Employee Determinants to Share Knowledge in a US Federal Government Environment

Kenneth White
Nova Southeastern University, kcwhite@rocketmail.com

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Employee Determinants to Share Knowledge in a U.S. Federal Government Environment

by

Kenneth C. White

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Information Science

Graduate School of Computer and Information Sciences
Nova Southeastern University
2012
An Abstract of a Dissertation Submitted to Nova Southeastern University
in partial fulfillment of the Requirements for the Degree Doctor of Philosophy

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October 2012

Although the literature indicates that knowledge sharing (KS) research is prevalent in the private sector, there is scant empirical research data about KS in the public sector. Moreover, organizations lack an understanding of employee KS behavior. This study investigated two research questions: First, how does the perceived importance of five determinants of KS behavior (organizational culture, workplace trust, incentives, management support, and technology) vary based upon the variables of job function, gender, and work category? Second, what is the relative importance of the five determinants of KS behavior to U.S. federal government employees? This descriptive study employed a Web-based survey methodology and interviews to collect data. The survey was administered to 121 employees in a single U.S. government organization, with a response rate of 69%. The Statistical Package for the Social Sciences was used for data analysis, and the multivariate analysis of variance and analysis of variance statistical techniques were used to compare variables. The study findings indicated no statistical differences in perceptions of the five facets investigated relative to the variables of work category, gender, and job function, and no statistical differences in the importance among the five determinants investigated. As a result, the null hypotheses were not rejected. Additional findings were that respondents perceived the five facets investigated to be positive KS determinants and that they agreed or strongly agreed that each facet was important to the success of KS initiatives. Although the results indicated no statistically significant difference between the five facets investigated, the results support literature findings that the five facets are important to the KS process. The investigation also advances the current state of KS implementation in the public sector by providing empirical data on a subject that is rarely investigated in the U.S. federal government. Future studies in similar and larger organizations are recommended. The investigation is a positive step toward improving the understanding of the determinants that affect employee KS behavior and provides a tool for KS planners to use to ascertain the state of KS in their organizations.
Acknowledgments

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Chapter 1

Introduction

Background

Knowledge sharing (KS) is not a new phenomenon. As repositories of distilled experience, village elders in early societies practiced knowledge sharing, though it was not identified as such (Denning, 2000). Early forms of knowledge sharing included oral traditions, storytelling, communal gatherings, and apprenticeships (Dalkir, 2005). The difference between early and present-day KS practices is that current organizations are consciously addressing KS (Ammar-Khodja & Bernard, 2008).

In the current economy, knowledge has become essential to productivity, competitiveness, and economic achievement. Whereas a traditional economy is noted for tangible assets such as land, capital, and buildings, the current economy’s intangible asset, knowledge, is an organization’s basic economic resource (Adams & Oleksak, 2010; Bennet & Bennet, 2008; Dalkir, 2005; Frappaolo, 2006; Ichijo & Nonaka, 2007; Prusak & Weiss, 2007; Sinclair, 2006).

The recent rise of the importance of managing and sharing knowledge in the business sector may be explained by the globalization of business. Businesses are situated in multiple locations around the world and the workforce is multilingual and highly mobile, all of which creates a problem of knowledge continuity. Managing knowledge reduces organizations’ need to “reinvent the wheel.” In addition, budget reductions and
the potential imminent retirement of the baby boomers, the largest segment of the workforce, challenges organizations to do more with less. Finally, technological advances have increased society’s connectivity, enhancing the ability to add structure to data and information and to transmit files worldwide instantaneously (Dalkir, 2005; Davenport, 2007; Frappaolo, 2006).

Although sharing knowledge helps organizations remain competitive, KS behavior is not well understood (Alhammad, Al Faori, & Abu Husan, 2009; Beckmann, 2009; Pee & Kankanhalli, 2008). Researchers have recommended investigations in diverse sectors to improve the understanding of employee KS behavior. The majority of employee KS behavior studies have occurred in the private sector, but the present study investigates determinants of employee knowledge sharing in an often-neglected arena, the public sector, and specifically in a U.S. federal government environment. If organizations understand employee KS behavior, KS strategies may be tailored to encourage employees to share knowledge that they otherwise would not share and that would be lost to the organization. This study is intended to enhance organizational understanding of the dynamics of employee KS behavior.

Chapter 1 outlines the foundation of the study, including a problem statement and the goal, relevance, significance, and issues related to this research. The chapter also will outline the research questions and the study’s limitations and delimitations, and will provide a list of defined terms.
**Problem Statement**

KS is a key asset that enhances organizational effectiveness and is critical to organizational success (Bennet & Bennet, 2008; Brown, Dennis, & Grant, 2006; Dalkir, 2005; du Plessis, 2005; O’Neill & Adya, 2007; Yang, 2007). Ismail and Yousof (2008) stated that knowledge is of little value if it is not shared, but KS within organizations is hampered by a lack of understanding of employees’ sharing behavior (Alhammad et al., 2009; Bechina & Bommen, 2006; Han & Anantatmula, 2006; Riege, 2005). The present investigation addresses the lack of understanding of the determinants that affect employee knowledge-sharing behavior.

Several recent studies have analyzed some aspects of the factors that affect employee knowledge-sharing behavior (Bechina & Bommen, 2006; Bock, Zmud, Kim, & Lee, 2005; Chau & Lam, 2005; Cruz, Perez, & Cantero, 2009; Dalkir, 2005; Hsu, 2006; Ichijo & Nonaka, 2007; Lindsey, 2006; Manolopoulous, 2008; Sveiby, 2007; Yang, 2007). These studies highlight the need for additional investigation in this area and indicate that an understanding of employees’ KS behavior increases the likelihood of success in organizational KS initiatives.

**Dissertation Goal**

One goal of this study was to investigate inhibitors and motivational conditions relative to employee KS behavior in a U.S. government environment. An additional goal was to design a model that planners of knowledge management (KM) initiatives may use to evaluate the state of KS in their organizations.
Research Questions and Hypotheses

Research Questions

The following research questions guided the investigation:

1. How does the perceived importance of five determinants (organizational culture, workplace trust, incentives, management support, and technology) of KS behavior vary based upon job function, gender, and work category?

2. What is the relative importance of the five determinants of KS behavior to U.S. federal government employees?

Null Hypotheses

1. There is no perceived importance between the five determinants of KS behavior investigated based upon job function, gender, and work category.

2. There is no relative importance of the five determinants of KS behavior investigated to U.S. federal government employees.

Relevance and Significance

Relevance

The factors that influence employees’ KS behavior are varied. Bock et al.’s (2005) study indicated that employee attitudes toward an organization, and employees’ anticipated reciprocity for sharing, may affect employee sharing behavior. Additionally, Wah, Menkhoff, Loh, and Evers (2005) investigated social and organizational factors that influence KS behavior, concluding that the strongest drivers of KS were rewards, incentives, and an environment in which open-mindedness thrives. Sveiby’s (2007) investigation took a different path in addressing the subject, focusing on management’s
influence on KS. His findings suggest that the lack of management support is a major inhibitor of KS in organizations.

These studies highlight the importance of investigating KS. Although the studies focused on a common theme, they investigated various facets of KS behavior in diverse environments. Each study recommended additional research in different environments as a means to better understand employee KS behavior. Wah et al. (2005) specifically recommended the investigation of KS in a military environment, which typifies a top-down, hierarchical organizational structure. The authors theorized that the findings in such an organizational structure would reveal different KS dynamics than were revealed in their investigation in an academic environment.

In its proposed guidelines to address critical KM issues in the U.S. federal government, the Federal KM Working Group (2008) listed KS as a challenge. Specifically, the authors noted issues of inconsistent KS practices and a lack of knowledge retention, both of which are germane to the present study. In discussing inconsistent KS practices, the committee stated that there are no established standards or consistent tools available to enable organizations to share knowledge. They believed that standard practices would facilitate the sharing of skills between employees and organizations.

Significance

The lack of an understanding of employee KS behavior potentially hampers KS efforts. Without empirical data, KS program planners must speculate about the best way to establish a sharing environment. Although KS study participants come from a variety of environments, including academia, the health-care industry, the hotel/tourist industry,
workers’ compensation boards, multinational engineering organizations, the business sector, and state or local government, this investigation focuses on U.S. federal government employees. Researchers such as Misra (2007) and Riege and Lindsay (2006) have stated that the purpose of KM in the public sector is to improve internal processes, formulate sound government policies, and create an innovative system that connects citizens with information. KS is a means to accomplish KM’s purpose.

The sharing of knowledge is especially important in the U.S. federal government sector. Barr (2005) reported that the percentage of U.S. federal employees over 45 years of age is almost twice as high as the corresponding percentage in the private sector. Mihm (2007), citing testimony before the House Subcommittee on Financial Services and General Government, Committee on Appropriations, emphasized that the loss of leadership and institutional knowledge at all levels will become a reality in the future, due to a wave of federal employee retirements. The United States Office of Personnel Management (2008) reported that 60% of U.S. federal government employees will be eligible to retire by 2016.

KS is sufficiently important that the Federal KM Working Group’s (2008) federal KM initiative road map listed the lack of KS practices and knowledge retention as critical issues. Perhaps an understanding of U.S. federal government employees’ KS behavior can assist in the implementation of efficient KS initiatives. Such initiatives may ease the impact of a potential expertise drain.

This investigation advances the current state of KM implementation in the public sector, in general, and in the U.S. federal government sector, specifically. It is anticipated that this study will assist organizations from all sectors in understanding the dynamics of
employee KS behavior. The results of the investigation will assist organizations in ascertaining the state of their KS and tailoring their KS planning activities.

**Issues**

The present research investigated factors that influence employee KS behavior in a U.S. federal government environment. The investigation of the entire U.S. federal government workforce was not feasible; therefore, the study focused on a single government organization. Although the literature outlines multiple factors that influence KS, the proposed investigation was limited to the factors most often listed in the literature as influencing KS behavior: organizational culture, workplace trust, incentives, management support, and technology.

Developing a comprehensive measurement instrument was critical to this investigation. Without such an instrument, the investigation would lack focus, and data germane to the investigation could not be collected efficiently. Another issue was the lack of a universally accepted definition of organizational culture. Including such a definition in the survey instrument ensured that respondents were sharing perceptions from a similar viewpoint.

Similar to organizational culture, the concept of workplace trust (the third issue) also has an ambiguous and often misunderstood definition. Because there are several types of trust, clarification of the term in the survey instrument was necessary to ensure that the aspects of trust under assessment were understood.

The fourth issue is incentives. Although incentives are a means of acknowledging the value of sharing knowledge, the complete list of potential incentives was too long to
include as an element of the survey instrument. Therefore, the survey instrument contained space for respondents to write in an incentive. Although an argument can be made that incentive programs do not encourage KS, the present study investigated the concept that an incentive program encourages sharing. In addition, the elements of the survey relating to the KS-influencing factors of management support and technology were addressed to ensure their terms were clear to survey respondents.

A lack of understanding of KS from all organizational employee perspectives is also an issue. Researchers such as Han and Anantatmula (2006) have stated that employee KS behavior is neither well explored nor understood. Unless organizations understand employee KS behavior, KS initiatives are unlikely to succeed. Research has demonstrated that existing KM research primarily focuses on an organization’s management perspective, at the expense of its non-management employees. According to Lindsey (2006), management should investigate all segments of an organization to ascertain KS perspectives before initiating a KS strategy. Incorporating plans to address all employee perspectives will improve the chances that KS initiatives will be successful.

The final issue involves data collection methodology. Although the tried-and-true mail survey collection method has been and remains a collection option, it is difficult to compile and use U.S. federal workers’ home addresses for the purpose of conducting mail surveys, due to legal restrictions. Therefore, a Web survey data collection methodology was employed.
Limitations and Delimitations

Limitations

Multiple elements have been identified in the literature as potential influences on KS behavior. For example, Riege (2005) listed over three dozen factors that may influence employee KS behavior. The current study investigates only the five factors most often listed in the literature as affecting KS outcomes. The investigation also was limited to a 30-day data collection window, as requested by the organization surveyed. Although the methodology called for the conduct of a formal interview, no potential interviewee would sign an informed consent form to be interviewed.

Delimitations

Survey respondents were limited to U.S. federal employees in civilian government service, military personnel, and contractor employees. Employees in other categories, such as interns, temporary hires, and consultants, were excluded.

Definition of Terms

Key terms and/or concepts are presented below to provide the reader with the definitions used in this dissertation.

Culture: The day-to-day activities that encourage employees to create, share, and utilize knowledge in a way that is beneficial to an organization’s long-term success (Oliver & Kandadi, 2006).

Incentives: Goal objects that stimulate one to act. Rewards and recognition represent acknowledgment of employee contributions to an organization’s KS efforts (Petri & Govern, 2004).
Knowledge management: “A deliberate, systematic business optimization strategy that selects, organizes, stores, packages, and communicates information essential to enhance employee performance and corporate competitiveness” (Bergeron, 2003, p. 8).

Knowledge sharing: “The ability of employees to share experience, expertise, values, contextual information, and insight for the purpose of creating frameworks for evaluating and incorporating new experiences and information” (Kim & Lee, 2005, p. 249).

Management support: When organizational management demonstrates a commitment to and support for the implementation of prospective change (Mohammadi, Khanlari, & Sohrabi, 2009).

Motivation: Internal forces and external stimuli that drive people to goal attainment (Kalat, 2010).

Technology: The practical use of scientific knowledge in the organization of human activities (Headrick, 2009).

Trust: An expectation based on experience that another person will not seek to act opportunistically through words, actions, or deeds (Robbins, 2006).

**Summary**

The problem investigated was the lack of understanding of the determinants that affect employee KS behavior. Studies have highlighted the need for additional investigations and have concluded that organizations that understand their employees’ KS behavior will increase their likelihood of KS success. The majority of KS studies have
been conducted in the private sector, but there exists a need to investigate employee KS behavior in the public sector.

Because the majority of U.S. federal government employees are steadily reaching retirement age, the government may potentially experience a loss of leadership expertise and institutional knowledge. Therefore, the Federal KM Working Group (2008) has listed the lack of KS practices and knowledge retention as critical issues. In addition, researchers such as Prusak and Weiss (2007) have stated that reviewing organizational knowledge initiatives from the employee’s perspective is an infrequent occurrence and that knowledge initiatives are too often approached from a management perspective, without regard for the end user. This investigation solicited input from both management and non-management employees.
Chapter 2

Review of the Literature

This chapter focuses on a review of literature pertinent to the proposed investigation. Although this investigation addresses employee KS behavior, the concept of KM will be discussed first. KM practitioners are concerned with processes that govern the creation, selection, collection, organization, dissemination, and utilization of knowledge to fulfill organizational objectives, and they identify KS as the key component of the KM process (Brown et al., 2006; O’Neill & Adya, 2007; Yang, 2007). The concept of KS will be discussed, followed by a discussion of the five organizational facets most often listed in the literature as critical to enhancing KS behavior.

Knowledge Management

Knowledge has become essential to organizational productivity, competitiveness, and economic achievement (Bennet & Bennet, 2008). In addition, Bennet and Bennet noted that, given the demands of a precarious world and unpredictable events, knowledge managers in both the private and the public sectors are challenged daily.

The term knowledge management has no universally accepted definition. Knowledge, the first half of KM, may be viewed as an employee’s expertise. Webster’s Universal College Dictionary (2004) defines knowledge as understanding gained through experience or study and the sum of that which is perceived, discovered, or inferred.
Management is determining goals and objectives, planning policy, organizing resources, and motivating employees to accomplish stated tasks (Frappaolo, 2006). Given the combined definitions of knowledge and management, therefore, KM may be defined as achieving organizational goals and objectives through the motivation and facilitation of employees to develop, enhance, and use their capabilities to interpret and reuse data and information.

Additional definitions state that KM is “a deliberate, systematic business optimization strategy that selects, organizes, stores, packages, and communicates information essential to enhance employee performance and corporate competitiveness” (Bergeron, 2003, p. 8). Robbins (2003) defined KM as a “process of organizing and distributing an organization’s collective wisdom so the right information gets to the right people at the right time” (p. 575). Likewise, Bhirud, Rodrigues, and Desai (2005) defined KM as information in action. Frappaolo (2006) defined KM as “the leveraging of collective wisdom to increase responsiveness and innovation” (p. 8) and noted that KM “emphasizes the re-use of previous experiences and practices” (p. 13). In Freeze and Kulkarni’s (2007) research to identify sources of an organization’s intangible knowledge assets, they stated that KM is a process that leverages organizational assets in an effort to improve the organization’s performance.

Technology, People, and Processes

Because KM has no universal definition, the term is open to interpretation from more than one point of view. In general, KM practitioners are divided into two camps, the technology camp and the people camp. The practitioners in the technology camp tend to view KM from an information technology perspective. Their education is generally in the
computer science or information sciences arena and their focus is on the design of information systems, artificial intelligence, or reengineering. For this group, knowledge comprises objects that are identified and handled in information systems (Lengnick-Hall & Lengnick-Hall, 2003). In addition, Handzic (2004) stated that proponents of the technology camp view knowledge as an object that can be codified and stored in databases. They perceive technology as a means for representing and processing knowledge. This group also predicts that technology will be the source of future KM breakthroughs. Handzic contended that technology’s role in KM is that of an enabling tool to facilitate processes of knowledge development, transfer, and utilization. He stated that technology facilitates KS by improving employees’ ability to acquire knowledge.

Gottschalk (2005) stated that technology is used to codify, store, and distribute knowledge and to enhance the communication of knowledge. Whereas Breivik and Gee (2006) reported that technology does not resolve KM issues but only enhances an organization’s ability to address KM issues, Wieneke and Phlypo-Price (2010) found that technology connects knowledge holders with knowledge seekers. They also reported that technology enhances KS because it assists in the efficient analysis, storing, and retrieval of knowledge.

In contrast, practitioners who view KM from a people perspective are generally educated in the areas of philosophy, psychology, sociology, or business/management. They focus on assessing, changing, and improving human skills. These practitioners consider knowledge to be complex, dynamic skill sets or expertise. They see the orchestration of various KM activities as leading to understanding and insight (Lengnick-Hall & Lengnick-Hall, 2003).
Gottschalk’s (2005) research found that people are the core of successful KM implementation because people are the creators and holders of knowledge. Gottschalk continued by stating that knowledge cannot reside in technology systems unless people store it there. Armstrong (2006) supported the idea that KM is more about people than about technology because people are the holders of knowledge. Soto, Vizcaino, Portillo-Rodriguez, and Piatini (2007) also reported that KM is a people-oriented organizational process, with technology playing a supporting role. Finally, McNabb (2009) stated that people may be considered the most important aspect of KM because knowledge resides with the employee and can be lost due to events such as employee transfer, firing, or retirement.

**Processes**

In addition to the technology and people aspects of KM, a variety of processes—sequences of established actions—are used to manage knowledge. Different approaches to classifying KM processes include Skyrme’s (2007) model of knowledge creation (collect knowledge), organization (categorize knowledge), diffusion (distribute knowledge), use (apply knowledge), and exploitation (apply knowledge to the greatest advantage).

Similar to Skyrme’s model, the Department of the Army’s (2008) KM process comprises five functions. The first function is assessment, which is an analysis of what knowledge an organization needs. During the performance of this function, the organization identifies what it knows and what it needs to know to accomplish its mission. The second function is design, which identifies a KM service or product to address a specific category of need. For example, if organizations cannot locate specific
documents or expertise, a solution may be to design a community of practice to enable members with similar expertise and experiences to interact with others. The next process, development, is the function that builds the solution identified through the assessment and design functions. Piloting is the fourth Army KM function. During the performance of this function, the solution is tested and validated by the organization. The final KM function is implementation, which means executing the validated solution and integrating it into the organization’s operations.

A final example of a KM process model is that of Becerra-Fernandez and Sabherwal (2010). Their model comprises four functions. The first is knowledge discovery. This function is defined as “the development of new tacit or explicit knowledge from data and information or from the synthesis of prior knowledge” (p. 57). Next is knowledge capture, which is “the process of retrieving either explicit or tacit knowledge that resides within people, artifacts, or organizational entities” (p. 58). Knowledge sharing, the third process, is where explicit and tacit knowledge is communicated to other individuals. This process enables efficiency by reducing redundancy of effort. The last function in Becerra-Fernandez and Sabherwal’s KM process model is knowledge application. The use of knowledge discovered, captured, and shared contributes to organizational performance when it is used to make decisions and/or perform tasks.

Although these three KM process models comprise various functions, they are similar. On a broad basis, each model consists of some form of identifying, collecting, indexing, and reusing knowledge. Table 1 provides examples of the KM process model components discussed.
Table 1. Examples of Knowledge Management Process Model Components

<table>
<thead>
<tr>
<th>Author</th>
<th>Model Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skyrme (2007)</td>
<td>Creation, organization, diffusion, use, exploitation</td>
</tr>
<tr>
<td>Department of the Army (2008)</td>
<td>Assess, design, develop, pilot, implement</td>
</tr>
<tr>
<td>Becerra-Fernandez and Sabherwal (2010)</td>
<td>Knowledge discovery, knowledge capture, knowledge sharing, and knowledge application</td>
</tr>
</tbody>
</table>

Data, Information, and Knowledge

Data, information, and knowledge are fundamental to KM. These building blocks are interrelated and are part of a sequential order that results in what is managed—knowledge. Similar to other KM components, data, information, and knowledge have multiple definitions. For instance, Bergeron (2003) stated that data are “numerical quantities or other attributes derived from observation, experiment, or calculation,” that information is data in context and a “collection of data and associated explanations, interpretations, and other textual material concerning an object, event, or process,” and that knowledge is “information that is organized, synthesized, or summarized to enhance comprehension, awareness, or understanding” (p. 10).

Reitz’s (2004) definitions of data, information, and knowledge parallel Bergeron’s (2003). Reitz defined data as “facts, figures, or instructions that can be comprehended by a human being or processed by a computer” (p. 201) and defined information as “data presented in a readily comprehensible form to which meaning has been attributed within a context for its use” (p. 355). Although Reitz’s book is titled Dictionary of Library and Information Science, no definition of knowledge was given.
Dalkir (2005) defined data as numbers or objects that can be stored in a database. He stated that information is data in context and is combined with personal experience, values, contextual information, and expert insight to form the third sequence, knowledge. Knowledge has been validated and is referred to as information with meaning.

McNabb (2007) stated that “data is facts, concepts, or statistics that can be collected, stored, or analyzed to produce information” (p. 279). This definition is similar to that given by Reitz (2004) and Dalkir (2005). McNabb (2007) defined information as organized data arranged for better comprehension or understanding. Finally, McNabb defined knowledge as derived from information and stated that it “includes familiarity, awareness, and understanding gained through study results or comparisons and combinations, identifying and weighing consequences, and making connections” (p. 284).

Each definition builds upon another and involves greater contextual richness. A visual example of data, information, and knowledge would be that data is the alphabet or a word, information is the sentences or paragraphs, and knowledge is a book on a subject. Using these definitions, one can see that without data there would be no information, without information there would be no knowledge, and without knowledge there would be no knowledge management.

*Tacit and Explicit Knowledge*

Although there are many categories of knowledge, the KM literature most often refers to tacit knowledge and explicit knowledge. Tacit knowledge is skill, expertise, judgment, and talent not easily described; it is subjective. This category of knowledge resides in an employee’s head and is difficult to codify (Eftekharzadeh, 2008). The
second category of knowledge is explicit knowledge, which can be expressed in numbers and words; it is objective and is easy to communicate and share (Frappaolo, 2006).

Alwis and Hartmann (2008) conducted a literature-based study to determine the use of tacit knowledge in organizations. The authors began by outlining the difficulty associated with conceptualizing tacit knowledge, because it is difficult to codify and is not communicated in language but is acquired through experience. The results indicated that tacit knowledge plays a vital role as an organizational resource and success factor. Likewise, in a descriptive investigation of factors that affect organizational KM, Ma, Qi, and Wang (2008) found that, although both explicit knowledge and tacit knowledge are significantly related to effective KM, tacit knowledge represents the greater challenge to successful KM implementation.

In summary, tacit knowledge is difficult to code and capture; explicit knowledge can be readily coded, stored, and shared. Although both types of knowledge are important to organizations, explicit knowledge is captured and reused more often than tacit knowledge.

**Knowledge Sharing**

The core of KM is KS, because knowledge is of little value unless it is shared (Ismail & Yousof, 2008). This section will define KS and will discuss the benefits of and barriers to KS. Researchers have offered various definitions of KS. In Connelly and Kelloway’s (2003) study to determine employees’ perceptions of organizational culture, KS is defined as a set of behaviors that enhances the exchange of information with others. Similarly, Helmstadter’s (2003) book on the economics of KS stated that KS is a
voluntary transfer of expertise and experience from one individual to another. Kim and Lee’s (2005) study of the influence of organizational culture, organizational structure, and information technology on KS capabilities defines KS as “the ability of employees to share experience, expertise, values, contextual information, and insight for the purpose of creating frameworks for evaluating and incorporating new experiences and information” (p. 249). Thus, one may surmise that KS involves at least two people who voluntarily exchange relevant knowledge with each other to enhance new experiences.

Benefits of Knowledge Sharing

In his study to determine the individual, organizational, and technology factors that influence the knowledge-sharing process, Lin (2007) reported that organizations enhance their position and achieve competitive advantage through KS. Likewise, various researchers have investigated the benefits of KS in organizations. For example, Syed-Ikhsan and Rowland (2004) researched the relationship between organizational elements and political directives on knowledge transfer performance and the creation of knowledge assets. Their investigation found that KS improved work quality; increased availability of up-to-date information; improved efficiency, effectiveness, and decision-making; and improved responsiveness to customers. The respondents in Syed-Ikhsan and Rowland’s exploratory study comprised 154 Malaysian public sector employees.

Dalkir (2005) outlined three categories of KS benefit: individual, community, and organizational. Individuals’ KS benefits include improved job proficiency, decision-making, problem solving, and bonding. Community benefits include the development of professional skills and a code of ethics, and facilitation of effective networking and collaboration. Finally, organizational benefits include acting as a motivating force for
strategy, diffusion of best practices, and assisting organizations in gaining and maintaining competitiveness.

Zhang, Dawes, and Sarkis (2005) also investigated the benefits of KS. Their descriptive investigation focused on project stakeholder expectations of KS in four environments: local government, state government, nonprofit groups, and private companies. Participants ranged from general administrators to information technology operations or management to program management. A total of 488 valid surveys were returned. The top four KS benefits identified by stakeholders were wider professional networks, enhanced information quality, comprehensive information, and shared information infrastructure. Although Zhang et al. presented a different list of KS benefits than the list presented by Dalkir (2005), both lists demonstrated that KS benefits are varied.

*Barriers to Knowledge Sharing*

Although there are valuable benefits to be gained from knowledge sharing, there also are barriers that inhibit it. For instance, Syed-Ikhsan and Rowland’s (2004) research cited command-and-control structure, communications channels among officers, political interference, and organizational structure as barriers to KS in a military setting. Likewise, Zhang et al. (2005) cited different organizational priorities, lack of funding, organizational resistance to change, overly ambitious goals, and individual resistance to change as the primary barriers to KS.

Bhirud et al. (2005) stated that the main object of KM is the management of organizational knowledge to create new knowledge. The purpose of Bhirud et al.’s investigation was to gain an understanding of KS in organizations and to identify barriers
to KS. The study methodology was classified as passive participant observation, in which data was gathered through interaction with employees. Over a 4-month period, the researchers attended organizational meetings, visited laboratories, and studied reports and KS e-mail. During informal periods, data also was collected while talking to employees at coffee breaks, lunch, and social events.

Bhirud et al. (2005) concluded that the organization had a suitable environment for KS, that KS practices were effective, and that technology was used appropriately. However, the researchers reported that there still were barriers to KS. The barriers included a lack of middle management support, because these managers did not see immediate benefits. Second, the organizational structure was seen as a barrier because each division was controlled by its parent organization in the service of a different business objective. Third, although knowledge is created through problem solving, an invisible link between KS and problem solving existed in this company. Fourth, because the majority of projects originated from the parent organization, the divisions suffered from a “not-invented-here syndrome.” Fifth, organizational employees saw knowledge as power and hoarded it. Finally, software development is a group activity and is filled with time constraints, whereas knowledge sharing is voluntary. This scenario causes employees to attempt to meet time constraints at the expense of KS.

Bhirud et al. (2005) went on to state that KM success depends on effective KS practices and recommended that organizations encourage management support of KS and encourage employees to share. The authors also recommended increased social interactions and ensuring that knowledge is more visible and easily accessible to employees.
According to Dalkir (2005), another KS barrier is employees’ concern that they will not get credit for sharing. Employees consider knowledge to be power, and they hoard it because they are rewarded for what they know and not for what they share. In addition, content and source credibility is problematic—employees want to know whether the knowledge is factual and the knowledge sender is truthful. Finally, Dalkir stated that organizational culture and the lack of the use of formal networks to capture knowledge hinders KS.

Chau and Lam’s (2005) case study investigated why KM projects fail. The authors analyzed five peer-reviewed cases from the pharmaceutical, banking, and manufacturing industries. The investigation highlighted four primary reasons that KM projects failed: technology, culture, irrelevant content, and failure of top management to wholeheartedly support the project’s effort. Chua and Lam stated that several of the organizations also displayed factors noted in successful KM project implementation, including (a) alignment of KM and the goals of the organization, (b) identification of a population with a particular need, (c) a demonstrated commitment to KM, (d) management support, and (e) technical and organizational infrastructure. Nonetheless, these organizational KM projects failed. The authors concluded that KM project successes are contingent not only on the presence of success factors but also on the absence of failure factors.

Bechina and Bommen (2006) conducted qualitative, operational research to ascertain indicators that facilitated or inhibited KS. The respondents were managers and non-managers in a global Scandinavian consulting firm and the methodology comprised interviews and observations. The authors found that “shared knowledge quality/relevance, transfer speed, sender and receiver perspectives, culture, trust,
motivation, incentives, and environment play an important role” (p. 114) in enhancing the KS process. Bechina and Bommen concluded that KS management practices were an operational reality and that, as a result of the investigation, management gained an improved understanding of the factors that hinder and/or facilitate KS.

Han and Anantatmula’s (2006) case study sought non-management employees’ perspectives on KS factors. The respondents were 182 employees from two large information technology and consulting firms. The study revealed that organizational culture was a significant influence on employee KS. It also found that employees perceived a lack of appreciation and proportional rewards for contributions, and a lack of appropriate training to operate technology systems to be obstacles to KS. The authors concluded that, although there is empirical evidence about why employees are reluctant to share knowledge, the findings cannot be generalized across all organizations because each organization’s culture or methods are different. Han and Anantatmula’s study contributes to the understanding of employee KS through empirical data, and it represents a departure from the majority of KS studies because the focus was on the employee rather than on looking at KS behavior from management’s perspective.

Knowledge Sharing in the Public Sector

The focus of this study is to investigate the factors that affect employees’ knowledge-sharing behavior. The U.S. federal government was selected as the study population because of recommendations that KS behavior be investigated in diverse environments and in organizations with a top-down management structure. Such
investigations may yield unique findings about employee KS behavior (Bock et al., 2005; Chau & Lam, 2005; Hsu, 2006; Sveiby, 2007).

This section addresses some unique features of the U.S. federal government that may represent barriers to KS efforts, four specific challenges to knowledge management/knowledge sharing, and five inhibitors of U.S. federal government agencies’ KM/KS initiatives. In addition, the Federal KM Working Group (2008) identified five issues that may distract from the implementation of KM/KS initiatives.

The distinction between federal government agencies and the private sector is not the focus of the proposed study, but comparisons of the two are useful. First, the federal government’s emphasis on a command-and-control organizational structure of rules, regulations, and specific protocols sets it apart from the private sector. In addition, the federal government cannot choose its customers; it must provide service to all citizens. The public sector also must cooperate both internally and with external organizations to achieve policy goals. In addition, there is an expectation that the majority of explicit public sector knowledge is available to the public, due to legal requirements such as the 1966 Freedom of Information Act, a federal statute that ensures citizens the right to access nonclassified public records. Finally, public sector policy and program development undergoes extraordinary scrutiny from politicians, stakeholders, citizens, and the media (Euske, 2003). Although organizations in any sector may exhibit one or more of these characteristics, these particular traits are more associated with the public sector than with the private sector.

Although the investigations cited in this dissertation typically were conducted in the private sector and/or in government sectors of countries other than the United States,
some research on U.S. federal government employees’ KS behavior was located. One such descriptive investigation involved 119 members of the Federal KM Working Group, who provided their perspectives on five study variables: agency size, type, length of time KM had been in place, written policy, and responsibility. The Web-based questionnaire examined the factors that influenced the success of KM practices in the U.S. government (Rhoads, O’Sullivan, & Stankosky, 2007).

The research yielded five specific findings. The first was that the size of the federal agency made a difference in whether KM was successful. Small agencies were more likely than larger agencies to implement successful KM initiatives. Second, independent agencies such as the General Services Administration were more successful than cabinet-level agencies such as the Department of State. A third finding was that agencies in which KM had been in place for more than four years had a higher KM practices index score than agencies in which KM had been in place for less than four years. The fourth finding was that agencies with a commitment to an effective written KM policy or strategy also had higher KM index scores than agencies without an effective KM policy. The last finding indicated that agencies that assigned KM responsibilities to a KM unit had higher KM index scores than agencies that assigned KM responsibilities to a different department (Rhoads et al. 2007).

Rhoads et al. (2007) stated that the results provide a benchmark view of 26 agencies with successful KM programs. The results also may be used to assist agency planners in adjusting their KM strategies. A weakness of the research is that it did not list the criteria for determining a successful KM program. It is not clear how many of these
characteristics an agency must demonstrate to be termed successful—must an agency score high in only three of the five areas, for example, or in all five areas?

No investigation revealed barriers to KS that were unique to the public sector and would not also represent barriers in the private sector. The present research investigated the prime enablers of KS noted in the literature: organizational culture, workplace trust, incentives, management support, and technology.

During the annual international conference on e-government, Wimmer and Traunmuller (2007) outlined four public-sector KM/KS challenges. The first challenge is content integration, or the task of making multiple connections using information from diverse data formats and sources. An example of this challenge is “rendering information visible with one browser for all data types and formats” (p. 70).

The second challenge is knowledge visualization, or the flow of knowledge from sources to users on demand. Issues here include how to prepare knowledge for public display and how to ensure data protection and user inspection rights. Additional issues include ensuring content comprehensiveness and readability, presenting geographical databases and environmental information, delivering external stakeholders’ information to the system, and ensuring feedback on the usefulness of input to participants (Wimmer & Traunmuller, 2007).

There are three areas of concern with regards to knowledge visualization. The first is to present knowledge in a comprehensible manner, using the proper interface. Means of presentation include text, graphics, animations, and audio. The second factor is the behavioral aspect of knowledge visualization and involves human–computer interaction to communicate “codified knowledge to a user who elaborates, internalizes, and
contributes knowledge back to the technical system” (Wimmer & Traunmuller, 2007, p. 70). Reiner (2008) listed unanswered questions in this area, including “How is visual representation turned into knowledge; what are the mental processes that are involved in attaching a meaning to a picture, map, or graph; and what mental and brain processes are involved in visualization?” (p. 25). The final area of concern is usability, defined as the potential of a product or tool to accomplish user goals. This area of concern involves a range of mechanisms adaptable by users to fulfill personal preferences, such as the ability to set personal preferences for the type of information displayed when a portal is accessed.

Wimmer and Traunmuller (2007) outlined two categories of challenge in delivering knowledge in a diverse, collaborative, and cooperative context. The first is the blending of different modes of cooperation, whether it is a structured work flow such as a discussion forum or an informal collaboration mode such as a blog or wiki. The second category entails the integration of knowledge processes into conventional e-government or e-participation solutions. This integration requires an understanding of knowledge processes in order to define the appropriate supporting technical systems. Again, although these challenges may enable knowledge management and sharing, they are not the focus of the present study and may not be unique to the public sector.

Rhoads et al. (2007) outlined the following inhibitors of U.S. federal government agencies’ KM programs:

- Hierarchical command-and-control management styles and bureaucratic organizational structures define the agencies’ cultures as restrictive.
• Information technology systems are a mixture of legacy and new-technology systems that are not interoperable.

• The vast amount of data and information residing in repositories, as well as the untapped knowledge in the minds of federal employees worldwide, adds to the KM challenge.

• The unique uses and designs of knowledge to fit specific agency objectives and provide agency-specific knowledge inhibit knowledge sharing across agencies.

• Although KM programs are on the increase in government agencies, there is no centrally administered mandate for adoption of KM in U.S. federal agencies.

The Federal KM Working Group (2008), comprising U.S. federal government departments, agencies, and organizations as well as private sector KM practitioners dedicated to seeing that KM works in the federal government, has outlined five KM/KS challenges. First, there is no centralized resource for KM—no government-sponsored support function for KM, no clearinghouse for data on existing activities, no government-wide library of best practices, and no available consultation. According to the initiative road map, when federal workers seek government-oriented support for KM, they must turn to private and/or academic sources.

The second issue involves a lack of KM policy or standards. The initiative committee stated that, in the absence of policy and standards, management is left to its own interpretation of how to accomplish KM/KS. They believe that a lack of policy and
standards demonstrates that the senior leadership is not committed to KM (Federal KM Working Group, 2008).

The third issue is inconsistent knowledge-sharing practices. The Federal KM Working Group (2008) acknowledged that each organization must tailor KM practices to its own needs and that organizations benefit from adopting a consistent tool set. Such a tool set saves money and creates efficiencies of scale. In addition, a consistent tool set eases the transfer of skills and work product when employees transfer among agencies. Adopting consistency enables knowledge sharing across multiple government departments and agencies.

Knowledge retention is listed as the fourth issue. According to the committee, the crux of this issue is employees departing without sharing with the organization their skills and expertise (Federal KM Working Group, 2008).

Finally, the committee noted a gap in federal worker knowledge competencies. According to the committee, there is a right way and a wrong way to seek and share knowledge, and the majority of workers employ the wrong method. Because seeking and sharing knowledge are learned skills, the committee recommended that organizations across the government devote a conscious effort to learning KM competencies (Federal KM Working Group, 2008).

In summary, the present study investigated the determinants that affect employees’ KS behavior in a U.S. federal government agency. A government organization was selected, based on literature recommending that KS behavior be investigated in diverse environments, including organizations with hierarchical command-and-control management styles and bureaucratic organizational structures. Four specific challenges to
knowledge management in the public sector, as outlined by previous researchers, include content integration, knowledge dissemination, knowledge visualization, and delivery of knowledge in diverse, collaborative, and cooperative contexts. The five KM/KS inhibitors outlined by Rhoads et al. (2007) and the five KM/KS issues identified by the Federal KM Working Group (2008) complement one another. Although unique characteristics, barriers, challenges, inhibitors, and issues may hamper U.S. federal government KS efforts, these factors are not the focus of the present investigation.

Factors That Influence Knowledge-Sharing Behavior

The next section outlines the primary organizational factors identified in the literature as influencing KS behavior: organizational culture, workplace trust, incentives, management support, and technology. It concludes with a summary of several studies that investigated these five elements.

Organizational Culture

There are several definitions of organizational culture. For example, Dalkir (2005) defined organizational culture as the values and beliefs that people hold central and that bond an organization together. He also stated that culture is a set of norms, routines, and unspoken rules about how things are done in the organization. Dalkir stated that a KS culture is one in which KS is the norm, not the exception, in which people are encouraged to work together to collaborate and share, and in which employees are rewarded for sharing. A KS culture is a key enabling component of KS and ensures critical knowledge flow within the organization. Dalkir outlined cultural barriers to KS, including lack of time, lack of an incentive program, lack of a common language (whether English versus
French, for example, or engineering language versus management language), intolerance of mistakes, and lack of trust.

Lucas and Ogilvie (2006) defined organizational culture as a system of shared values and assumptions. Their exploratory study investigated how reputation, culture, and incentives affected employee KS in a private sector energy supply company. The authors found that reputation and culture played a role in successful KS, whereas incentives did not. Lucas and Ogilvie concluded that KS is an activity that employees must willingly embrace, regardless of incentives offered.

Oliver and Kandadi’s (2006) case study investigating factors that influence organizational culture defined organizational culture as the day-to-day activities that encourage employees to create, share, and utilize knowledge in a way that is beneficial to the organization’s long-term success. The authors listed 10 factors that influenced organizational culture: leadership, organizational structure, evangelization, communities of practice, reward systems, time allocation, business processes, recruitment, infrastructure, and physical attributes. The present study favors Oliver and Kandadi’s definition of organizational culture.

Various researchers have concluded that organizational culture is a primary element in effective KS. For instance, Balthazard, Cooke, and Potter’s (2006) descriptive study investigated how behavioral norms affect organizational culture. The authors’ methodology employed a combination of secondary analysis of data provided by over 60,000 participants, gathered between 2001 and 2004 using the Organizational Culture Inventory (OCI), and a case study comparison of four state government departments that had initiated an organizational change program.
The quantitative instrument used to measure behavioral norms, the OCI, identifies values, expectations, and shared beliefs that guide the way employees interact with one another and approach their work (Human Synergistics International, 2010). OCI respondents have included private sector and not-for-profit organizations as well as public sector organizations such as government agencies.

The OCI instrument identifies three styles of organizational culture: constructive, passive/defensive, and aggressive/defensive. Constructive organizational cultures assist employees in meeting their satisfaction needs, favor coordination over competition, and value quality over quantity. This cultural style has been identified as ideal, and levels of satisfaction in such organizations are high. Organizations with a passive/defensive cultural style have a need for security and prefer low risk. In addition, this type of culture seeks to avoid interpersonal conflict, prefers little competition, employs intense supervision, experiences high employee turnover, and supports an environment in which rules, procedures, and orders are followed. Examples of such a cultural style include government agencies, government-regulated agencies, and monopolies.

Aggressive/defensive organizational cultures are task oriented and display a need for security to protect one’s personal status. Fast-paced organizations, where employees must think quickly and take action, are typical of this cultural style. The mantra of this organizational culture style is quantity over quality. Examples include health emergency services, military organizations, and organizations that have experienced unexpectedly huge sales growth (Balthazard & Cooke, 2004; Balthazard et al., 2006).

In addition, Balthazard et al. (2006) included organizational culture performance–driving forces in their study. These driving forces are divided into two categories,
individual and organizational, and have been demonstrated to influence culture behavior. Individual performance drivers include role clarity, communication quality, “fit” in the organization, behavior conformity, and job satisfaction. Organizational drivers include quality of production or service, commitment to customer service, adaptability, turnover, and workplace quality.

Results indicated that constructive organization cultures are associated with positive organizational outcomes, whereas passive/defensive and aggressive/defensive organization cultures are associated with negative organizational behavior. Balthazard et al. (2006) concluded that an understanding of the various organizational culture styles can explain why some organizations display behavior counter to their expressed values and mission. The authors also stated that they have demonstrated the effective use of the OCI as a valid cultural assessment instrument to help determine whether employee behavior supports or detracts from organization success.

As noted previously, Han and Anantatmula (2006) researched non-management employee perspectives on selected KS factors and suggested that organizational culture influences employees to share their knowledge. Another example of the effect of organizational culture on KS is found in a study conducted by Yeh, Lai, and Ho (2006), who investigated the role enablers play in influencing KM. Their case study of two private sector organizations in Taiwan was an attempt to verify the KM-enabler findings of other published papers. In addition to the finding that culture plays a major role in influencing KS, Yeh et al. found that a major role is played by top management support, incentives, information technology, and an organizational unit dedicated to focusing on
KM initiatives. The case study also verified, through real practice, previous study findings and academic theory that culture influences KS.

Issa and Haddad’s (2008) descriptive study addressed how the factors of organizational culture, trust, and technology affect KS. The investigation’s respondents were management employees in U.S. construction organizations. The results of the mail survey indicated that respondents perceived that a positive organizational culture enhances mutual trust and that technology assists KS but does not motivate people to share. Elements of a positive organizational culture included encouragement to share, openness, holding meetings and other events to improve socialization, mutual trust among employees, and an established incentive program. These characteristics reflect Wong and Aspinwell’s (2005) research findings, though Issa and Haddad (2008) included the use of negative consequences for those not sharing.

The results of Lai and Lee’s (2007) investigation of the relationship between organizational culture and KS also revealed that culture affects organizational performance. The respondents in this exploratory study comprised 154 senior management executives in Taiwanese firms. Although the investigation’s respondents were management employees, the findings highlighted the need for planners to consider culture when implementing KS initiatives.

McNabb (2007) also highlighted the importance of culture to the success of KS. The author’s investigation of KM in the public sector discussed the influence of organizational culture characteristics on the success of KM. McNabb stated that mutual trust and respect, satisfaction with one’s job, a commitment to the organization’s mission,
a willingness to share information openly, and employees’ trust of one another should be present in an organization when initiating KM.

Likewise, Yao, Kam, and Chan’s (2007) case study investigated whether organizational culture has an effect on KS success. The respondents were public sector employees in Hong Kong with at least 5 years of public sector service. Like Yeh et al. (2006), Yao et al. (2007) reported that organizational culture exerts a primary influence on KS behavior. In addition, the respondents reported that they lacked motivation to share knowledge in the absence of management support and a rewards/incentives program.

Yeh et al. (2006) investigated private corporations, whereas Yao et al. (2007) investigated KS in a government agency. Although the two investigations occurred in different settings (private and public), the conclusions were the same: organizational culture is a primary influence on KS. Notably, all of the literature on organizational culture indicated that culture plays an important role in the success of KS.

**Workplace Trust**

The next organizational factor discussed is trust. As with organizational culture, trust is defined variously. In his investigation of the role of trust and organizational identification in employees’ continuous improvement, Lee (2004) characterized trust as predictability and an expectation of one party that a second party will do what it has promised. Additionally, trust is defined as an expectation based on experience that another person will not seek to act opportunistically through words, actions, or deeds (Robbins, 2006). One may surmise that trust plays a major role in whether KS occurs in organizations. In addition, Dalkir (2005) contended that the core of a KS culture is trust.
Researchers have expounded on the ways trust influences the behavior of organizational members and the overall performance of the organization. For instance, Moye and Henkin (2006) investigated trust in organizations by surveying 1,436 salaried employees in a Fortune 500 manufacturing organization. The purpose of their exploratory investigation was to determine the relationship between employees’ level of empowerment and their level of interpersonal trust in their manager. The authors defined empowerment as a multifaceted motivational construct manifested in four cognitions: meaning, competence, self-determination, and impact. They also defined interpersonal trust as the extent to which employees are confident in and willingly act on the words of a manager. Moye and Henkin found that “employees who perceived higher levels of empowerment had higher levels of interpersonal-level trust” (p. 110). The conclusion is that there exists a positive relationship between employee empowerment and interpersonal-level trust. Moreover, trust contributes to a positive working environment characterized by honest, supportive relationships.

Poon’s (2006) research examined the relationship between employee trust-in-supervisor and willingness to help coworkers, and the effect of employee perceptions of organizational politics on the relationship between trust-in-supervisor and willingness to help coworkers. The respondents were 106 employees from the manufacturing, travel, and education industries in Malaysia. Poon’s exploratory investigation found that employees who trusted their supervisor also displayed satisfaction with their supervisor and demonstrated increased innovative behavior. This behavior also increased the likelihood that employees would help coworkers. Moreover, when employees trusted their supervisor they were likely to share knowledge. Among employees perceiving low
levels of organizational politics, results showed a positive relationship between trust in a supervisor and willingness to help coworkers. Poon concluded that trust itself is not enough to induce employees to put forth effort to help coworkers; a favorable environment of minimal politics also must be present. However, the author’s key point is that trust matters and is a prerequisite for the success of KS.

Bakker, Leenders, Gabbay, Kratzer, and van Engelen’s (2006) descriptive study undertook to determine the effect of trust on KS in product development teams and to determine whether trust is social capital. An analysis of 91 product development team employees found no statistically significant relations between the trust dimensions of capability, benevolence, and integrity. Capability trust was defined as confidence that fellow employees have the skills to perform given tasks. Benevolence trust was defined as belief that fellow employees will do good, will do the right thing, and will do no harm. Finally, integrity trust was defined as the belief that fellow employees are fair and ethical when dealing with others. The findings indicated that trust should not be considered social capital in the area of KS. For clarity, social capital was defined as the condition or relationship between entities that can lead to the attainment of an established goal. Bakker et al. concluded that trust alone does not explain why employees are willing to share knowledge and that trust is not social capital because it is not a desirable outcome of social structure. In other words, trust can be a means to an end but not the end itself.

Mooradian, Renzl, and Matzler (2006) investigated the correlation between the propensity to trust and KS. The descriptive study collected data from 64 project team members in a software and consulting firm. The results of a self-administered mail survey indicated a positive correlation between an employee’s propensity to trust and his or her
willingness to share knowledge. Mooradian et al. suggested that employees who scored higher on the survey’s trust facets were more likely than their counterparts to share knowledge. The implication for practice is that, during the hiring process, it may be possible to identify employees who have inhibitions about sharing as well as those who are predisposed to share knowledge. This investigation departed from other studies in suggesting that employers may be able to identify employees who are inclined to share knowledge.

Pate, Beaumont, and Stewart (2006) addressed the subject of the effect of trust in the public sector, a focus of the present investigation. Pate et al.’s case study examined the extent of public sector employee trust in senior management. Respondents were employees from two UK public sector organizations. The authors’ findings indicated a persistent lack of employee trust in senior management. The implication of the finding is that trust may negatively affect employee attitude and KS behavior when senior management is not trusted. The authors’ investigation differed from other studies in that its focus was on the public sector.

Similar to Moye and Henkin’s (2006) investigation, Bagraim and Hime’s (2007) descriptive study investigated interpersonal trust in organizations, looking at the relationship between different forms of interpersonal trust and commitment to the organization. The forms of trust investigated were trust in coworkers and trust in supervisors. The results of the survey of 278 South African employees indicated that interpersonal trust had a significant positive relationship with commitment to the organization. Specifically, the study indicated that employees had a high level of trust in
their supervisors. The results imply that the promotion of trust in supervisors may lead to greater employee retention and improved productivity.

Usoro, Sharratt, Tsui, and Shekhar (2007) investigated whether trust is positively related to KS. Their exploratory study investigated three dimensions of trust: (a) competence-based trust, in which an employee perceives an organization as competent and is therefore motivated to share knowledge; (b) benevolence-based trust, in which employees will share knowledge with the expectation that they will receive knowledge in kind; and (c) integrity-based trust, exemplified by an employee’s words and actions. These dimensions parallel Lee’s (2004) definition and the dictionary’s definition of trust. The 120 participants in Usoro et al.’s (2007) study were employees in a global information technology organization. The authors’ findings indicated that the three trust dimensions positively affect KS, and they concluded that organizations should support these dimensions to encourage KS.

Chen, Yeh, and Tu (2008) conducted an exploratory investigation into how trust affects KS. Their respondents came from 288 manufacturing firms in the private sector in Taiwan. The investigation indicated that trust has a positive influence on KS and plays a significant role in organizational KS behavior. The authors concluded that trust is the pivot among the KS-influencing factors. Chen et al. also concluded that, in order to benefit from trust, organizations should develop trust-based relationships by focusing on activities that will enhance mutual trust and by avoiding activities that undermine it.

Finally, Wu, Lin, Hsu, and Yeh (2009) investigated the relationship between KS and interpersonal trust of coworkers and supervisors, as well as whether individual altruism had an effect on a social interaction environment. The respondents in this descriptive
study were Taiwanese technology industry employees. The results indicated that interpersonal trust was positively correlated with KS behavior. Characteristics of trust of coworkers and supervisors were openness, integrity, and benevolence. In addition, the researchers identified a positive association between trust of coworkers and KS as the organization’s social interaction environment intensified. In other words, the effect of trust of coworkers on KS is greater in an established social interaction environment. The results suggest that KS is generated through the effects of interpersonal trust and not through social interaction environments.

**Incentives**

Incentives are the third KS factor for review. According to Petri and Govern’s (2004) book on motivation, incentives are goal objects that stimulate one to act. Rewards and recognition may represent acknowledgment of employee contributions to an organization’s KS efforts. In addition, incentives are a means of improving productivity and increasing organizational profits.

In Dalkir’s (2005) view, incentives remain one of the important KM challenges, but an incentive scheme often is not considered when implementing KS initiatives. Dalkir listed three types of incentives. Financial incentives offer money in exchange for acting in accordance with an organization’s standards. Moral incentives are regarded as an employee doing the right thing. Acting on moral incentives can lead to self-esteem and/or organizational admiration, whereas acting against moral incentives may lead to a feeling of guilt or condemnation from the organization. Finally, coercive incentives include punishment or firing when an employee fails to act in a prescribed manner. Dalkir stated that an incentive system can send messages to employees about what is important in the
organization and that values are communicated by what management praises and what it criticizes.

Likewise, Frappaolo (2006) stated that a personal desire to share knowledge must exist when building a KS community and that incentives are a means of facilitating KS. Frappaolo listed examples of incentives, such as linking KS to the employee’s job description and formal reviews and ensuring that management recognizes KS as part of the work effort. Basic practices to recognize an employee’s performance include a letter of recognition, a plaque, or a thank you from management. Although monetary rewards are also an effective motivation tool, there is an issue of whether to base the reward on the quantity or the quality of knowledge shared.

The literature highlighted intrinsic and extrinsic motivation as two facets of incentive that stimulate employees to share knowledge. Intrinsic motivation comes from within an employee. For example, an employee’s sense of satisfaction when completing a task comes from within himself or herself. On the other hand, extrinsic motivation comprises value measurable in monetary terms. In short, intrinsic motivation comes from within an employee and extrinsic motivation comes from an external stimulant (Fahey, Vasconcelos, & Ellis, 2007).

Fahey et al.’s (2007) investigation of the effect of intrinsic and extrinsic rewards on KS motivation indicated that extrinsic rewards undermine employee KS efforts. The respondents were business executives and professionals in a community of practice. Fahey et al. suggested that the sharing of knowledge is done out of self-interest and is detrimental to the perception of knowledge as a public good. As motivation to share knowledge decreases, motivation for economic gain increases. Hence, employees
experience no moral obligation to share knowledge when they are offered rewards. The findings suggested that organizations should rethink the implementation of KS strategies that are based on extrinsic reward systems.

Cruz, Perez, and Cantero (2009) also conducted a study that explored the importance of intrinsic and extrinsic motivation on employee KS. Their case study investigated Spanish public sector workers, using a questionnaire and interviews to collect data. The study results revealed that employees with high levels of intrinsic motivation were more likely than employees with high levels of extrinsic motivation to share their knowledge. The authors concluded that intrinsic motivation improves KS. Cruz et al. also recommended that managers encourage employees to share knowledge as a means of enhancing organizational proficiency and success.

Although Fahey et al. (2007) did not support the concept of offering incentives for KS, and Lucas and Ogilvie (2006) stated that incentives do not play a role in KS, investigations more often than not support the use of incentives to enhance KS. For instance, Lee and Ahn (2005) investigated the effect of employee incentives to motivate KS. Their findings indicated that incentives enhance employee motivation to share knowledge. However, Lee and Ahn advocated establishing an incentive program that rewards employees for the quality as well as the quantity of knowledge shared.

Wah et al.’s (2005) descriptive research explored whether social or organizational factors influenced KS. Based on data collected from 262 public sector educational institutional members in Singapore, the authors noted that rewards, incentives, open-mindedness, and cost benefit concerns had a significant effect on KS. These findings were social rather than organizational in nature. In addition, Wah et al. found that
employees who were highly competent in their work skills were less inclined to share their knowledge when incentives or recognition were not involved, and they recommended that organizations pay close attention to their incentive structure if they wish to enhance KS. In addition, the study suggested that if an organization wants to achieve behavior change, relevant behavioral rewards and incentives must be given. Whereas other studies considered KS factors such as rewards and incentives to be organizational factors, Wah et al. designated rewards and incentives as social factors.

Jain, Sandu, and Sidu (2006) investigated the perceptions of Malaysian business school staff members in order to identify KS barriers and techniques to promote KS. The researchers received 256 usable responses in their descriptive study. Results, in the order of importance to respondents, identified as barriers a lack of rewards and recognition, a lack of time, a lack of informal and formal activities to promote KS, poor staff communication skills, and a lack of an information technology system. Strategies to promote KS included top management demonstrating support for KS, linking KS with rewards and the performance appraisal, and an increased awareness of KS benefits. Jain et al. concluded that KS should be promoted continuously and that barriers should be addressed. They noted that strategies must be organization specific, which supports other research indicating that KS support strategy is not one-size-fits-all. Finally, an awareness of KS benefits should be emphasized on an ongoing basis.

In Pham and Świerczek’s (2006) exploratory investigation of organizational factors that influence learning outcomes, incentives proved to be an influencing factor. Based on the responses of 339 construction and design institute professionals from public and
private organizations, Pham and Swierczek concluded that their investigation offers empirical evidence about the importance of incentives programs.

Teerajetgul and Charoengam’s (2006) descriptive investigation also found that incentives influenced KS behavior. The respondents were 44 project managers and 56 project engineers, which represented management’s perspective on construction projects in Thailand. The investigation examined how construction project teams adopted the knowledge-creation process to improve project performance. The authors stated that project managers seeking success should consider their team incentives, information technology, and individual employee competencies.

Yu, Kim, and Kim (2007) investigated key KM motivators and how they relate to KM performance. The respondents in this descriptive study were chief executive officers, KM team managers, and knowledge workers in 66 Korean organizations with established KM programs. The researchers determined that incentives positively affected the level of organizational learning, the quality of knowledge, and the level of user satisfaction with knowledge. In addition to incentives, the study found that the key driving forces for KM were organizational culture, management support, and technology. The study indicated that these drivers also have a positive influence on KM performance. The core of Yu et al.’s study is that offering incentives exerted a positive influence on KM activities, a primary element of which is KS. In addition, these findings increase the understanding of an organization’s KS dynamics.

Finally, Manolopoulous (2008) investigated the relationship between work motivation and organization performance in the Greek public sector. In general, the Greek managers studied preferred to use extrinsic rewards such as wages and job security
to motivate workers. However, an analysis of data collected from 454 employees in state-owned corporations indicated that intrinsic incentives were a more significant motivator of organizational performance than extrinsic incentives such as recognition for achievement or autonomy in the workplace. According to Manolopoulous, the implication of the investigation is that “public managers need a new conceptualization of how extrinsic and intrinsic motivation operates” (p. 80). Managers who understand what motivates their employees are in a better position to implement successful incentive schemes.

With the exception of Fahey et al. (2007), all of these investigations highlighted the importance of incentives in encouraging KS. The present investigation assumes that incentives encourage KS.

Management Support

The fourth KS factor crucial for successful KS is management support for KS activities. Wong and Aspinwell (2005) investigated the success factors that influenced the adoption of KM. The descriptive study was conducted via a postal survey of KM academics, consultants, and practitioners in the United Kingdom. The study’s top three success factors parallel three of the five factors identified in the literature review—organizational culture, management support, and technology. Examples of positive organizational culture characteristics were a display of trust, openness, encouragement of employees to share knowledge and ask questions, and inclusion of KS as part of the performance rating system. Positive management support characteristics included demonstrations of management commitment, support, modeling of desired behavior, and the establishment of conditions for KM to thrive. Positive technology characteristics were
the availability of the appropriate systems, ease of use, and reliability. Of the top three success factors, respondents perceived management support to be the most critical. The results of the present study will assist organizations in understanding KM/KS practices and may act as a blueprint to assist in KM/KS implementation strategies.

King and Marks’s (2006) research into the effect of management support of KS is one of few studies that involved data from a U.S. federal agency. Their descriptive study used a Web survey to collect data and included 169 civilian, military, and contractor respondents. The study focused on the effect of supervisory control and perceived organizational support on an employee’s decision to share knowledge through a knowledge management system. The authors found that supervisory control was positively related to an employee’s decision to share knowledge in such a manner. In this instance, supervisory control equates to management encouragement of employees. The study also found that organizational support was not positively related to an employee’s decision to share knowledge. For King and Marks’s study, organizational support revolved around the degree to which an employee believed he or she would benefit from the organization. The authors concluded that management support encourages employees to share knowledge.

In addition to investigating the relationship of organizational culture to KS, Yeh et al. (2006) investigated the influence of management support on KS. The authors concluded that top management support is critical to successful KS activities. The authors also stated that organizations that understand employee motivation to share knowledge are in a positive position to implement viable KS programs.
Similarly, Ichijo and Nonaka (2007) reported that “the success of a company in the twenty-first century will be determined by the extent to which its leaders can develop intellectual capital through knowledge creation and knowledge sharing on a global basis” (p. 3). They indicated that management’s role in the KS process is to provide vision and a driving objective for the organization as well as to develop and promote the sharing of knowledge. They see management support of KS as crucial to successful KS initiatives.

Jonsson and Kalling (2007) investigated the relationship between institutional forces, organizational context, and KS. This case study involved 102 interviews with management and non-management employees in two multinational corporations—one manufacturing and one retail. KS in these organizations was influenced both by institutional forces (e.g., a clear and communicated logic and designed routines) and by organizational context (e.g., structure, control, and culture). According to Jonsson and Kalling, institutional forces were the more important of the two factors. The results also implied that knowledge use is not optimized in organizations where employers lack influence over their employees. Therefore, management’s role in encouraging KS takes on greater significance.

Lin’s (2007) research also addressed how management relates to KS. Lin found that top management support positively influenced employee knowledge-sharing activities. The author also stated that KS improves organizational innovation capability.

Lin’s (2007) findings are supported by Lakshman (2007). In a case study investigation, Lakshman examined the role of organizational leadership in KM by interviewing 37 CEOs. The findings supported both Yeh et al.’s (2006) and Lin’s research results, which suggested that KM (including KS) is a key function of leaders,
whose role affects organizational performance. These findings add to the growing body of literature supporting top management as an important factor in implementing KS.

Yang’s (2007) descriptive study sought data about the influence on organizational KS of employee attitudes toward learning, sharing, and storing information. The 499 respondents to the self-report questionnaire came from all employee categories in nine international tourist hotels operating in Taiwan. Of the three variables tested, only employee attitudes toward learning and sharing significantly influenced organizational KS. These findings suggest that the practice of management assisting employees to learn and share, as well as encouraging them to incorporate such activities into their daily routine, may enhance organizational performance.

*Information Technology*

Finally, information technology is a key influence on KS behavior. Frappao (2006) reported that an increased interest in KM is due to evolving technology, which also improves KS effectiveness. According to Yeh et al. (2006), the role of technology is to “enable rapid search, access, and retrieval of information and the support of collaboration and communication between organizational members” (p. 799).

A segment of Park, Ribiere, and Schulte’s (2004) investigation looked at whether there exists a positive correlation between successful KM technology implementation and attributes of organizational culture. The investigators surveyed employees and managers from 26 participating U.S. organizations in information technology/telecommunications, software development, consulting, finance/banking, government, and education. Their findings revealed a positive correlation between successful KM technology implementation and attributes of organizational culture. The authors’ work indicated that
organizations should assess and understand their culture before launching KM technology initiatives. Likewise, Dalkir’s (2005) book listed examples of technical barriers to KS, including making the knowledge capture process easy and transparent, making it easy to retrieve and reuse knowledge, and ensuring the credibility and relevance of captured knowledge.

Evangelou and Karacapilidis (2005) also investigated technical factors that influence KS. According to these researchers, the technological factors shown to affect KS were the availability and user-friendliness of technological infrastructure. In their exploratory case study, Evangelou and Karacapilidis stated that technology systems facilitate communication, ease collaboration among remote community members and, in turn, enhance employees’ flexibility in time and place as well as their quality of work. Their explanation of technology benefits paralleled that of Yeh et al. (2006).

Davenport’s (2007) experience with technology led him to state that technology may be the most important intervention in managing knowledge. The author also believes that, without new technologies such as personal computers, the Internet, mobile devices, and Web portals, few people would be discussing KM. Davenport stated that although the ability to capture and reuse knowledge and to locate best practices and experts represents a technological benefit, the questionable reliability, time spent trying to exploit features, and proliferation of low-quality knowledge can be viewed as limitations.

Prusak and Weiss (2007) also consider technology to be an enabler of data management in structured formats and a facilitator of the spread of knowledge on a global basis. In addition, Lin’s (2007) investigation of the use of technology for knowledge collection indicated a significant positive relationship between technology use
and employee knowledge collection. The findings indicated that organizations can promote employee KS behavior by providing appropriate, user-friendly information technology systems.

Consistent with these findings, Halawi, McCarthy, and Aronson (2008) investigated successful KM systems to determine the system characteristics that generate user satisfaction. Technology system quality was the independent variable and user satisfaction was the dependent variable. Results indicated that convenience of access, flexibility of the system, integration of systems, response time, realization of user expectations, reliability, ease of use, and ease of learning were the features users looked for in KM technology.

**Five Success Factors**

The following studies outlined the five success factors most often listed in the literature as influencing KS in organizations. Lin’s (2007) descriptive study explored whether organizational support influences KS. Organizational support is defined as a KS organizational culture that is supported by management, in which employees have a positive perception of the organization, interpersonal trust is present, an incentive system is in place, and KS technology is on hand. The 154 private sector respondents to the mail survey were senior executives in Taiwanese organizations. The findings indicated that organizational support significantly influences KS. Lin recommended that organizations increase their efforts to enable employees to propose ideas and that they foster a positive social interaction culture prior to implementing KS initiatives. Lin’s findings supported earlier reports that the five variables investigated in the present study are beneficial to promoting KS.
Barachini’s (2009) descriptive study explored whether KS is based on a trading theory. His research methodology comprised an online survey of 1,500 employees from private sector European companies and 40 personal interviews. Barachini based his research on business transaction theory, which states that people evaluate information on an individual basis and use a tacit function, independent of culture, to evaluate the value of information. They share information as if they were investing currency, in anticipation of obtaining information in the future that will assist them in accomplishing their goals.

Barachini’s (2009) online survey asked, “What is your motivation to exchange information with colleagues in your company?” (p. 102). Results indicated that the major motivators for information exchange were “justification or refutation of personal perception, reaching own goals, learning from each other, and building trust” (p. 104). Next, interviews were conducted to solicit interpretations supporting the business transaction theory. In addition to organizational features such as culture, trust, positive attitude, leadership, and group support, which were regarded as motivators of KS in earlier research, Barachini’s investigation suggested that KS also is based on a business trading process. The author reminded practitioners that the business transaction theory is independent of culture and should be considered during KS implementation planning.

Ling, Sandhu, and Jain’s (2009) case study investigation explored the perceptions of 81 executives working in an American multinational company based in Malaysia. The authors sought the views of executives about the importance of KS, whether the importance of KS was communicated clearly throughout their organization, and to what degree executives and employees were willing to share knowledge. The research indicated that 75% of respondents either agreed or strongly agreed that KS was
important, and 69% of respondents reported that the importance of KS was communicated clearly throughout their organization. As for willingness to share information, 53% of the executives responded that they were willing to share knowledge, and they perceived that 70% of employees were willing to share.

The second aim of Ling et al.’s (2009) study was to identify barriers to KS. The primary barriers identified were a lack of formal or informal activities to promote KS, a lack of rewards and/or recognition that would motivate employees to share, and the absence of a system to identify employees with whom knowledge could be shared.

The final aim of Ling et al.’s (2009) study was to determine which strategies would effectively promote KS. The results indicated that the most effective strategy was to link KS with rewards and the performance appraisal. Such a system reinforces the need, process, and discipline of sharing knowledge for the good of the organization. In addition, the authors emphasized that management involvement, the creation of a KS culture, trust, and technology are vital to KS success. Although practitioners may benefit from these results, it is important to keep in mind that the authors surveyed only 81 executives in an organization of 600 to 700 employees.

Finally, Fu, Chang, Chao, and Chiou (2006) investigated the implementation of a collaborative Web site to enhance government agencies’ service quality by more effectively sharing knowledge with the public. In this real-world example of the effectiveness of various KS factors, the authors collected data from 97 respondents. The primary factors listed were the establishment of policy, implementation of appropriate technology, management support of ongoing efforts, the use of incentives to garner cooperation, and the establishment of a sharing climate. By adhering to these factors,
customer satisfaction was improved through the implementation of the collaborative site, and the government’s commitment to user convenience was fulfilled.

Fu et al. (2006) believed these results may help other organizations to improve their customer satisfaction, but they cautioned that it may not be generalizable to all contexts—such as, for example, the private sector. Fu’s study confirmed that one size does not fit all organizations or sectors. Each sector is different, and organizations must conduct internal inquiries to determine the state of their KS behavior.

Summary

This literature review began with a discussion of the concept of KM and provided an overview of current research on employee KS behavior. Of the two KM schools of thought outlined (technology and people), the present study supports the people school of thought, because technology cannot accomplish KM without people to provide input.

The heart of the present investigation, KS, was discussed next. KS is the core of KM, and knowledge is of little value unless it is shared. Among the KS benefits and barriers reviewed, the benefits of KS to an organization’s competitive advantage appear to outweigh the barriers. Because the present study investigated employee KS behavior in the public sector, pertinent literature was reviewed.

The organization investigated was an agency of the U.S. federal government, and researchers have identified barriers, challenges, inhibitors, and issues that may hamper U.S. federal government organizations’ KS efforts (though these are not unique to the public sector). However, these barriers, challenges, inhibitors, and issues were not the focus of the proposed study.
Finally, the chapter outlined the five factors most often associated with successful KS initiatives: organizational culture, workplace trust, incentives, management support, and technology. A common theme of the literature review is that these factors influence KS behavior and are important to organizational KS success. Thus, these factors were a primary focus of this investigation of U.S. federal employees’ KS behavior.
Chapter 3
Methodology

This chapter presents the methodology used for this study. It begins with a general discussion of the research approach, followed by a description of the study sample. Next, a brief discussion of sampling bias is presented, followed by a review of the research design and an overview of the specific procedures used to administer the survey instrument. Finally, the chapter ends with a consideration of the survey instrument’s validity and reliability, an outline of resources used, and a chapter summary.

Research Methodology

This descriptive investigation examined the determinants of employee knowledge sharing in a U.S. federal government environment and developed an instrument that decision makers and planners may use to ascertain employee perceptions of KS in their organizations. The investigation is characterized as descriptive research because data was collected to answer the study questions and to gain a better understanding of the determinants that affect employee knowledge-sharing behavior (Kumar, 2011; Leedy & Ormrod, 2009). The study employed both quantitative and qualitative research methods. The purpose of quantitative research is “to quantify the extent of variation in a phenomenon, situation, issue, etc.; emphasis is on measurement or classification of variables.” At the same time, the purpose of qualitative research is “to describe variation
in a phenomenon, situation, issue, etc.; with emphasis on the description of variables” (Kumar, 2011, p. 20).

Following a review of various data collection methodologies, a Web-based survey instrument and interviews were determined to be appropriate for the present study, due to the characteristics of the target population. For instance, the target population was familiar with their day-to-day procedures and was accustomed to Web-based surveys; therefore, their responses were based on similar experiences. In addition, a review of the literature revealed that the majority of similar KM/KS investigations relied on a Web-based survey methodology. Finally, a Web survey methodology was selected because of its several advantages, including faster turnaround, lower implementation cost, lower respondent error rate, global reach, ease of data entry and analysis, ability to obtain large samples, and the broader stimulus potential of the Web survey’s multimedia capabilities (Evans & Mathur, 2005; Sue & Ritter, 2007).

The research plan also included face-to-face interviews as a follow-up to the Web survey data collection. This method enabled the clarification of any ambiguous responses received on the Web survey. In preparation for the interview, a structured interview with a predetermined set of closed-ended questions was prepared (see Appendix A). A structured schedule was selected to provide uniformity and to enable data comparability (Kumar, 2011). The intent was to have the interviewee read and sign the informed consent form (Appendix B). Next, the interviewer would ask the questions and record the interviewee’s replies. The conduct of a mock interview also served as preparation for the formal interview.
Three employees participated in the mock interview sessions. First, the interviewees were provided with information about the interview’s purpose, confidentiality, and format, and about the anticipated survey length. The interviewees also were provided with interviewer contact information, in the event an interviewee needed to contact the interviewer later. Next, the purpose of the informed consent form was explained and the interviewees were given a copy to read and sign. The interview questions (Appendix A) were asked and replies were recorded manually.

At the completion of the mock interview, interviewees were asked for their comments on how to improve the interview. One interviewee commented that the interviewer should begin by exchanging greetings and small talk to place the interviewee at ease with the interview process. The two remaining mock interviewees stated that they experienced no problem with the interview procedures.

Data collection approaches have the potential of introducing sources of error, which can result in collected data being unacceptable; examples include coverage, nonresponse, and measurement errors (Fowler, 2008). A coverage error results from a mismatch between the target population—the people a researcher wishes to study—and the frame population—the actual population from which the researcher selects the sample. In this case, all employees in the frame population were invited to participate in the study.

Second, instances in which potential respondents are unwilling or unable to complete a survey create nonresponse errors. To limit nonresponse errors, the frame population was notified via a presurvey notice, a frame population invitation message, and a reminder notice after the survey was active for one week.
The final source of survey error is measurement error, or a deviation of a respondent’s answers from their true measurement value. Issues such as wording, the flow of questions, and survey layout can have a negative effect on data collection. A survey pretest was conducted and several developers reviewed the survey to address potential sources of error.

**Study Sample**

The frame population comprised employees of the Multinational Information Sharing Program Management Office, Engineering Review Board, located in the Washington, DC, metropolitan area. This organization is subordinate to the Defense Information Systems Agency, a combat support agency, whose mission is to engineer and provide information technology and communications support to national leaders, Department of Defense organizations, and coalition partners as required.

An overall requirement of the program management office is to facilitate information sharing among Department of Defense components and eligible foreign nations in support of planning and execution of military operations. As such, the program management office manages the engineering review process for technical validation of proposed changes to the information sharing systems within its purview. It assigns action items, establishes for the appropriate technical staff action item suspense dates, establishes priorities, and ensures that the board’s activities are documented. The 121 civilian, military, and contractor personnel also review and approve recommendations for off-the-shelf commercial equipment and software and develop and revise directives to govern engineering review activities. The activities of the board enable information
sharing and collaboration, thereby enhancing decision-making across the Department of Defense community (K. Walker, personal communication, October 6, 2010).

The goal of the investigation was to collect at least 92 usable responses from a frame population of approximately 121 personnel. The researcher selected a 95% confidence level to represent an estimate of how often a percentage of the population would select the same survey answer. In addition, the selected confidence interval was 5. Therefore, the required sample size to support a 95% confidence level with a confidence interval of 5 was 92 usable responses (Gravetter & Wallnau, 2008).

**Sampling Bias**

The population of U.S. federal government employees was too large to study in its entirety. Therefore, a sampling of the population was employed to draw conclusions about the larger group. However, sampling bias, an error that causes some members of the population to be less likely than others to be included, can occur. All members of the target organization were solicited to participate in the study, as a means of limiting undercoverage bias.

Another source of sampling bias is the response rate. Leedy and Ormrod (2009) recommended a comparison of initial response rates with response rates following a reminder notice to survey participants, and this was implemented in the present study. A presurvey notice and a reminder notice were distributed, and comparison of early and postreminder responses was annotated.
Research Survey

The literature review did not yield an appropriate instrument to address the research questions. Therefore, a research instrument was developed. The survey collected demographic data and information about employee perceptions of selected facets of KS. Survey elements were based on the literature review and parallel the five most-frequently listed influences on employee KS behavior: organizational culture, workplace trust, incentives, management support, and technology. The items used in the survey instrument were adapted from previous survey instruments (Jain, Sandu, & Sidu, 2006; Mooradian, Renzl, & Matzler, 2006; Ong & Lai, 2007; Rampersad, 2002; Sveiby & Simons, 2002; Wah, Menkoff, Loh, & Evers, 2005; Yang, 2007) and were adjusted to conform to the current survey context.

The Web-based survey questionnaire used a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree) to represent an employee’s level of agreement with the statements (see Appendix C). The instrument comprised 35 items. The instrument solicited feedback about employee KS behavior and included six parts. Part 1 sought employee perceptions of their workplace culture. A sample statement is “In my organization, employees know what is expected of them.” Part 2 sought employee perceptions of workplace trust. A representative statement is “In my organization, employees count on each other to share information.” Part 3 sought employee perceptions of their organization’s incentives program. A sample statement is “In my organization, I would share knowledge if knowledge sharing was part of my performance rating.” Part 4 sought employee perceptions of their organization’s management support. A sample statement is “In my organization, management encourages knowledge sharing by action
and not only words.” Part 5 sought employee perceptions of their organization’s technology systems. A sample question is “In my organization, knowledge-sharing technology is reliable.” Part 6 sought employee demographic data, collecting such data as job function (i.e., whether an employee was part of management), work category (civilian, military, or contractor), and gender.

**Procedure**

A pretest of the Web survey instrument was conducted to test the survey’s administrative procedures and to ensure the instrument’s clarity (see Appendix D). The pretest involved 15 participants from the frame population. The pretest participants were administered the survey instrument over a 2-day period. The frame population was provided with a Web link to the survey instrument and feedback was requested. Respondents stated that the instrument was easy to read and understand and was not time consuming. The average time to complete the Web-based survey was 12 minutes.

The participants’ input provided validity for the survey’s construct and proposed implementation procedures.

**Implementation**

The Web survey implementation procedures involved several steps. First, 10 days before the survey start date, an e-mail message was sent to the frame population’s point of contact, asking him to inform his organization of the upcoming survey (see Appendix E). Three days before the survey start date, the survey invitation e-mail was sent to the point of contact, asking him to invite his organization to participate in the survey (see Appendix F). In addition, the survey remained active for 14 days, and on the sixth day of
the survey the point of contact was sent a reminder e-mail message to forward to his organization, alerting potential survey respondents of the remaining active survey days (see Appendix G).

The Statistical Package for the Social Sciences was used for data analysis. Next, responses were reported in an aggregate format to ensure respondent confidentiality. Finally, descriptive statistics were used to describe the collected data, and inferential statistical techniques were used to answer the research questions. The analysis of variance (ANOVA) statistical technique was used because it is useful in testing the significance of group differences between two or more groups as well as detecting interaction effects among variables.

**Validity and Reliability**

*Validity*

Validity and reliability are research process concepts associated with the development of assessment instruments. Validity refers to the degree to which a survey instrument measures what it claims to measure. Four validity elements were used during the development of the study instrument. The first was face validity, which involved presenting the instrument to a pretest frame population group. This group reviewed the instrument and verified that the survey items would capture the data sought.

The second validity measure was content validity. For this measure, four personnel experienced in survey construction and administration provided reviews of the survey’s instruction comprehensibility, sentence clarity, and length, and they stated whether they believed the survey would capture employee perceptions of the selected KS factors. The
reviewers included a private sector PhD with a concentration in organizational management and 21 years of experience. The next reviewer was a government employee PhD whose job title was Quantitative Management Consultant, with a concentration in mathematics and 20 years of experience. The third and fourth reviewers also were government employees, with job titles of Senior Operations Research Analyst and Operations Research Analyst. Their concentration was in management science. Each possessed an MS degree and had 18 and 14 years of experience, respectively.

Reviewer comments included (a) emphasize to respondents that the survey is confidential and responses will be reported only in the aggregate; (b) describe what each part of the survey seeks; (c) thank respondents on the first page of the survey for their participation; and (d) add a block in each part of the survey where respondents can provide additional comments. All reviewers stated the survey would capture the data sought.

Concurrent validity, the third measure, was used to judge how well the instrument compared with a second assessment. Finally, a retest was used to assess how well the instrument under development measured what it was designed to measure (Kumar, 2011). Retest results indicated that the instrument would measure what it stated it would measure.

Reliability

Reliability refers to the degree of stability exhibited when a measurement is repeated under identical conditions (Kumar, 2011). The test-retest reliability of the instrument was measured by having the pretest participants retake the survey 21 days after the pretest date. The responses did not change from the previous responses.
Cronbach’s alpha also was used to ascertain the survey’s internal reliability. In addition, the survey instrument was reviewed by several experienced survey instrument developers and administrators, as indicated. When improvements were recommended, adjustments were made. The final three reviews of the instrument under development did not yield any suggested improvements. Moreover, the surveyed organization’s management reviewed the survey instrument and gave permission for its use.

Although no survey instrument can be 100% valid and reliable (Kumar, 2011), these measures were employed to assess the validity and reliability of the survey instrument employed in the present study. Based on the measures employed, a determination was made that the instrument would capture U.S. government employees’ perceptions of selected KS factors.

**Resources**

A Microsoft Windows–enabled personal computer running Microsoft Office was used to conduct the data analysis and to prepare the final report documentation. Survey Methods, a Web-based survey development product, was used to facilitate the development and administration of the survey instrument. The frame population of U.S. federal employees was an invaluable resource for the conduct of this investigation. In addition, the Statistical Package for the Social Sciences software package was used to analyze collected data.
Summary

The descriptive investigation employed a Web-based, Likert-type survey instrument to ascertain U.S. federal workers’ perceptions of five KS facets often listed in the literature as being associated with successful KS efforts: organizational culture, workplace trust, incentives, management support, and technology. The study sample comprised U.S. federal government employees in a single organization—the Multinational Information Sharing Program Management Office, Engineering Review Board. Because an appropriate survey instrument was not located in the literature, a research tool was developed. Various actions were undertaken to address potential sources of bias and to limit sampling bias. Procedures also were implemented to ensure efficient administration of the instrument, and actions were taken to address the instrument’s validity and reliability. The frame population, a personal computer, a Web-based survey product, and data analysis software were invaluable assets in the conduct of this research. Overall, the research methodology provided focus and structure and enabled the researcher to conduct an efficient investigation.
Chapter 4

Results

This chapter reviews the findings of a survey that solicited the perceptions of U.S. federal government employees about knowledge-sharing behavior. A single U.S. federal organization was used as the respondent population. Data collection procedures, results analysis, research questions and hypotheses findings, and a summary of results are presented here.

Data Collection

Quantitative data collection utilized a Web-based survey instrument, hosted by Survey Solutions, to solicit responses from the target population. The instrument solicited feedback regarding employee perceptions of five factors associated with successful KS implementation and was segmented into six parts: organizational culture (Part 1), workplace trust (Part 2), incentives (Part 3), management support (Part 4), technology (Part 5), and employee demographics (Part 6).

The collection procedure began 3 days before the survey start date with an e-mailed survey invitation sent to the sample population by a survey coordinator designated by the organization (see Appendix F). The survey remained active for 14 days, and on the sixth day of the survey the frame population survey coordinator sent a reminder e-mail message, supplied by the researcher (see Appendix G), to his organization, alerting potential survey respondents of the remaining active survey days. The survey closed on
Day 14 at midnight, Eastern Standard Time. The survey instrument limited submissions to one per URL to prevent multiple submissions by a single respondent.

Upon conclusion of the data collection, the data was imported from the Survey Solutions server into a Microsoft Excel spreadsheet. Next, the data variables were manually assigned numbers, to assist with analysis. For example, the variable *manager* was assigned the number 1 and the variable *nonmanager* was assigned the number 2; the variable *female* was assigned the number 1 and *male* the number 2; the variable *civilian* was assigned the number 1, *military* the number 2, and *contractor* the number 3. Data screening was performed to ensure that only one survey was submitted per URL, that no duplicate surveys were received, and that no survey was missing data. A total of 88 surveys were collected. Because five surveys were incomplete, they were deleted. Therefore, a total of 83 usable surveys were imported into SPSS for analysis.

The second research method used to collect study data was qualitative. In this procedure, face-to-face interviews were scheduled as a follow-up to the Web survey. This method was chosen to enhance and/or clarify information in the event that respondents provided ambiguous responses on the Web survey. The structured interview comprised a predetermined set of questions formatted to be asked in the same sequence. This structured approach enhanced survey administration and improved survey feedback interpretation.

An interview schedule for 18 employees was established by the frame population’s engineering review board chairman. An organizational conference room was provided for the interviews, which were scheduled over 5 days. As with the Web survey, the interviewees were sent a reminder e-mail by the frame population’s interview coordinator.
3 days prior to the start of the interviews. When interviewees arrived, at the appointed time on the scheduled day, each was told the purpose of the interview and was assured of confidentiality. The interview format and anticipated length also were discussed, and the interviewee was provided with the interviewer’s contact information in the event the interviewee needed to contact the interviewer later. Next, the purpose of the informed consent form was discussed and the interviewee was given a copy to read and sign.

Again, the interview sought participants’ perceptions regarding their level of agreement on the importance of the five KS behavior factors investigated—organizational culture, workplace trust, incentives, management support, and technology. Web survey results indicated that the variable incentives received the majority of strongly agree and agree responses, whereas management support received the fewest positive strongly agree and agree responses. Eight valid interviews were collected. At the conclusion of the interview, each interviewee was asked not to divulge to other employees information about the interview procedures.

Results Analysis

Quantitative

A Web-based instrument, hosted by Survey Methods, was used to collect quantitative data from 121 U.S. federal government employees, members of the Multinational Information Sharing Program Management Office, Engineering Review Board. Of the 88 results collected, five surveys were incomplete and were not included in the analysis.
The 83 completed responses used for analysis were collected over a 2-week period. The response rate was 37% (31 respondents) during the first week of the survey. Following a reminder notice to the frame population, the remaining 63% (52 respondents) of the completed responses were received.

Survey Responses and Interpretation

Tables 2 through 6 display the aggregated responses to the 30 survey statements and indicate the prominent themes noted and an interpretation of the responses. For the purpose of interpreting each response, a three-point scale of positive, neutral, and negative was developed. The positive scale element was the combined survey responses of strongly agree and agree, neutral responses were the neutral responses submitted by the survey respondents, and the negative scale element was the combination of the strongly disagree and disagree survey responses.

Based on the responses and according to the interpretation scale, the overall interpretation of survey parts 1 through 5 was positive. The survey response aggregate levels of agreement are presented in Appendix H. Table 2 of the survey indicates that Part 1 (Culture) was perceived positively by the employees. The prominent theme was that culture is important to knowledge-sharing success. In addition, each statement on Part 2 of the KS perceptions survey (Trust) was perceived positively (Table 3). The prominent theme was that trust is important to KS success.

As with parts 1 and 2, each statement on Part 3 (Incentives) of the KS perceptions survey was perceived positively (Table 4). The prominent theme of Part 3 was that
Table 2. Aggregated Survey Responses: Organizational Culture (Part 1)

Prominent theme: Culture is important to knowledge-sharing success.

Overall interpretation: POSITIVE

<table>
<thead>
<tr>
<th>S #</th>
<th>Statements: In my organization</th>
<th>Positive</th>
<th>Neutral</th>
<th>Negative</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Employees share pride in their work.</td>
<td>63</td>
<td>8</td>
<td>12</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>76%</td>
<td>10%</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Employees know what is expected of them.</td>
<td>45</td>
<td>13</td>
<td>25</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>54%</td>
<td>16%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The employee turnover rate is low.</td>
<td>64</td>
<td>9</td>
<td>10</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>77%</td>
<td>11%</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>It is a good place to work.</td>
<td>48</td>
<td>28</td>
<td>7</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>58%</td>
<td>34%</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>I share knowledge because my coworkers share their knowledge.</td>
<td>46</td>
<td>15</td>
<td>22</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>55%</td>
<td>18%</td>
<td>27%</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Organizational culture is important to knowledge sharing.</td>
<td>80</td>
<td>3</td>
<td>0</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>96%</td>
<td>4%</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

incentives are a KS motivator. For Part 4 (Management Support), three of five statements were perceived positively (Table 5). The statements regarding management encouraging open communication in the work environment, and management encouraging KS by actions and not only words, were interpreted as neutral, which indicates that employees did not perceive the statements as either positive or negative. Finally, Part 5 (Technology) also was perceived positively (Table 6). The prominent theme was that technology is important to KS success.

Figures 1 through 5 present a visual depiction of survey parts 1 through 5 and an interpretation of respondent perceptions of the KS factors investigated based on a positive, neutral, and negative scale. The ‘S’ numbers on the left axis of each figure represent each statement on the survey. For example, S4 represents survey statement 4, Part 1 (Culture). The numbers across the bottom of each figure represent the total
Table 3. Aggregated Survey Responses: Workplace Trust (Part 2)

Prominent theme: Workplace trust is important to knowledge-sharing success.

Overall interpretation: POSITIVE

<table>
<thead>
<tr>
<th>S #</th>
<th>Statements: In my organization</th>
<th>Positive</th>
<th>Neutral</th>
<th>Negative</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Employees count on each other to share information.</td>
<td>55</td>
<td>11</td>
<td>17</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>66%</td>
<td>13%</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>My coworkers’ actions are worthy of trust.</td>
<td>78</td>
<td>4</td>
<td>1</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>94%</td>
<td>5%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Coworkers count on each other to lend support when needed.</td>
<td>67</td>
<td>8</td>
<td>8</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>80%</td>
<td>10%</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Employees can depend on the organization to act in the employees’ best interest.</td>
<td>32</td>
<td>31</td>
<td>20</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>39%</td>
<td>37%</td>
<td>24%</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Employees can depend on their supervisor to share important information.</td>
<td>47</td>
<td>23</td>
<td>13</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>56%</td>
<td>28%</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>My supervisor’s actions are worthy of trust.</td>
<td>68</td>
<td>11</td>
<td>4</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>82%</td>
<td>13%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Workplace trust is important to knowledge-sharing success.</td>
<td>83</td>
<td>0</td>
<td>0</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

responses collected for each statement. For instance, Figure 1 indicates that, for S5, 46 positive responses were collected, 15 neutral responses were collected, and 22 negative responses were collected. A visual depiction of respondent agreement totals per survey statement is located in Appendix I. Table 7 presents interviewee comments collected during the face-to-face interview phase of the investigation.

In summary, respondents had a positive overall perception of the survey elements, with the exception of “management support encouraging open communication in the work environment” and “management support encouraging knowledge sharing by actions and deeds.” Respondents displayed neither a positive nor a negative perception of Part 4 (Management Support) questions 23 and 24. In addition, the five KS factors surveyed were perceived as important to KS success.
Table 4. Aggregated Survey Responses: Incentives (Part 3)

Prominent theme: Sharing knowledge enhanced operational efficiency.

Overall interpretation: POSITIVE

<table>
<thead>
<tr>
<th>S #</th>
<th>Statements: In my organization, I would share if:</th>
<th>Positive</th>
<th>Neutral</th>
<th>Negative</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Sharing knowledge enhanced operational efficiency.</td>
<td>81</td>
<td>1</td>
<td>1</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>98%</td>
<td>1%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>I had more time.</td>
<td>73</td>
<td>3</td>
<td>7</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>88%</td>
<td>4%</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Knowledge sharing was part of my performance rating.</td>
<td>71</td>
<td>5</td>
<td>7</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>86%</td>
<td>6%</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>It helped me to keep my job.</td>
<td>75</td>
<td>5</td>
<td>3</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>90%</td>
<td>6%</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>I received recognition.</td>
<td>67</td>
<td>6</td>
<td>10</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>81%</td>
<td>7%</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>I received tangible incentives (e.g., free parking/metro pass, money).</td>
<td>63</td>
<td>5</td>
<td>15</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>76%</td>
<td>6%</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Incentives were a knowledge-sharing motivator.</td>
<td>70</td>
<td>5</td>
<td>8</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>84%</td>
<td>6%</td>
<td>10%</td>
<td></td>
</tr>
</tbody>
</table>

Table 5. Aggregated Survey Responses: Management Support (Part 4)

Prominent theme: Management support is important to knowledge-sharing success.

Overall interpretation: POSITIVE

<table>
<thead>
<tr>
<th>S #</th>
<th>Statements: In my organization, management:</th>
<th>Positive</th>
<th>Neutral</th>
<th>Negative</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Encourages me to come up with innovative solutions to work-related problems.</td>
<td>35</td>
<td>28</td>
<td>20</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>42%</td>
<td>34%</td>
<td>24%</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Keeps me informed about changes that affect the work environment.</td>
<td>33</td>
<td>32</td>
<td>18</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40%</td>
<td>38%</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Encourages open communication in the work environment.</td>
<td>27</td>
<td>40</td>
<td>16</td>
<td>Neutral</td>
</tr>
<tr>
<td></td>
<td></td>
<td>33%</td>
<td>48%</td>
<td>19%</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Encourages knowledge sharing by action and not only words.</td>
<td>23</td>
<td>32</td>
<td>28</td>
<td>Neutral</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28%</td>
<td>38%</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Support is important to knowledge sharing success.</td>
<td>81</td>
<td>1</td>
<td>1</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>98%</td>
<td>1%</td>
<td>1%</td>
<td></td>
</tr>
</tbody>
</table>
Table 6. Aggregated Survey Responses: Technology (Part 5)

Prominent theme: Technology is important to knowledge-sharing success.

Overall interpretation: POSITIVE

<table>
<thead>
<tr>
<th>S #</th>
<th>Statements: In my organization:</th>
<th>Positive</th>
<th>Neutral</th>
<th>Negative</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>It is easy to use our technology to share knowledge.</td>
<td>69</td>
<td>4</td>
<td>10</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>83%</td>
<td>5%</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>We have the appropriate knowledge-sharing technology systems.</td>
<td>70</td>
<td>5</td>
<td>8</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>84%</td>
<td>6%</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>The knowledge-sharing technology is reliable.</td>
<td>66</td>
<td>9</td>
<td>8</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>79%</td>
<td>11%</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Training has prepared me to use our knowledge-sharing technology.</td>
<td>34</td>
<td>22</td>
<td>27</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>41%</td>
<td>26%</td>
<td>33%</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Technology is important to knowledge-sharing success.</td>
<td>80</td>
<td>1</td>
<td>2</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>96%</td>
<td>1%</td>
<td>3%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. Respondents’ perceptions of culture (positive).
Figure 2. Respondents’ perceptions of trust (positive).

Figure 3. Respondents’ perception of incentives (positive).
Figure 4. Respondents’ perception of management support (positive).

Figure 5. Respondents’ perceptions of technology (positive).
Table 7. Interviewee Comments

<table>
<thead>
<tr>
<th>Interviewee number</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Incentives would motivate employees to share their knowledge.</td>
</tr>
<tr>
<td>2</td>
<td>Although I feel incentives should not be necessary to encourage knowledge sharing, I believe more employees would share if they received incentives. We should share knowledge because it is the right thing to do.</td>
</tr>
<tr>
<td>3</td>
<td>I would share more if I received incentives. Type of incentives: monetary, award, letter of recognition.</td>
</tr>
<tr>
<td>4</td>
<td>What is knowledge good for if it is not shared?</td>
</tr>
<tr>
<td>5</td>
<td>If management is not interested in sharing knowledge, I’m not.</td>
</tr>
</tbody>
</table>

Qualitative Results

Although 18 employees were scheduled for the interview phase of the study, only 12 (66%) met with the researcher at the appointed time and location. Eight of the 12 (66%) were interviewed. The interviewees were two managers and six non-managers; one was female and seven were male. Five interviewees were civilians, one was military, and two were contractors.

The first question asked whether interviewees perceived each of the five facets investigated to be important to KS success. All eight respondents (100%) agreed or strongly agreed that the KS determinants investigated were important to KS behavior. Based on survey responses indicating that incentives are one of the leading KS motivators, employees also were asked to provide their perceptions about incentives. Six out of eight employees (75%) provided feedback that indicated incentives would encourage them to share knowledge.
In contrast, two employees (25%) stated that incentives should not be given to employees because sharing knowledge is the right thing to do. These employees went on to say that sharing knowledge should be part of the work flow process and that awards and incentives should not be necessary to encourage the sharing of information. An interview participant also asked, “What is knowledge good for if it is not shared?” (Table 7). Finally, when they were asked whether the lack of management support inhibits KS, seven of the eight interviewees (87%) agreed with the statement and one (13%) neither agreed nor disagreed.

**Descriptive Statistics**

*Quantitative Demographics*

The independent variables were job function, with the subcategories of non-management and management; gender, with subcategories of male and female; and work, with categories of government civilian, contractor, and military personnel. There were 71 study participants (86%) in the non-management group and 12 (14%) in the management group. There were 69 males (83%) and 14 females (17%). In the work category, distribution was 41 (49%) government civilians, 32 (39%) contractors, and 10 (12%) military personnel.

Next, the responses in reference to the dependent variables of organizational culture, workplace trust, incentives, management support, and technology were analyzed to address the research questions and hypotheses. Table 8 shows descriptive statistics for the five KS factors. The minimum possible score for the five factor measures was 1 and the maximum possible score was 5. The scoring scale was parallel to the levels-of-agreement
Table 8. Descriptive Statistics for the Dependent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Valid</td>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizational culture</td>
<td>83</td>
<td>0</td>
<td>3.78</td>
<td>.48</td>
<td>2.50</td>
</tr>
<tr>
<td>Workplace trust</td>
<td>83</td>
<td>0</td>
<td>3.67</td>
<td>.38</td>
<td>2.29</td>
</tr>
<tr>
<td>Incentives</td>
<td>83</td>
<td>0</td>
<td>3.92</td>
<td>.51</td>
<td>2.29</td>
</tr>
<tr>
<td>Management support</td>
<td>83</td>
<td>0</td>
<td>3.33</td>
<td>.61</td>
<td>1.40</td>
</tr>
<tr>
<td>Technology support</td>
<td>83</td>
<td>0</td>
<td>3.68</td>
<td>.55</td>
<td>2.00</td>
</tr>
</tbody>
</table>

scale; thus, a score of 1 equated to strongly disagree, 2 equaled disagree, 3 equaled neutral, 4 equaled agree, and 5 equaled strongly agree. Among the sample of 83 study participants, the average organizational culture score was 3.7 and the range was 2.5 to 5. Rounding the 3.7 to the next whole number (4), study participants’ average response was agree.

The distributions of the other knowledge-sharing scores were similar to that of the organizational culture scores; the average response was agree, except in the case of management support, which had an average response of neutral. Of the five KS factors, management support had the smallest mean (3.33) and the smallest minimum (1.40). Using these results, employee perception of management support for KS was addressed during the interview phase of the study.

Internal Consistency Reliability

Internal consistency is a form of reliability that assesses how consistently the test items measure a single construct affected by the number of items in the test, and the correlation among the test items (Rubin, 2011). In addition to the test-retest reliability measure reported in the Procedure section of Chapter 3, Cronbach’s alpha was a second
statistical procedure used to address the internal consistency reliability of the KS scale scores.

Of the five dependent variables investigated, the internal consistency scores were management = .80; incentives = .78; technology = .74; workplace trust = .63; and organizational culture = .56. The 35-item survey instrument yielded a correlation coefficient of .70, which is an acceptable internal consistency (Rubin, 2011).

Research Questions

Research Question 1

There were two research questions. The first research question asked, How does the perceived importance of five determinants of KS behavior vary based upon job function, gender, and work category? The null hypothesis stated that there is no variation in perceived importance of the five determinants of KS behavior based upon job function, gender, and work category. The multivariate analysis of variance (MANOVA) statistical test was used to address Research Question 1. This procedure was used because it answers questions such as, what, if any, variance is there in the dependent variable according to various categorical independent variables?

Three separate MANOVAs were performed, one for each of three independent variables of job function, gender, and work category. The dependent variables were organizational culture, workplace trust, incentives, management support, and technology support. Table 9 displays the descriptive statistics for the five dependent variables by job function.
Table 9. Descriptive Statistics for the Five Dependent Variables by Job Function

<table>
<thead>
<tr>
<th>Variable</th>
<th>Job function</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational culture</td>
<td>Nonmanagement</td>
<td>3.7289</td>
<td>.47198</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td>3.5625</td>
<td>.54486</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.7048</td>
<td>.48317</td>
<td>83</td>
</tr>
<tr>
<td>Workplace trust</td>
<td>Nonmanagement</td>
<td>3.6680</td>
<td>.39514</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td>3.7381</td>
<td>.35432</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.6781</td>
<td>.38826</td>
<td>83</td>
</tr>
<tr>
<td>Incentives</td>
<td>Nonmanagement</td>
<td>3.9296</td>
<td>.53663</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td>3.9048</td>
<td>.41014</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.9260</td>
<td>.51814</td>
<td>83</td>
</tr>
<tr>
<td>Management support</td>
<td>Nonmanagement</td>
<td>3.2901</td>
<td>.60075</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td>3.5833</td>
<td>.67398</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.3325</td>
<td>.61626</td>
<td>83</td>
</tr>
<tr>
<td>Technology support</td>
<td>Nonmanagement</td>
<td>3.6704</td>
<td>.58758</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td>3.7833</td>
<td>.35633</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.6867</td>
<td>.55978</td>
<td>83</td>
</tr>
</tbody>
</table>

Table 10 displays the MANOVA for comparing the five dependent variables by job function using four of the commonly used measures to assess the difference between groups. The results show that the \(p\)-value, the value used to make a decision to reject or not reject the null hypothesis, is .55. If the \(p\)-value is less than .05, the null hypothesis is rejected; otherwise, it is not rejected. The findings indicate that the \(p\)-value is greater than .05; therefore, the null hypothesis is not rejected. There is no statistically significant difference among any of the five dependent variables in the job function categories.

Table 11 displays the descriptive statistics for the five dependent variables by gender, and Table 12 displays the MANOVA for comparing the five dependent variables by gender, using four common measures to assess the difference between groups. The results show that the \(p\)-value is .49. Because the \(p\)-value is greater than .05, the null hypothesis is not rejected. There is no statistically significant difference among any of the five dependent variables in the categories of male and female.
Table 10. Multivariate Analysis of Variance for Comparing the Five Dependent Variables by Job Function

<table>
<thead>
<tr>
<th>Effect</th>
<th>Value</th>
<th>F</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pillai’s trace</td>
<td>.049</td>
<td>.800</td>
<td>5.000</td>
<td>77.000</td>
<td>.553</td>
</tr>
<tr>
<td>Wilks’ lambda</td>
<td>.951</td>
<td>.800</td>
<td>5.000</td>
<td>77.000</td>
<td>.553</td>
</tr>
<tr>
<td>Hotelling’s trace</td>
<td>.052</td>
<td>.800</td>
<td>5.000</td>
<td>77.000</td>
<td>.553</td>
</tr>
<tr>
<td>Roy’s largest root</td>
<td>.052</td>
<td>.800</td>
<td>5.000</td>
<td>77.000</td>
<td>.553</td>
</tr>
</tbody>
</table>

Table 11. Descriptive Statistics for the Five Dependent Variables by Gender

<table>
<thead>
<tr>
<th>Variable</th>
<th>Gender</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational culture</td>
<td>Female</td>
<td>3.8393</td>
<td>.45581</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3.6775</td>
<td>.48715</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.7048</td>
<td>.48317</td>
<td>83</td>
</tr>
<tr>
<td>Workplace trust</td>
<td>Female</td>
<td>3.6224</td>
<td>.51235</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3.6894</td>
<td>.36170</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.6781</td>
<td>.38826</td>
<td>83</td>
</tr>
<tr>
<td>Incentives</td>
<td>Female</td>
<td>3.8163</td>
<td>.64482</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3.9482</td>
<td>.49120</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.9260</td>
<td>.51814</td>
<td>83</td>
</tr>
<tr>
<td>Management support</td>
<td>Female</td>
<td>3.1143</td>
<td>.63592</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3.3768</td>
<td>.60734</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.3325</td>
<td>.61626</td>
<td>83</td>
</tr>
<tr>
<td>Technology support</td>
<td>Female</td>
<td>3.7286</td>
<td>.61573</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3.6783</td>
<td>.55223</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.6867</td>
<td>.55978</td>
<td>83</td>
</tr>
</tbody>
</table>

Finally, Table 13 displays the descriptive statistics for the five dependent variables by work category. Table 14, the results of the MANOVA test, indicates there was no statistically significant difference among any of the five dependent variables in
Table 12. Multivariate Analysis of Variance for Comparing the Five Dependent Variables by Gender

<table>
<thead>
<tr>
<th>Effect</th>
<th>Value</th>
<th>F</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pillai’s trace</td>
<td>.055</td>
<td>.900</td>
<td>5.000</td>
<td>77.000</td>
<td>.485</td>
</tr>
<tr>
<td>Wilks’ lambda</td>
<td>.945</td>
<td>.900</td>
<td>5.000</td>
<td>77.000</td>
<td>.485</td>
</tr>
<tr>
<td>Hotelling’s trace</td>
<td>.058</td>
<td>.900</td>
<td>5.000</td>
<td>77.000</td>
<td>.485</td>
</tr>
<tr>
<td>Roy’s largest root</td>
<td>.058</td>
<td>.900</td>
<td>5.000</td>
<td>77.000</td>
<td>.485</td>
</tr>
</tbody>
</table>

Table 13. Descriptive Statistics for the Five Dependent Variables by Work Category

<table>
<thead>
<tr>
<th>Variable</th>
<th>Work category</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational culture</td>
<td>Civilian</td>
<td>3.7073</td>
<td>.43626</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Military</td>
<td>3.4750</td>
<td>.55840</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Contractor</td>
<td>3.7734</td>
<td>.50942</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.7048</td>
<td>.48317</td>
<td>83</td>
</tr>
<tr>
<td>Workplace trust</td>
<td>Civilian</td>
<td>3.6411</td>
<td>.38746</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Military</td>
<td>3.6857</td>
<td>.23133</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Contractor</td>
<td>3.7232</td>
<td>.43077</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.6781</td>
<td>.38826</td>
<td>83</td>
</tr>
<tr>
<td>Incentives</td>
<td>Civilian</td>
<td>3.9024</td>
<td>.49635</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Military</td>
<td>3.8571</td>
<td>.39841</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Contractor</td>
<td>3.9777</td>
<td>.58409</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.9260</td>
<td>.51814</td>
<td>83</td>
</tr>
<tr>
<td>Management support</td>
<td>Civilian</td>
<td>3.3951</td>
<td>.65496</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Military</td>
<td>3.3600</td>
<td>.27968</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Contractor</td>
<td>3.2437</td>
<td>.64405</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.3325</td>
<td>.61626</td>
<td>83</td>
</tr>
<tr>
<td>Technology support</td>
<td>Civilian</td>
<td>3.7561</td>
<td>.52443</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Military</td>
<td>3.6800</td>
<td>.37947</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Contractor</td>
<td>3.6000</td>
<td>.64658</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.6867</td>
<td>.55978</td>
<td>83</td>
</tr>
</tbody>
</table>

the three work categories. The p-value is .67; therefore, the null hypothesis was not rejected.
In summary, based on the results, the null hypothesis for Research Question 1 was not rejected and it was concluded that there is no statistically significant difference in perceptions of the five dependent variables (organizational culture, workplace trust, incentives, management support, and technology) relative to the three independent variables (job function, gender, and work category) among employees in the frame population.

Research Question 2

Research Question 2 asked, What is the relative importance of the five determinants of KS behavior to U.S. federal government employees? The null hypothesis stated, There is no relative importance of the five determinates of KS behavior to U.S. federal government employees. An analysis of variance statistical procedure was used to address Research Question 2 because ANOVA is appropriate to test the significance of group differences between two or more groups and can detect interaction effects between variables. The ANOVA compared the average score of any of the five KS factor scores relative to the three work category groups of civilian, military, and contractor. The results showed no statistically significant difference among the three work category groups on
any of the five KS factor score averages. Table 15 presents the descriptive statistics data for the five dependent variables relative to the independent variable category of work.

Table 15. Civilian, Military, and Contractor Work Category Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Work category</th>
<th>N valid</th>
<th>Missing</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational culture</td>
<td>Civilian</td>
<td>41</td>
<td>0</td>
<td>3.70</td>
<td>.43</td>
<td>2.75</td>
<td>5.00</td>
</tr>
<tr>
<td></td>
<td>Military</td>
<td>10</td>
<td>0</td>
<td>3.47</td>
<td>.55</td>
<td>2.50</td>
<td>4.25</td>
</tr>
<tr>
<td></td>
<td>Contractor</td>
<td>32</td>
<td>0</td>
<td>3.77</td>
<td>.50</td>
<td>2.50</td>
<td>4.75</td>
</tr>
<tr>
<td>Workplace trust</td>
<td>Civilian</td>
<td>41</td>
<td>0</td>
<td>3.64</td>
<td>.38</td>
<td>2.71</td>
<td>4.43</td>
</tr>
<tr>
<td></td>
<td>Military</td>
<td>10</td>
<td>0</td>
<td>3.68</td>
<td>.23</td>
<td>3.29</td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td>Contractor</td>
<td>32</td>
<td>0</td>
<td>3.72</td>
<td>.43</td>
<td>2.29</td>
<td>4.14</td>
</tr>
<tr>
<td>Incentives</td>
<td>Civilian</td>
<td>41</td>
<td>0</td>
<td>3.90</td>
<td>.49</td>
<td>2.29</td>
<td>4.71</td>
</tr>
<tr>
<td></td>
<td>Military</td>
<td>10</td>
<td>0</td>
<td>3.85</td>
<td>.39</td>
<td>3.29</td>
<td>4.43</td>
</tr>
<tr>
<td></td>
<td>Contractor</td>
<td>32</td>
<td>0</td>
<td>3.97</td>
<td>.58</td>
<td>2.29</td>
<td>4.86</td>
</tr>
<tr>
<td>Management support</td>
<td>Civilian</td>
<td>41</td>
<td>0</td>
<td>3.39</td>
<td>.65</td>
<td>2.20</td>
<td>5.00</td>
</tr>
<tr>
<td></td>
<td>Military</td>
<td>10</td>
<td>0</td>
<td>3.36</td>
<td>.27</td>
<td>3.00</td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td>Contractor</td>
<td>32</td>
<td>0</td>
<td>3.24</td>
<td>.64</td>
<td>1.40</td>
<td>4.80</td>
</tr>
<tr>
<td>Technology</td>
<td>Civilian</td>
<td>41</td>
<td>0</td>
<td>3.75</td>
<td>.52</td>
<td>2.20</td>
<td>5.00</td>
</tr>
<tr>
<td></td>
<td>Military</td>
<td>10</td>
<td>0</td>
<td>3.68</td>
<td>.37</td>
<td>3.00</td>
<td>4.40</td>
</tr>
<tr>
<td></td>
<td>Contractor</td>
<td>32</td>
<td>0</td>
<td>3.60</td>
<td>.64</td>
<td>2.00</td>
<td>4.60</td>
</tr>
</tbody>
</table>

Table 16 indicates no statistically significant differences among the five dependent variables relative to the independent variable of the category of work.

Table 17 shows descriptive statistics for the respondents’ perceptions of the five organizational factors most often identified in the literature as influencing KS behavior. According to the results, incentives were the most influential factor and management support was the least influential factor in motivating employees to share knowledge.
Table 16. Civilian, Military, and Contractor Work Category Inferential Statistics (Analysis of Variance)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational culture</td>
<td>Between groups</td>
<td>.67</td>
<td>2</td>
<td>.34</td>
<td>1.47</td>
<td>.23</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>18.46</td>
<td>80</td>
<td>.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>19.14</td>
<td>82</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workplace trust</td>
<td>Between groups</td>
<td>.12</td>
<td>2</td>
<td>.06</td>
<td>.39</td>
<td>.67</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>12.23</td>
<td>80</td>
<td>.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>12.36</td>
<td>82</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incentives</td>
<td>Between groups</td>
<td>.15</td>
<td>2</td>
<td>.07</td>
<td>.28</td>
<td>.75</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>21.85</td>
<td>80</td>
<td>.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>22.01</td>
<td>82</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management support</td>
<td>Between groups</td>
<td>.42</td>
<td>2</td>
<td>.21</td>
<td>.54</td>
<td>.58</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>30.72</td>
<td>80</td>
<td>.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>31.14</td>
<td>82</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td>Between groups</td>
<td>.43</td>
<td>2</td>
<td>.21</td>
<td>.69</td>
<td>.50</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>25.25</td>
<td>80</td>
<td>.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>25.69</td>
<td>82</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 17. Respondents’ Perceptions of the Five Knowledge-Sharing Factors Investigated

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Valid</td>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incentives</td>
<td>83</td>
<td>0</td>
<td>3.92</td>
<td>.51</td>
<td>2.29</td>
</tr>
<tr>
<td>Organizational culture</td>
<td>83</td>
<td>0</td>
<td>3.70</td>
<td>.48</td>
<td>2.50</td>
</tr>
<tr>
<td>Technology support</td>
<td>83</td>
<td>0</td>
<td>3.68</td>
<td>.55</td>
<td>2.00</td>
</tr>
<tr>
<td>Workplace trust</td>
<td>83</td>
<td>0</td>
<td>3.67</td>
<td>.38</td>
<td>2.29</td>
</tr>
<tr>
<td>Management support</td>
<td>83</td>
<td>0</td>
<td>3.33</td>
<td>.61</td>
<td>1.40</td>
</tr>
</tbody>
</table>
Summary

This chapter discussed the results of an investigation that sought the perceptions of employees of a single U.S. federal organization regarding the KS factors that the literature often associates with KS success: organizational culture, workplace trust, incentives, management support, and technology. Two research methods were used to collect data. The quantitative methodology collected a total of 83 usable responses via a Web-based instrument. Overall, respondents had a positive perception of the survey elements, except for “management support encouraging open communication” and “management support encouraging knowledge sharing by actions and deeds.” In those instances, respondent perceptions were neutral. The qualitative data collection methodology used face-to-face interviews and sought employee perceptions of their level of agreement regarding the importance of the five KS behaviors investigated. Eight usable interviews were cataloged. All interviewees agreed that the five KS factors were important to KS.

There were two research questions. Research Question 1 asked, How does the perceived importance of five determinants of KS behavior vary based upon job function, gender, and work category? The corresponding null hypothesis stated that there is no variation in perceived importance of the five determinants of KS behavior based upon job function, gender, and work category. As a result of three MANOVAs, the null hypothesis was not rejected and it was concluded that there is no statistically significant difference in perceptions of the five dependent variables (organizational culture, workplace trust, incentives, management support, and technology) relative to the three independent
variables (job function, gender, and work category) among employees of the U.S. federal
government organization investigated.

The second research question asked, What is the relative importance of the five
determinants of KS behavior to U.S. federal government employees? The null hypothesis
for Research Question 2 stated, There is no relative importance of the five determinates
of KS behavior to U.S. federal government employees. ANOVA was used to address this
research question. The results show that the respondents indicated no statistically
significant differences in the importance among the five determinates investigated.
Moreover, the null hypothesis was not rejected. Although the results indicated that
employees’ perceptions of the variables were not statistically significant, the results also
indicated that incentive was the most influential factor and that management support was
the least influential factor in motivating employees to share knowledge.
Chapter 5
Conclusions, Implications, Recommendations, and Summary

This chapter presents the investigation’s conclusions, implications, recommendations, and summary. The conclusions section provides answers to the research questions and discusses what is concluded from the investigation. The implications for practice are discussed in the second section. The third section, Recommendations, provides recommendations and directions for future studies. The final section provides a succinct summation of the investigation.

Conclusions

The purpose of this study was to investigate the determinants that affect employee KS behavior. The literature indicated that, although KS is an important element in assisting organizations to remain competitive, it is not well understood. In other words, organizations do not understand what motivates their employees to share knowledge.

The literature provided several reasons for difficulty in retaining organizational knowledge. Examples were the requirement of organizations to do more with less, due to shrinking budgets; the imminent potential retirement of the baby boomer generation, the largest workforce group; and technological advances that have increased society’s connectivity and heightened the expectation that knowledge is and will be available instantaneously upon request (Davenport, 2007; Frappaolo, 2006).
One goal of the study was to investigate factors that inhibit or promote KS behavior in a U.S. federal government environment. A government environment was selected based on prior research recommendations for such an investigation and to remedy a lack of previous KS research in the public sector. A second goal of the study was to design a model that KM/KS initiative planners may use to evaluate the state of KS in their organizations and to establish a baseline for subsequent study.

According to the literature, understanding employees’ KS behavior may increase the likelihood of successful organizational KS initiative implementation. One may conclude that this study results support the theory, formed during the literature review, that the five KS behavior facets investigated are important to the KS process.

The data collection procedure employed both quantitative and qualitative research methodologies. The quantitative procedure employed a Web-based survey to solicit employee perceptions of five facets associated with successful KS practices (organizational culture, workplace trust, incentives, management support, and technology). A total of 83 surveys (69% of the sample) were used for data analysis. A scale of positive, neutral, and negative was established to simplify the interpretation of each survey part.

Although the interpretation of the Web survey parts 1 through 5 were positive, two responses in Part 4, Management Support, were interpreted as neutral, based on response frequencies and percentages. The neutral responses were “Management encourages open communication in the work environment” and “Management encourages knowledge sharing by action and not only words.”
The qualitative methodology used face-to-face interviews to collect data, and 8 of 12 employees (66%) consented to interviews. Results indicated that 100% of the interviewees strongly agreed or agreed that the five facets investigated were important to KS success. Whereas 84% of the Web-based respondents agreed that incentives were a KS motivator, 75% of the interviewees agreed that incentives would motivate them to share knowledge. Finally, seven of the eight employees interviewed (87%) agreed that the lack of management support inhibits KS. The bottom line is that the quantitative and qualitative results are comparable.

There were two research questions. The first research question asked, How does the perceived importance of five determinants of KS behavior vary based upon job function, gender, and work category? The null hypothesis for Research Question 1 stated that there is no perceived importance of the five determinants of KS behavior based upon job function, gender, and work category. Based on the results of the three MANOVAs performed, one for each of three independent work category variables of job function, gender, and work category, the findings indicated no statistically significant difference in employee perceptions of any of the five dependent facets investigated. Therefore, the null hypothesis was not rejected.

The second research question asked, What is the relative importance of the five determinants of KS behavior to U.S. federal government employees? The corresponding null hypothesis stated, There is no relative importance of the five determines of KS behavior to U.S. federal government employees. An ANOVA was used to address Research Question 2; the results indicated no statistically significant difference in the relative importance of the five determinants of KS to U.S. federal government employees.
employees. However, based on the frequency of responses, the results indicated that incentive was considered the most influential KS facet, whereas management support was the least motivating KS facet investigated.

The results did not conform to the anticipated outcome. It was anticipated that there would be statistically significant differences in the perceived importance of the five determinants of KS behavior based upon an employee’s job function, gender, and work category, as well as in the relative importance of the five determinants of KS behavior to U.S. federal government employees. Whereas the majority of the investigations found in the literature indicated statistically significant differences among the KS facets investigated, the results of the current study did not. Differences noted were insufficient to state that the perception of any given facet was more statistically significant than others. This outcome suggests that, in this instance, all the facets investigated are similar in terms of their importance to organizational KS success; therefore, none of the five facets should be overlooked when establishing organizational KS initiatives. Additionally, organizations should strive to institute an environment conducive to these five facets in order to encourage successful KS.

The present study offers useful insight into employees’ KS behavior. The investigation included a population often overlooked when conducting KS studies—employees. More often than not, KM/KS investigations are conducted from management’s perspective (Beckmann, 2009). In contrast, the current investigation included both employees and managers. The inclusion of all employees when ascertaining organizational KS behavior ensures that KS behavior is explored from multiple points of view. Input from all organizational segments improves the
thoroughness of the investigation and demonstrates to all employees that the organization is interested in the perceptions not only of management but also of all employees.

The literature stated that management should investigate all segments of an organization to ascertain KS perspectives before initiating a KS strategy, and that incorporating plans to address all employee perspectives will improve the chances that KS initiatives will be successful (Lindsey, 2006). Although the results of this investigation may not be universal to all organizations, it represents a start in remedying the lack of KS investigations in the U.S. federal government. It may act as a basis for future investigations, and the study instrument may serve as a tool to identify baseline organizational KS behavior. The present study offers enhanced comprehension of KS behavior in a federal government organization.

The results of this investigation also may serve as a frame of reference for other U.S. government organizations interested in employee perceptions of KS. Although only a single organization was investigated and a small sample was analyzed, the results nonetheless could be useful for KM/KS planners. The results indicated no statistically significant difference in employees’ perceptions of the five dependent KS variables but did indicate that incentives are a KS motivator and that a lack of management support inhibits KS.

In summary, the investigation found that the five facets investigated were perceived positively by respondents. Incentives appeared to lead as a KS motivating factor, whereas a lack of management support was found to inhibit KS. Both a Web-based survey instrument and interviews corroborated these results. No statistically significant differences were noted among the five factors investigated relative to the variables job
function, gender, and work category, nor were there any significant differences noted in the relative importance of the five determinants of KS behavior to U.S. federal government employees. Therefore, the null hypotheses were not rejected.

**Implications**

There are several implications of this investigation of employee KS behavior. First, testing indicated that the findings were not statistically significant. It is important to discuss this issue, to prevent readers from summarily dismissing the findings and study methodology as unimportant due to a lack of statistical significance. Although the word *significance*, in general usage, implies importance, a finding of significance in research implies that a result is probably true and is not due to chance (Vaughan, 2001). From a practical perspective, none of the facets investigated should be overlooked by KS strategy planners, because the study participants agreed that the investigated facets were important to KS success. As a strategy, based on resource limitations and survey feedback, an organization may choose to focus first on the facet or facets that require immediate attention, while remaining cognizant that organizations that mirror the five KS behavior facets investigated are likely to implement successful KS programs.

Another issue relates to the neutral findings in Part 4 of the survey, Management Support. Although the overall feedback for management support was positive, the responses in this section indicated that management’s lack of support was a factor inhibiting KS. This result supports Sveiby’s (2007) position that a lack of management support inhibits KS. Specifically, Statement 23, “Management encourages open communication in the work environment,” and Statement 24, “Management encourages
knowledge sharing by action and not only words,” received neutral ratings, implying that
the respondents neither agreed nor disagreed with the statements. Potential reasons for an
employee display of ambivalence on this point could be that respondents did not have
enough information to select a level of agreement, that they were reluctant to criticize
management, or a combination of the two (Kumar, 2011).

This public sector investigation is a departure from the norm of KM/KS
investigations, because KM/KS investigations are more often conducted in the private
sector. This investigation is important because the study adds to the field of knowledge in
this sector, an often overlooked and under investigated arena. In addition, the inclusion of
both management and non-management employees in the study indicates that the
organization respects the perceptions of all its employees.

Although it may be tempting for practitioners to take results and immediately
incorporate them into practice, the literature warns that results may not be applicable to
all organizations because organizational culture and/or methods are unique (Han &
must be specific to an organization and are not one-size-fits-all. However, despite the
investigation’s small sample population and focus on a single U.S. federal government
environment, its results, though not universally applicable, may assist organizations by
providing empirical data for comparison as they customize their KS planning activities.
In addition, the study’s survey instrument can serve as the benchmarking tool for
ascertaining the state of employee KS perceptions in private sector organizations in
general and public sector organizations such as the U.S. federal government specifically.
The implication is that organizations that are able to comprehend the dynamics of their employee KS behavior will be prepared to maximize the return on their KS investment.

**Recommendations**

Recommendations include conducting additional investigations within other U.S. federal government organizations of the same size and larger as well as in private sector organizations. Such investigations would provide additional empirical data for comparison as well as additional insight into employee KS behavior.

Another potential area of future study could center on the investigation of a single KS facet instead of all five facets simultaneously, as was the focus in this study. The investigation of one facet at a time would sharpen the study’s focus and allow an in-depth exploration that would perhaps lead to greater understanding of the facet investigated and its relationship to KS. For example, in this study, incentives received the most positive responses as a KS motivator. Future studies could focus on what type of incentive—i.e., money, gift certificates, or a thank you from management—would motivate employees to share their knowledge.

In addition, future research could investigate management support for KS. Potential questions for exploration include what actions management can take to demonstrate it is encouraging open communication in the work environment, and what management activity would demonstrate to employees that management encourages KS by action and not only words.

Finally, future studies could revise the survey methodology. For instance, the number of statements per survey instrument could be expanded and the sample size could
be increased, potentially improving survey validity and reliability. The survey instrument could be administered in a group setting, which would improve timely receipt of the results, decrease the likelihood of duplicate survey submissions, and increase respondent confidence that their questions or concerns will be answered in a timely manner, because the survey administrator would be present.

Several practitioner recommendations also are provided. As was discussed in Chapter 1, there are no standard definitions for key KM/KS terms such as *culture*, *incentives*, *knowledge management*, *knowledge sharing*, *motivation*, *technology*, and *trust*. It is recommended that organizations adopt and publish standard definitions for key KM/KS terms. Such adoption and publication of standard terms within organizations would perhaps enhance employee awareness and provide a common reference point for sharing KM/KS perceptions.

In addition, organizations should adopt the practice of conducting exit interviews of all departing personnel to help alleviate the loss of organizational expertise. Next, senior management should establish management training programs that emphasize the importance of management involvement in encouraging open communication and KS through action and not just words. Finally, a yearly assessment of the state of organizational KS is recommended. These annual assessments can be compared from year to year to determine what improvements have been made and to identify what areas still require improvement.
Summary

Knowledge, an intangible asset, has become essential to organizational productivity, competitiveness, and success (Bennet & Bennet, 2008). This rise in the importance of managing knowledge can be attributed to multiple factors, such as budget reductions and pending employee retirements. In addition, the globalization of business and the rise in technological advancements have led customers to demand and expect information to be transmitted worldwide instantaneously (Davenport, 2007; Frappaolo, 2006).

Although knowledge is an important asset, KS behavior is not understood by organizations, and knowledge is of little value unless it is shared (Alhammad et al., 2009; Bechina & Bommen, 2006). The literature highlighted that KS within organizations is hampered by a lack of understanding of employees’ sharing behavior and called for additional investigations in this area (Alhammad et al.; Bechina & Bommen, 2006; Han & Anantatmula, 2006; Riege, 2005). Therefore, the present study investigated selected determinants that affect employees’ KS behavior.

Although the majority of studies have been conducted in the private sector, this study was conducted in an often-overlooked sector—the U.S. federal government. The investigation of KS in the U.S. federal government is significant because the United States Office of Personnel Management (2008) reported that 60% of U.S. federal government employees will be eligible to retire by 2016. An understanding of employee KS behavior can enhance KS initiative planning and assist in reducing the loss of institutional knowledge due to retirement, relocation, or dismissal.

There were two study goals. The first goal was to investigate inhibitors and motivational conditions relative to employee KS behavior in a U.S. federal government
environment. The second goal of the study was to design a model that KS planners might use to evaluate the state of KS in their organizations. The research questions were (a) How does the perceived importance of five determinants of KS behavior vary based upon job function, gender, and work category? and (b) What is the relative importance of the five determinants of KS behavior to U.S. federal government employees? In addition, the first null hypothesis stated that at there is no perceived importance of the five determinants of KS behavior relative to job function, gender, and work category. The second null hypothesis stated that there is no relative importance of the five determinates of KS behavior to U.S. federal government employees.

The literature defines KS variously. According to KS investigators such as Helmslandter (2003) and Kim and Lee (2005), KS can be defined as the involvement of at least two people who voluntarily exchange relevant knowledge with each other to enhance new experiences. KS benefits include improved job proficiency, decision-making, and problem solving; enhanced information quality; and shared information infrastructure (Dalkir, 2005; Syed-Ikhsan & Rowland, 2004; Zhang, Dawes, & Sarkis, 2005).

Five facets, suggested by the literature review, were most often associated with successful organizational KS: organizational culture, workplace trust, incentives, management support, and technology. Multiple researchers subscribed to the concept that the five facets investigated are important to organizational KS success (Barachini, 2009; Ling et al., 2009; Siakas, Georgiadou, & Balstrup, 2010).

The descriptive investigation employed quantitative and qualitative methodologies. Because a ready-made survey instrument was not located, a survey instrument was
developed based on validated literature sources. The resulting Web-based instrument was administered to 121 management and non-management U.S. government employees who are members of the Multinational Information Sharing Program Management Office, Engineering Review Board. The 83 completed responses used for data analysis yielded a 69% response rate. The survey’s validity was addressed through a review by an organizational management consultant, a quantitative management consultant, a senior operations research analyst, and two operations research analysts. The instrument also was pretested with a group of 15 participants and was retested. Cronbach’s alpha was used to test internal reliability.

The quantitative procedures were followed by face-to-face interviews. Interviews were scheduled with 18 employees. Twelve of the 18 employees met with the researcher as scheduled and eight agreed to be interviewed.

The results of Research Question 1 indicated no statistically significant difference among the factors investigated. Likewise, for Research Question 2, results indicated no statistically significant difference in the perceived importance of the five determinants of KS behavior based upon job function, gender, and work category. Therefore, the investigation failed to reject the null hypotheses. Additionally, respondents indicated that they had a positive perception of each of the five facets and that all facets investigated were important to KS success. Incentives received the largest percentage of positive responses as a KS motivating determinant, and employee perceptions of a lack of management support suggested that this is a KS inhibitor.

Although the results did not yield anticipated statistically significant differences, this does not imply that the investigation is of no importance. Although in general usage the
word *significance* implies importance, a research finding of significance implies that a result is probably true and is not due to chance (Vaughan, 2001). In practice, none of the five factors investigated should be overlooked by KS initiative planners, because the respondents agreed with the literature that the five facets investigated were important to successful KS.

This investigation makes several contributions to the field of KS. First, the study has enhanced the organizational understanding of employee KS behavior by providing empirical results that address employee perceptions of KS behavior. It provides an instrument for KS planners and organizational management to use to ascertain employees’ KS behavior perceptions. At the same time, the study demonstrates, as the literature has, that the factors investigated are important to successful KS. The study also suggests that, in this instance, all of the factors investigated should be addressed during KS implementation planning.

Recommendations include future investigations of U.S. federal government organizations of a similar size or larger, as well as of private sector organizations, and a focused investigation of one of the five facets rather than of all five facets simultaneously. For instance, because the facet *incentives* received the highest percentage of responses, an investigation might focus on why federal government employees consider incentives a motivating factor and what type of incentives would encourage the maximum KS return.

A revision of the investigation’s methodology might improve its findings. For example, the current survey instrument’s statements could be revised to capture additional perceptions of the investigated facets, and the sample population size could be
increased. Qualitatively, future studies involving the use of interviews should seek to increase the number of interviewees.

From a practical point of view, the standardization of definitions associated with KS could perhaps help employees understand KS and respond from a common perspective during organizational KS assessments. In addition, the establishment of employee exit interviews, management training programs, and yearly KS assessments have the potential to advance the understanding of organizational KS behavior. The study results provide additional insight into the dynamics of KS in a seldom-investigated area, the U.S. federal government, and represents a step toward greater understanding of the determinants that affect employee KS behavior.
Appendix A

Interview Questions

Part 1 – Organizational Culture: Use the following legend:
1= Strongly Disagree  2= Disagree  3 = Neutral  4= Agree  5 = Strongly Agree

In my organization:

1. Organizational culture is important to knowledge sharing. _____

PART 2 – Workplace Trust: Use the following legend:
1= Strongly Disagree  2= Disagree  3 = Neutral  4= Agree  5 = Strongly Agree

In my organization:

2. Trust is important to knowledge sharing. _____

PART 3 – Incentives: Use the following legend:
1= Strongly Disagree  2= Disagree  3 = Neutral  4= Agree  5 = Strongly Agree

In my organization, I would share knowledge if:

3. Incentives were a knowledge sharing motivator. _____

PART 4 – Management Support: Use the following legend:
1= Strongly Disagree  2= Disagree  3 = Neutral  4= Agree  5 = Strongly Agree

In my organization: Management

4. Support is important to knowledge sharing success. _____

PART 5 – Technology Support: Use the following legend:
1= Strongly Disagree  2= Disagree  3 = Neutral  4= Agree  5 = Strongly Agree

In my organization:

5. Technology is important to knowledge sharing success. _____
Appendix B

Inform Consent to Interview

Consent form for Participation in the study entitled Employee Determinants to Share Knowledge in a U.S. Federal Government Environment

Funding Source: None.

IRB approval #

Principal investigator Co-investigator
Kenneth White, M.S. Steven Zink, Ph.D.
PO Box XX Nova Southeastern University
Lorton, VA 22199 3301 College Avenue
703-6XX-XXXX DeSantis Building

FT Lauderdale, FL 33314
954-262-2000

For questions/concerns about your research rights, contact:
Human Research Oversight Board (Institutional Review Board or IRB)
Nova Southeastern University
(954) 262-5369/Toll Free: 866-499-0790
IRB@nsu.nova.edu

Site Information:
Multinational Information Sharing Offices
6914 Cooper Ave
Ft Meade, MD 20755

What is the study about?
You are invited to participate in a research study that seeks your perceptions of knowledge sharing within your organization. We are attempting to collect data to understand what motivates government employees to share their knowledge.

Why are you asking me?
We are inviting you to participate because you work in a U.S. federal government environment. Although many studies have been conducted in the private workforce regarding knowledge sharing perceptions, few studies have involved the government workforce. All employees in your organization have been asked to participate.

Initials ______  Date______
What will I be doing if I agree to the study?
You will answer five questions posed by the interviewer, Kenneth White, one question from each of the first five survey parts. You will be asked questions about your perceptions of your organization’s knowledge sharing environment and to rate your agreement or disagree with the questions on a scale from 1, strongly disagree to 5, strongly agree. The survey should take no more than 15 minutes to complete. You are welcome to provide additional information but it is not required.

Is there any audio or video?
The interview segment of the study will not include audio nor video recording.

What are the dangers to me?
The level of risk involved with this survey is best described as minimal. You will not experience any bodily harm by participating in this survey interview. No identifiable participant information will be collected. If you have questions about the research or your research rights, please contact Mr. White at (703) 622-6297. The IRB at the numbers listed above may be contacted with questions about your research rights.

Are there any benefits to me for taking part in this research study?
There are no direct benefits to you for participating.

Will I get paid for being in the study? Will it cost me anything?
There are no payments made for participating in this study or costs to you.

How will you keep my information private?
No identifiable information will be collected during the interview. Results will be reported in an aggregate form only. Not later than 30 days following the survey completion date, your organization will notify you of the aggregate survey results posting URL.

All information obtained is strictly confidential unless disclosure is required by law. The interview records will be retained for a period of three years.

In addition, the Nova Southeastern University (NSU)-Institution Review Board and other regulatory agencies may review research records.

Others who may review the research records include the NSU School of Computer and Information Science dissertation chair and faculty adviser.

Initials ______  Date_______
What if I do not want to participate or want to stop participation during the interview?
You have the right to leave this study at any time or refuse to participate. If you do decide to leave or you decide not to participate, you will not experience any penalty or loss of services you have a right to receive. If you choose to withdraw, any information collected about you before the date you leave the study will be kept in the research records for 36 months from the conclusion of the study and may be used as a part of the research.

By signing below, you indicate that
- this study has been explained to you
- you have read this document or it has been read to you
- your questions about this research study have been answered
- you have been told that you may ask the researchers any study related questions in the future or contact them in the event of a research-related injury
- you have been told that you may ask Institutional Review Board (IRB) personnel questions about your study rights
- you are entitled to a copy of this form after you have read and signed it
- you voluntarily agree to participate in the study entitled Employee Determinants to Share Knowledge in a U.S. Federal Government Environment

Other Considerations:
You will be told if the researchers learn anything which might change your mind about participating in this survey.
Participant's Signature: ___________________________ Date: _____________

Participant's Name: _____________________________ Date: _____________

Signature of Person Obtaining Consent: ________________________________

Date: ________________________________

Initials ______ Date______
Appendix C

Survey Instrument

**Knowledge Sharing Perceptions**

**Survey Orientation**: There are six **PARTS** to the survey:

**Part 1** seeks your perception of the organization’s culture. The culture can be defined as the day-to-day activities in the organization and how things are done.

**Part 2** seeks your perception of workplace trust. Trust can be defined as the confident expectation that other employees will do what they say.

**Part 3** seeks your perception of incentives to encourage knowledge sharing and your preference for various forms of incentives. The intent of incentives is to motivate employees to act in a certain way.

**Part 4** seeks your perception of management’s support for knowledge sharing.

**Part 5** seeks your perception of technology’s use for knowledge sharing.

**Part 6** seeks demographic information.

**Instructions**: Please review and respond to the questions or statements in the left column by clicking a radio button (1-6 columns) corresponding to the legend to represent your level of agreement. Although additional comments are not required, space is provided at the end of each **PART** of the survey for you to enter comments.
Part 1 – Organizational Culture: Use the following legend:

1 = Strongly Disagree   2 = Disagree  3 = Neutral  4 = Agree  5 = Strongly Agree

In my organization:

1. Employees share pride in their work. 1 2 3 4 5
2. Employees know what is expected of them. 1 2 3 4 5
3. The employee turnover rate is low. 1 2 3 4 5
4. It is a good place to work. 1 2 3 4 5
5. I share knowledge because my co-workers share their knowledge. 1 2 3 4 5
6. Organizational culture is important to knowledge sharing. 1 2 3 4 5

Comments:

PART 2 – Workplace Trust: Use the following legend:

1 = Strongly Disagree   2 = Disagree  3 = Neutral  4 = Agree  5 = Strongly Agree

In my organization:

7. Employees count on each other to share information. 1 2 3 4 5
8. My co-worker’s actions are worthy of trust. 1 2 3 4 5
9. Co-workers count on each other to lend support when needed. 1 2 3 4 5
10. Employees can depend on the organization to act in the Employees’ best interest. 1 2 3 4 5
11. Employees can depend on their supervisor to share important information. 1 2 3 4 5
12. My supervisor’s actions are worthy of trust. 1 2 3 4 5
13. Workplace trust is important to knowledge sharing success. 1 2 3 4 5

Comments:

PART 3 – Incentives: Use the following legend:

1 = Strongly Disagree   2 = Disagree  3 = Neutral  4 = Agree  5 = Strongly Agree

In my organization, I would share knowledge if:

14. Sharing knowledge enhanced operational efficiency. 1 2 3 4 5
15. I had more time. 1 2 3 4 5
16. Knowledge sharing was part of my performance rating. 1 2 3 4 5
17. If it helped me to keep my job. 1 2 3 4 5
18. I received recognition. 1 2 3 4 5
19. I received tangible incentives (free parking/metro pass, money). 1 2 3 4 5
20. Incentives were a knowledge sharing motivator.  

Other incentives: (Please List)

<table>
<thead>
<tr>
<th>PART 4 – Management Support: Use the following legend: 1= Strongly Disagree 2= Disagree 3 = Neutral 4= Agree 5 = Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In my organization:</strong> Management</td>
</tr>
<tr>
<td>21. Encourages me to come up with innovative solutions to work-related problems.</td>
</tr>
<tr>
<td>22. Keeps me informed about changes that affect the work environment.</td>
</tr>
<tr>
<td>23. Encourages open communication in the work environment.</td>
</tr>
<tr>
<td>24. Encourages knowledge sharing by action and not only words.</td>
</tr>
<tr>
<td>25. Support is important to knowledge sharing success.</td>
</tr>
</tbody>
</table>

| Comments:                                                                                                                       |

<table>
<thead>
<tr>
<th>PART 5 – Technology Support: Use the following legend: 1= Strongly Disagree 2= Disagree 3 = Neutral 4= Agree 5 = Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In my organization:</strong></td>
</tr>
<tr>
<td>26. It is easy to use our technology to share knowledge.</td>
</tr>
<tr>
<td>27. We have the appropriate knowledge sharing technology systems.</td>
</tr>
<tr>
<td>28. The knowledge sharing technology is reliable.</td>
</tr>
<tr>
<td>29. Training has prepared me to use our knowledge sharing technology.</td>
</tr>
<tr>
<td>30. Technology is important to knowledge sharing success.</td>
</tr>
</tbody>
</table>

| Comment:                                                                                                                        |

| PART 6 – Demographics: Please select the categories appropriate to you:                                                         |
| **Job Function:** ____ Non-Management ____ Management                                                                           |
| **Gender:** ____ Female ____ Male                                                                                                |
| **Work Category:** ____ Civilian ____ Military ____ Contractor                                                                 |

Thank you again for your time and cooperation.
Appendix D

Survey Pretest Questions

Pretest Questions:

Now that you have completed the survey, please answer the following questions:

1. How long did it take you to complete this survey?
   ___ 8 minutes of less       ___ 9-10 minutes       ___ 11-12 minutes
   ___ 13-14 minutes       ___ 15 minutes or more

1. If it took more than 15 minutes to complete the survey, please list factors that
   prevented you from completing the survey in a shorter time span:

   Write in Comments:

4. Are PARTS 1, 2, 3, 4, and 5 Instructions clear?   ___ Yes   ___ Not Sure   ___ No

5. If your answer above is “Not sure” or “No,” what are your comments and/or
   recommended changes?

   Write in Comments:

6. Are the PART 6 Demographics clear?   ___ Yes   ___ Not Sure   ___ No

7. If your answer above is “Not sure” or “No,” what are your comments and/or
   recommended changes?
Write in Comments:

Again, thank you for your participation in the Knowledge Sharing Perceptions survey pretest.
Appendix E
Survey Pre-notice

Subject: Pre-notice of Upcoming Knowledge Sharing Perceptions Survey

Dear Prospective Participant,

I am a graduate student at Nova Southeastern University conducting a study of U.S. federal employees’ perceptions of their organization’s knowledge sharing behavior.

This message provides notification of an upcoming Knowledge Sharing Perceptions Survey in which your organization is participating. The survey will start on (date), 2010. You are invited to participate in this 15-minute survey by visiting. The survey URL will be provided in a separate email.

Your confidentiality is assured. The survey results will only be reported in the aggregate. Since the survey is anonymous, your name cannot be associated with data collected. Completion and submission of survey responses indicate voluntary participation in the study.

The results will be used to assess your organization’s current knowledge sharing activities; improve future planning; and potentially enhance your work environment.

Not later than 30 days following the survey completion date, your organization will notify you of the aggregate survey results posting URL.

Thank you for your time and help. I look forward to your participation.

Sincerely,

Kenneth White
kwhite@nova.edu
703-633-6297
Appendix F

Frame Population Invitation

Subject: Knowledge Sharing Perceptions Survey

Dear Prospective Participant,

I am a graduate student at Nova Southeastern University conducting a study of U.S. federal employees’ perceptions of their organization’s knowledge sharing behavior. This message announces the start date for the knowledge sharing perceptions survey.

We are inviting you to participate because you work in a U.S. federal government environment. Although many studies have been conducted in the private workforce regarding knowledge sharing perceptions, few studies have involved the government workforce. All employees in your organization have been asked to participate.

There are no direct benefits to you for participating and no payment is provided. The questionnaire will not ask you for any information that could be linked to you. Nor does it electronically tag your input in any manner that could identify you as a participant. Your responses will remain anonymous.

You have the right to not participate in this study. If you decide not to participate, you will not experience any penalty. If you choose to withdraw, any information collected will not be saved as part of this study.

Your confidentiality is assured. Survey results will only be reported in the aggregate. Since the survey is anonymous, your name cannot be associated with data collected. The survey start date is 6 am (date), 2010 and the end date is (date) midnight, (date) 2010.

The results will be used to assess your organization’s current knowledge sharing status; improve future planning; and potentially enhance your work environment.

Not later than 30 days following the survey completion date, your organization will notify you of the aggregate survey results posting URL.

Completion and submission of survey responses indicate voluntary participation in the study. We invite you to take the Web-based 35 question, 15-minute survey by visiting URL: http://www.-------.com/ks/kspss.html.
Thank you for your time and help. I look forward to your participation.

Kenneth White
kwhite@nova.edu
703-633-6297
Appendix G
Reminder Notice

Subject: Reminder-Knowledge Sharing Perceptions Survey

Dear Prospective Participant,

This message is to remind you that there are only 12 days left before the internal knowledge sharing perceptions survey ends. Your participation is important to the success of this study. If you have not already done so, please go to URL http://www.----.com/ks/ksps.html to complete the 15-minute survey; use the following password, ksps53, for access.

The survey end date is midnight, (date), 2010.

If you have already completed the survey, thank you very much.

To summarize, we are inviting you to participate because you work in a U.S. federal government environment. Although many studies have been conducted in the private workforce regarding knowledge sharing perceptions, few studies have involved the government workforce. All employees in your organization have been asked to participate.

There are no direct benefits to you for participating and no payment is provided. The questionnaire will not ask you for any information that could be linked to you. Nor does it electronically tag your input in any manner that could identify you as a participant. Your responses will remain anonymous.

You have the right to not participate in this study. If you decide not to participate, you will not experience any penalty. If you choose to withdraw, any information collected will not be saved as part of this study.

Your confidentiality is assured. Survey results will only be reported in the aggregate. Since the survey is anonymous, your name cannot be associated with data collected. The survey start date is 6 am (date), 2010 and the end date is (date) midnight, (date) 2010.

The results will be used to assess your organization’s current knowledge sharing status; improve future planning; and potentially enhance your work environment.

Not later than 30 days following the survey completion date, your organization will notify you of the aggregate survey results posting URL.
Completion and submission of survey responses indicate voluntary participation in the study.

Thank you for your time and help. I look forward to your participation.

Sincerely,

Kenneth White
kwhite@nova.edu
703-633-6297
Appendix H

Respondent Levels of Agreement Totals & Percentages per Survey Statement

### PART 1 - Culture

<table>
<thead>
<tr>
<th>Q #</th>
<th>Statements : In my organization:</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Employees share pride in their work.</td>
<td>4</td>
<td>59</td>
<td>8</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5%</td>
<td>71%</td>
<td>10%</td>
<td>13%</td>
<td>1%</td>
</tr>
<tr>
<td>2</td>
<td>Employees know what is expected of them.</td>
<td>1</td>
<td>44</td>
<td>13</td>
<td>23</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1%</td>
<td>53%</td>
<td>16%</td>
<td>28%</td>
<td>2%</td>
</tr>
<tr>
<td>3</td>
<td>The employee turnover rate is low.</td>
<td>1</td>
<td>63</td>
<td>9</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1%</td>
<td>76%</td>
<td>11%</td>
<td>10%</td>
<td>2%</td>
</tr>
<tr>
<td>4</td>
<td>It is a good place to work.</td>
<td>4</td>
<td>44</td>
<td>28</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5%</td>
<td>53%</td>
<td>34%</td>
<td>8%</td>
<td>0%</td>
</tr>
<tr>
<td>5</td>
<td>I share knowledge because my co-workers share their knowledge.</td>
<td>3</td>
<td>43</td>
<td>15</td>
<td>21</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4%</td>
<td>52%</td>
<td>18%</td>
<td>25%</td>
<td>1%</td>
</tr>
<tr>
<td>6</td>
<td>Organizational culture is important to knowledge sharing.</td>
<td>27</td>
<td>53</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>32%</td>
<td>64%</td>
<td>4%</td>
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</tr>
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</table>

### PART 2 - Trust

<table>
<thead>
<tr>
<th>Q #</th>
<th>Statements : In my organization:</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Employees count on each other to share information.</td>
<td>3</td>
<td>63</td>
<td>11</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4%</td>
<td>63%</td>
<td>13%</td>
<td>19%</td>
<td>1%</td>
</tr>
<tr>
<td>8</td>
<td>My co-worker’s actions are worthy of trust.</td>
<td>2</td>
<td>76</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2%</td>
<td>92%</td>
<td>5%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>9</td>
<td>Co-workers count on each other to lend support when needed.</td>
<td>3</td>
<td>64</td>
<td>8</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4%</td>
<td>77%</td>
<td>10%</td>
<td>8%</td>
<td>1%</td>
</tr>
<tr>
<td>10</td>
<td>Employees can depend on the organization to act in the employees’ best interest.</td>
<td>0</td>
<td>32</td>
<td>31</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0%</td>
<td>39%</td>
<td>37%</td>
<td>20%</td>
<td>4%</td>
</tr>
<tr>
<td>11</td>
<td>Employees can depend on their supervisor to share important information.</td>
<td>3</td>
<td>44</td>
<td>23</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4%</td>
<td>53%</td>
<td>28%</td>
<td>14%</td>
<td>1%</td>
</tr>
<tr>
<td>12</td>
<td>My supervisor’s actions are worthy of trust.</td>
<td>6</td>
<td>62</td>
<td>11</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7%</td>
<td>75%</td>
<td>13%</td>
<td>4%</td>
<td>1%</td>
</tr>
<tr>
<td>13</td>
<td>Workplace trust is important to knowledge sharing success.</td>
<td>24</td>
<td>59</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>29%</td>
<td>71%</td>
<td>0%</td>
<td>0%</td>
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</tbody>
</table>
### PART 3 - Incentives

<table>
<thead>
<tr>
<th>Q #</th>
<th>Statements: In my organization, I would share if:</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Sharing knowledge enhanced operational efficiency.</td>
<td>14</td>
<td>67</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>I had more time.</td>
<td>7</td>
<td>66</td>
<td>3</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>16</td>
<td>Knowledge sharing was part of my performance rating.</td>
<td>20</td>
<td>51</td>
<td>5</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>It helped me to keep my job.</td>
<td>25</td>
<td>50</td>
<td>5</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>18</td>
<td>I received recognition.</td>
<td>5</td>
<td>62</td>
<td>6</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>19</td>
<td>I received tangible incentives (free parking/metro pass, money).</td>
<td>8</td>
<td>55</td>
<td>5</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>20</td>
<td>Incentives were a knowledge sharing motivator.</td>
<td>20</td>
<td>50</td>
<td>5</td>
<td>6</td>
<td>2</td>
</tr>
</tbody>
</table>

### PART 4 – Management Support

<table>
<thead>
<tr>
<th>Q #</th>
<th>Statements: In my organization: Management</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Encourages me to come up with innovative solutions to work-related problems.</td>
<td>2</td>
<td>33</td>
<td>28</td>
<td>19</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>Keeps me informed about changes that affect the work environment.</td>
<td>3</td>
<td>30</td>
<td>32</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>23</td>
<td>Encourages open communication in the work environment.</td>
<td>5</td>
<td>22</td>
<td>40</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>24</td>
<td>Encourages knowledge sharing by action and not only words.</td>
<td>6</td>
<td>17</td>
<td>32</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>25</td>
<td>MGT Support is important to knowledge sharing success</td>
<td>21</td>
<td>60</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

### PART 5 Technology

<table>
<thead>
<tr>
<th>Q #</th>
<th>Statements: In my organization:</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>It is easy to use our technology to share knowledge.</td>
<td>4</td>
<td>65</td>
<td>4</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>27</td>
<td>We have the appropriate knowledge sharing technology systems.</td>
<td>5</td>
<td>65</td>
<td>5</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>28</td>
<td>The knowledge sharing technology is reliable.</td>
<td>4</td>
<td>62</td>
<td>9</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>29</td>
<td>Training has prepared me to use our knowledge sharing technology.</td>
<td>4</td>
<td>30</td>
<td>22</td>
<td>23</td>
<td>4</td>
</tr>
<tr>
<td>30</td>
<td>Technology is important to knowledge sharing success.</td>
<td>23</td>
<td>57</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Appendix I

Visual Depiction of Respondent Levels of Agreement Totals per Survey Statement Regarding the Five KS Factors Investigated

Part 1 – Culture
Part 4 – Management Support

Part 5 – Technology
References


