy Knowledge Management Strategy (Wennergren, 2005)
- b. Operational KM: Department of the Navy Chief Information Office (Department of the Navy, 2005)
- c. The Revolution of Training: Executive Review of Navy Training (Gunn, 2001)
- d. KM and the Learning Revolution: Flag Conference (Kantner and Malafsky, 2003)
- e. Navy Knowledge Online : The Navy Knowledge Portal (Department of the Navy, n.d.- h)
- f. KM 101 (Department of the Navy, n.d.- c)
- g. KM Position Descriptions and Training Path Matrix (Department of the Navy, 2002)
- h. Naval Personnel Development Command (NPDC) Domain Knowledge Management (KM) Strategy Guidance (Department of the Navy, 2005)
- i. Knowledge Manager: Management and Program Analyst (GS-0343-09) (Department of the Navy, n.d.-d)
- i. Knowledge Manager: Management and Program Analyst (GS-0343-11) (Department of the Navy, n.d.-e)
- i. Knowledge Manager: Management and Program Analyst (GS-0343-12) (Department of the Navy, n.d.-f)
- i. Knowledge Manager: Supervisory Management and Program Analyst (GS-0343-13) (Department of the Navy, n.d.-g)
- j. NPDC Metrics Guide for Knowledge Management Initiatives (Department of the Navy, 2001)
- k. Naval KM Way Ahead (Department of the Navy, 2003)
- l. Naval Personnel Development Command (NPDC): Knowledge Management Procedures Guide (Department of the Navy, 2004)
- m. Submarine Enterprise Knowledge Management Strategy (Moore, n.d.)
- n. Technical Data Knowledge Management Integrated Data Environment (TDKM-IDE): Improving Knowledge Access and Fleet Readiness (Department of the Navy, n.d.-a)
- o. TFE Integrated Enterprise Taxonomy (Malafsky, Harrison, and Marquise, 2003).

## **Appendix D: The Department of the Air Force's KM Documents**

This appendix lists the Air Force's KM documents that were evaluated for elements of leadership, organization/culture, technology, and learning. The list of documents is divided into two sections, a section of documents that were retrieved from KM Portals and a section of documents that were obtained from alternate sources (Google, military websites, and KM practitioners). The numbered documents indicate they were obtained from alternate sources and the documents that are marked with letters indicate they were obtained from KM portals.

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***The following documents were retrieved from the Air Force Portal, Air Force Plans and Programs Office, Air Force Library, and the Secretary of the Air Force Office of Warfighting Integration and CIO (SAF/XC) websites during the months of November 2005 - December 2005. Documents were also obtained from KM practitioners.***

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### ***Documents obtained from KM Practitioner***

1. Air Force Portal Concept of Operations (Department of the Air Force, 2002)
2. Air Force Knowledge Management: The Way Ahead (Sasser, 2006)

### ***Documents retrieved from the Secretary of the Air Force Office of Warfighting Integration and CIO (SAF/XC) website (<https://www.safxc.hq.af.mil/>)***

3. Office of Warfighting Integration and Chief Information Officer (XC) Strategic Plan (Department of the Air Force, 2005b)  
[https://www.safxc.hq.af.mil/xc\\_Strategic\\_Plan\\_15Nov05\\_signed.pdf](https://www.safxc.hq.af.mil/xc_Strategic_Plan_15Nov05_signed.pdf)

### ***Documents retrieved from the Air Force Plans and Programs Office (<https://www.xp.hq.af.mil/>)***

4. The USAF Strategic Planning Directive for Fiscal Years (2006 – 2023) (Department of the Air Force, 2006b) [https://www.xp.hq.af.mil/xpx/docs/afspd\\_c.pdf](https://www.xp.hq.af.mil/xpx/docs/afspd_c.pdf)

### ***Documents retrieved from the Air Force Library (<http://www.af.millibrary.mil/>)***

5. The U.S. Air Force Flight Transformation Plan (Department of the Air Force, 2003)  
[http://www.af.millibrary/posture/AF\\_TRANS\\_FLIGHT\\_PLAN-2004.pdf](http://www.af.millibrary/posture/AF_TRANS_FLIGHT_PLAN-2004.pdf)

### ***Documents obtained from KM Practitioner***

6. Knowledge Based Operations (KBO) Strategic Plan (Department of the Air Force, 2006 a)
-

***The following documents (a-i) were retrieved from the Air Force Knowledge Now website (<https://rso.my.af.mil/afknprod/ASPs/CoP/Entry.asp?Filter=OO>) during the months of December 2005 – January 06.***

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***\*\*The AFKN website can be accessed two ways. The AFKN website can be accessed from a computer terminal on the Air Force network or it can be access from a menu option on the Air Force Portal website, which is publicly accessible.***

- a. The Semantic Web: Imagine the Possibilities (Gilligan, 2005)
  - b. Air Force Information Strategy (Rouse, 2002)
  - c. Air Force Knowledge Now “AF KM Center of Excellence” (Adkins, 2005)
  - d. Air Force Community of Practice Workshop (Adkins, n.d.)
  - e. Knowledge Management (AF CIO Memorandum) (Gilligan, 2004)
  - f. Knowledge Management: The Imperative (Rogers, 2005)
  - g. Air Force Knowledge Management (Brook, n.d.)
  - h. Information Management Operating Instruction (OI) Plan (Department of the Air Force, 2005a)
  - i. Information Management: Moving to a Service Orientation (Hobbins, 2005)
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## Appendix E: The KM Practitioner Feedback from Army Respondent

### *The Four Pillar Framework Checklist*

**\* Directions:** Please review the *Four Pillar Background Paper* prior to marking your response. Place an "X" by the component that is present your service's KM program.

| LEADERSHIP                                        | RESPONSE |
|---------------------------------------------------|----------|
| Business Culture                                  | X        |
| Strategic Planning                                | X        |
| Specific and general goals and objectives         | X        |
| Vision Sharing                                    | X        |
| Executive Commitment                              | X        |
| Knowledge Management (KM) program tied to metrics | X        |
| Tangible rewards for use of KM                    | X        |
| Special Recognition for knowledge sharing         | X        |
| Performance criteria include KM items             | X        |

**Additional Comments:** The Army CIO/G-6 500 Day Plan, a forceful statement of senior leadership involvement, has all of these attributes

| LEARNING ENTERPRISE                           | RESPONSE |
|-----------------------------------------------|----------|
| Tacit and explicit knowledge understood       | X        |
| Vision sharing / team learning                | X        |
| Management supports continuous learning       | X        |
| Knowledge captured and distributed            | X        |
| KM values and principles formally encouraged  | X        |
| Virtual teams / exchange forums in use        | X        |
| Communities of practice in use                | X        |
| Innovation encouraged / recognized / rewarded | X        |

**Additional Comments:** The Army's premier learning enterprise is the Battle Command Knowledge System (BCKS) accessed through Army Knowledge OnLine

| TECHNOLOGY / TOOLS           | RESPONSE |
|------------------------------|----------|
| Process Modeling             | X        |
| Search engines               | X        |
| E-mail                       | X        |
| Online Analytical Processing | X        |
| Data Warehousing             | X        |
| Database Management Software | X        |
| Multi-media Repositories     | X        |
| GroupWare                    | X        |
| Decision Support Systems     | X        |
| Corporate Intranet           | X        |
| Business Modeling Systems    |          |
| Intelligent Agents           |          |
| Neural Networks, etc.        |          |

**Additional Comments:** Not sure of presence of intelligent agents, neural networks, business modeling systems.

| ORGANIZATION / CULTURE                         | RESPONSE |
|------------------------------------------------|----------|
| Process Work-flows                             | X        |
| Operating Procedures for Knowledge Sharing     | X        |
| Business Process Reengineering (BPR)           | X        |
| Management by Objectives (MBO)                 | X        |
| Total Quality Management (TQM)                 | X        |
| Metric Standards                               | X        |
| Hierarchical, Centralized, Decentralized       | X        |
| Matrix type organization                       | X        |
| Open / Sharing                                 | X        |
| Closed / Power Based                           |          |
| Internal partnering vs. competing type culture | X        |

**Additional Comments:** Army KM occurs within the context of the Army CIO/G-6 500 Day Plan, delivering a joint net-centric information enterprise in support of the Army Campaign Plan

## Appendix F: The KM Practitioner Feedback from Navy Respondent

### *The Four Pillar Framework Checklist*

**\* Directions: Please review the Four Pillar Background Paper prior to marking your response. Place an "X" by the component that is present your service's KM program.**

| LEADERSHIP                                                                       | RESPONSE |
|----------------------------------------------------------------------------------|----------|
| Business Culture                                                                 | X        |
| Strategic Planning                                                               | X        |
| Specific and general goals and objectives                                        | X        |
| Vision Sharing                                                                   | X        |
| Executive Commitment                                                             | X        |
| Knowledge Management (KM) program tied to metrics                                |          |
| Tangible rewards for use of KM                                                   |          |
| Special Recognition for knowledge sharing                                        | X        |
| Performance criteria include KM items                                            |          |
| <b>Additional Comments:</b> DON IM/IT Excellence Awards in Knowledge Superiority |          |

| LEARNING ENTERPRISE                           | RESPONSE |
|-----------------------------------------------|----------|
| Tacit and explicit knowledge understood       | X        |
| Vision sharing / team learning                |          |
| Management supports continuous learning       | X        |
| Knowledge captured and distributed            |          |
| KM values and principles formally encouraged  | X        |
| Virtual teams / exchange forums in use        | X        |
| Communities of practice in use                | X        |
| Innovation encouraged / recognized / rewarded | X        |
| <b>Additional Comments:</b>                   |          |

| TECHNOLOGY / TOOLS                                  | RESPONSE |
|-----------------------------------------------------|----------|
| Process Modeling                                    | X        |
| Search engines                                      | X        |
| E-mail                                              | X        |
| Online Analytical Processing                        | X        |
| Data Warehousing                                    | X        |
| Database Management Software                        | X        |
| Multi-media Repositories                            | X        |
| GroupWare                                           | X        |
| Decision Support Systems                            | X        |
| Corporate Intranet                                  | X        |
| Business Modeling Systems                           | X        |
| Intelligent Agents                                  | X        |
| Neural Networks, etc.                               | X        |
| Instant messaging                                   | X        |
| Integrate IT componets (servers, applications,etc ) | X        |
| <b>Additional Comments:</b>                         |          |

| ORGANIZATION / CULTURE                         | RESPONSE                        |
|------------------------------------------------|---------------------------------|
| Process Work-flows                             | X                               |
| Operating Procedures for Knowledge Sharing     | X                               |
| Business Process Reengineering (BPR)           | X                               |
| Management by Objectives (MBO)                 | X                               |
| Total Quality Management (TQM)                 |                                 |
| Metric Standards                               | X                               |
| Hierarchical, Centralized, Decentralized       | Instances of all three          |
| Matrix type organization                       | Many Navy commands are matrixed |
| Open / Sharing                                 | X                               |
| Closed / Power Based                           |                                 |
| Internal partnering vs. competing type culture | teamwork, sharing               |

**Additional Comments:**

## Appendix G: The KM Practitioner Feedback from Air Force Respondent #1

| LEADERSHIP                                                  | RESPONSE                                                                                                                                                                                                              |
|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Business Culture:</b>                                    | AF is trying to operate more like a business. Use of ERP is one example in IT.                                                                                                                                        |
| <b>Strategic Planning:</b>                                  | Much of this ongoing. AF is good a strategic planning, but we need to focus more on translating strategy to actionable plans                                                                                          |
| <b>Specific and general goals and objectives:</b>           | Not really in the area of KM. We're good for IM, but need to work for KM.                                                                                                                                             |
| <b>Executive Commitment:</b>                                | Varies. Will no doubt get better with the new SECAF/CSAF and their interest in IM & KM.                                                                                                                               |
| <b>Knowledge Management (KM) program tied to metrics:</b>   | No                                                                                                                                                                                                                    |
| <b>Tangible rewards for use of KM:</b>                      | Not really there yet.                                                                                                                                                                                                 |
| <b>Special Recognition for knowledge sharing:</b>           | Some, but still a grass roots initiative.                                                                                                                                                                             |
| <b>Performance criteria include KM items:</b>               | Not there yet.                                                                                                                                                                                                        |
| LEARNING ENTERPRISE                                         | RESPONSE                                                                                                                                                                                                              |
| <b>Tacit and explicit knowledge:</b>                        | Nope. Too much confusing KM and IM. Not enough people understand this and its importance.                                                                                                                             |
| <b>Sharing vision / team learning:</b>                      | Yes, but not always in the context of KM.                                                                                                                                                                             |
| <b>Management support for continuous learning:</b>          | Yes!                                                                                                                                                                                                                  |
| <b>Knowledge captured and distributed:</b>                  | Little capability to do this so it only happens on a very limited basis. There is a desire even at senior leader levels to move this forward.                                                                         |
| <b>KM values and principles formally encouraged</b>         |                                                                                                                                                                                                                       |
| <b>Virtual teams / exchange forums in use:</b>              | Yes. Much collaboration going on. AFKN is a good example.                                                                                                                                                             |
| <b>Communities of practice / shared results are active:</b> | Yes!                                                                                                                                                                                                                  |
| <b>Innovation encouraged / recognized / rewarded:</b>       | Only at the local level. Some centers of excellence but mainly aligned functionally.                                                                                                                                  |
| TECHNOLOGY / TOOLS                                          | RESPONSE                                                                                                                                                                                                              |
| <b>Process Modeling:</b>                                    | Nope.                                                                                                                                                                                                                 |
| <b>Search engines:</b>                                      | Many search engines, but no true discovery capability yet.                                                                                                                                                            |
| <b>E-mail:</b>                                              | Many different types. E-mail is our only true enterprise service and is probably used <b>more than anything else for collaboration.</b>                                                                               |
| <b>OLAP:</b>                                                | Yes. AFKS is part of GCSS and support OLAP.                                                                                                                                                                           |
| <b>Data Warehousing:</b>                                    | Yes! See OLAP.                                                                                                                                                                                                        |
| <b>Database Management:</b>                                 | More than we need. Everybody has there own DBMS. Trying to shepherd enterprise data to a single structured repository (AFKS) for analytical processing.                                                               |
| <b>Multi-media Repositories:</b>                            | Multiple across functional domains.                                                                                                                                                                                   |
| <b>GroupWare:</b>                                           |                                                                                                                                                                                                                       |
| <b>Decision Support Systems:</b>                            | Multiple across functional domains.                                                                                                                                                                                   |
| <b>Corporate Intranet:</b>                                  |                                                                                                                                                                                                                       |
| <b>Business Modeling Systems</b>                            |                                                                                                                                                                                                                       |
| <b>Intelligent Agents:</b>                                  | Not yet.                                                                                                                                                                                                              |
| <b>Neural Networks, etc.:</b>                               | Only in research maybe or restricted programs.                                                                                                                                                                        |
| ORGANIZATION/CULTURE                                        | RESPONSE                                                                                                                                                                                                              |
| <b>Process Work-flows:</b>                                  | Yes when we get EIM tool suite implemented.                                                                                                                                                                           |
| <b>Operating Procedures for Knowledge sharing:</b>          | Not at the enterprise level. Some local, mainly on C2 side.                                                                                                                                                           |
| <b>Business Process Reengineering (BPR):</b>                | Yes, but not convinced that it's a priority with BP owners.                                                                                                                                                           |
| <b>Management by Objectives (MBO):</b>                      | Yes - and exception also!                                                                                                                                                                                             |
| <b>Total Quality Management (TQM):</b>                      | Not anymore.                                                                                                                                                                                                          |
| <b>Metric Standards:</b>                                    | Yes, big metrics initiatives.                                                                                                                                                                                         |
| <b>Hierarchical, Centralized, Decentralized:</b>            | All 3, but mainly decentralized. Think in terms of MAJCOM leadership.                                                                                                                                                 |
| <b>Matrix type organization:</b>                            | Yes, but I've not had good luck with this type organization working well. Unless personnel are highly motivated and self-starters it works best if the "leader" can directly influence performance ratings, pay, etc. |
| <b>Open / Sharing:</b>                                      | Yes                                                                                                                                                                                                                   |
| <b>Closed / Power Based:</b>                                | Both depending on subject                                                                                                                                                                                             |
| <b>Internal partnering vs. competing type culture:</b>      | Both depending on subject                                                                                                                                                                                             |

## Appendix H: The KM Practitioner Feedback from Air Force Respondent #2

### *The Four Pillar Framework*

*\* Directions: Please review the Four Pillar Background Paper prior to marking your response. Place an "X" by the component that is present your service's KM program.*

| LEADERSHIP                                        | RESPONSE |
|---------------------------------------------------|----------|
| Business Culture                                  |          |
| Strategic Planning                                | X        |
| Specific and general goals and objectives         | X        |
| Vision Sharing                                    | X        |
| Executive Commitment                              | X        |
| Knowledge Management (KM) program tied to metrics | X        |
| Tangible rewards for use of KM                    | X        |
| Special Recognition for knowledge sharing         | X        |
| Performance criteria include KM items             |          |
| <b>Additional Comments:</b>                       |          |

| LEARNING ENTERPRISE                           | RESPONSE |
|-----------------------------------------------|----------|
| Tacit and explicit knowledge understood       | X        |
| Vision sharing / team learning                | X        |
| Management supports continuous learning       | X        |
| Knowledge captured and distributed            | X        |
| KM values and principles formally encouraged  | X        |
| Virtual teams / exchange forums in use        | X        |
| Communities of practice in use                | X        |
| Innovation encouraged / recognized / rewarded | X        |
| <b>Additional Comments:</b>                   |          |

| TECHNOLOGY / TOOLS                                  | RESPONSE |
|-----------------------------------------------------|----------|
| Process Modeling                                    | X        |
| Search engines                                      | X        |
| E-mail                                              | X        |
| Online Analytical Processing                        |          |
| Data Warehousing                                    | X        |
| Database Management Software                        | X        |
| Multi-media Repositories                            | X        |
| GroupWare                                           | X        |
| Decision Support Systems                            | X        |
| Corporate Intranet                                  | X        |
| Business Modeling Systems                           |          |
| Intelligent Agents                                  |          |
| Neural Networks, etc.                               |          |
| Instant messaging                                   | X        |
| Integrate IT componets (servers, applications,etc ) | X        |
| <b>Additional Comments:</b>                         |          |

| ORGANIZATION / CULTURE                         | RESPONSE |
|------------------------------------------------|----------|
| Process Work-flows                             | X        |
| Operating Procedures for Knowledge Sharing     | X        |
| Business Process Reengineering (BPR)           | X        |
| Management by Objectives (MBO)                 |          |
| Total Quality Management (TQM)                 |          |
| Metric Standards                               | X        |
| Hierarchical, Centralized, Decentralized       | X        |
| Matrix type organization                       |          |
| Open / Sharing                                 | X        |
| Closed / Power Based                           |          |
| Internal partnering vs. competing type culture |          |
| Help Desk                                      | X        |
| <b>Additional Comments:</b>                    |          |

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## **Vita**

First Lieutenant Patrick L. Booker graduated from Charleston High School in Charleston, Mississippi. He enlisted in the Air Force in 1994 as an apprentice in the Chaplain Service Support Personnel career field. He served one assignment at Keesler Air Force Base, Mississippi where he was assigned to the 81<sup>st</sup> Training Wing for seven years. In March 2001, Staff Sergeant Booker was selected for the Airmen Scholarship and Commissioning Program (ASCP) to complete his undergraduate degree. He graduated in May 2003 with a Bachelor of Arts degree in Biology from the University of Mississippi. He was commissioned that same year through the Reserve Officer Training Corp (ROTC) at the University of Mississippi.

In August 2003, he served his first assignment as a commissioned officer at Wright-Patterson AFB, Ohio. While assigned to Wright-Patterson AFB, he entered the Graduate School of Engineering as a direct accession at the Air Force Institute of Technology. Upon graduation, he will be assigned to the 392 Space/Missile Operations Training Squadron at Vandenberg Air Force Base, CA.

| REPORT DOCUMENTATION PAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |                                   |                                      | Form Approved<br>OMB No. 074-0188                                   |                                                                                                        |
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| 14. ABSTRACT<br><p>Knowledge is a corporate resource that is required to accomplish business processes, to make decisions, and to improve efficiency and effectiveness. To completely take advantage of the benefits of knowledge, organizations must harvest and leverage the collective knowledge of the entire workforce. This can be achieved through effective knowledge management. Knowledge management involves processes to create, to store, and transfer knowledge to accomplish business objectives and to achieve a competitive advantage. The United States armed services have also recognized the benefits of knowledge management in meeting the emerging challenges of modern warfare. This study investigated knowledge management programs in the U.S. Army, Navy, and Air Force. Using a case study methodology, each of the service's knowledge management programs were assessed against Stankosky et al.'s (1999) "Four Pillar Framework" which outlines key elements of leadership, technology, organization/culture, and learning associated with robust knowledge management programs. Based on the evidence reviewed for this research, the results indicate each of the services are making progress albeit with slightly different approaches towards a more mature KM program with the U.S. Army having the most complete approach according to the evaluation criteria. The research also revealed that there is much collaboration and work yet to be done among the services if the concepts of knowledge management are to be used to operate and fight more effectively as a joint force.</p> |               |                                   |                                      |                                                                     |                                                                                                        |
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