U.S. AIR FORCE SUPPLY CHAIN MANAGERS SHARE ATTITUDES REGARDING THE USE OF THE FIVE ELEMENTS OF THE ADKAR MODEL AS CRITICAL SUCCESS FACTORS TO IMPLEMENT ENTERPRISE RESOURCE PLANNING SOFTWARE

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Major Field: APPLIED EDUCATIONAL STUDIES

Abstract: This qualitative, phenomenological study explored the attitudes of civilian (non-military) U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model (*awareness, desire, knowledge, ability*, and *reinforcement*) as critical success factors (CSFs) to implement enterprise resource planning (ERP) software.

The dissertation was based on a literature review and qualitative interviews with 11 U.S. Air Force supply chain managers who have had experience with ERP implementations.

The significance of this research was based on the costly failure of the multiyear implementation of ERP software (ECSS) in the U.S. Air Force, and on the subsequent struggles to implement other such software.

The findings in this study indicated that participants perceived all five ADKAR elements are necessary CSFs for supporting employees before and after an ERP software implementation.

Practical implications of the findings indicated that the U.S. Air Force may benefit from integrating the ADKAR Model into a standardized change framework for ERP software implementation in its supply chain, that this framework should address employee extrinsic motivation by standardizing and mandating formal and informal recognition for employee demonstrations of required skills and behaviors, and that performance measurement should likewise be standardized and mandated to assess the need for reinforcement of required skills and behaviors through retraining or alternative training.

Overall, the study indicated that managing U.S. Air Force supply chain ERP software implementations should involve the use of the five elements of the ADKAR Model as CSFs to ensure required changes occur successfully on the individual level.

Keywords: CSF, critical success factors, ADKAR Model, awareness, desire, knowledge, ability, reinforcement, ERP, enterprise resource planning.

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CHAPTER I

INTRODUCTION

The end goal for managing an organization's change initiatives is to achieve maximum adoption and use of the change (Hiatt & Creasey, 2012), which, for the present study, involves implementing new enterprise resource planning (ERP) software. Successful implementation is easier stated than accomplished. The research is extensive on ERP software implementations and critical success factors (CSFs) (Kiran & Reddy, 2019). When searching Google Scholar using the words "ERP implementation critical success factors," there are 16,900 articles returned since 2017. However, despite much research in this area, approximately 90% of change initiatives are unsuccessful (Phelan, 2010), despite the identification of CSFs to successfully manage an ERP implementation.

Analyst consulting firm Deloitte conducted research and found that ERP projects fail between 45 to 75% of the time to meet implementation objectives and that "The single biggest failure point for ERP implementations is the need for change management" (Deloitte, n.d. p. ii). Though failure is common in ERP software implementations, it is partly avoidable because the people-side of the change can be managed. The ADKAR Model (*awareness, desire, knowledge, ability*, and *reinforcement)* is an effective five-

element framework for understanding change occurring in individuals. The elements can be viewed as sequential building blocks to bring about successful change in individuals.

Change management is one of the most crucial success factors for ERP implementations (Finney & Corbett, 2007). It is unknown, however, whether United States (U.S.) Air Force supply chain managers regard the use of the five elements of the ADKAR Model as CSFs to implement ERP software. This information is needed to close gaps in the literature and provide practical information on use of the ADKAR Model to effectively implement change in the U.S. Air Force regarding ERP software.

Background of the Problem

ERP software is configurable software designed to enable an organization to integrate operational and management processes across a broad range of internal business activities, including procurement, inventory management, accounting, finance, and human resources (Riposo, et al., 2013). These business activities can be viewed as islands of data and information, which depend on the timely availability of critical information. Thus, ERP software is a bridge, which connects the business activities into an integrated enterprise-wide value chain (Manary, Comm, & Mathaisel, 2009). In the 1960s, early versions of ERP software ran on mainframe computers. Today, the trend is to enable employees to access their company's ERP software from a mobile computing device such as a smart phone, tablet, or laptop.

The U.S. Air Force started an ERP software transformation project called the Expeditionary Combat Support System (ECSS) program in 2004. The project's purpose was to subsume more than 400 legacy software systems and replace those systems with

one unified logistics and supply chain management ERP system (Riposo, et al., 2013). The main objectives were to: (1) improve management of its worldwide inventories, (2) reduce costs, and (3) optimize efficiency in support of its 5,000+ aircraft and 325,000+ active-duty military personnel. Early approximations of project costs were nearly three billion dollars with a project length of eight years. The contract was awarded to Oracle in 2004 but was immediately bogged down by contract disputes from bidders who did not win. Soon after the contract award, the project had more than 1,000 project members and was regarded by some as the largest ERP project in history. With only meager results to show for the effort and spending of more than one billion dollars, the U.S. Air Force shut down the ECSS project in 2012 (Riposo, et al., 2013).

According to a report to the U.S. Senate Permanent Subcommittee on Investigations, the primary contributors for the project's demise include: (1) a failure to adhere to defense acquisition requirements, (2) cost overruns, (3) schedule delays, (4) turnover in high levels of program leadership, (5) a culture of resistance to change in the U.S. Air Force, and (6) absence of leadership to implement the necessary changes (United States. Congress. Senate, July 2014). The Institute for Defense Analyses conducted a root cause study focused on cost growth and schedule slippage; the report indicated that project personnel most likely did not have proper experience with an ERP project of the magnitude of ECSS: "As the scope of ECSS is so big, it is possible that nobody in the world really knew how long it would take or what it would cost to acquire this system" (Aronin, et al., 2011, p. 6).

After the failure of ECSS, the U.S. Air Force requested the RAND Corporation analyze and assess the steps the U.S. Air Force should take to implement successful new or future business transformations (Riposo, et al., 2013). According to researchers, change management is one of the most crucial success factors for ERP implementations (Finney & Corbett, 2007) and one of the most underappreciated (General Accounting Office, 2008). Even though failures such as ECSS cost over one billion dollars, the U.S. Air Force continues to develop and implement ERP applications, and part of the rationale is based on remaining the most lethal air force on earth. Lagging technologically to another world power is not a situation the U.S. Air Force is willing to accept.

Statement of the Problem

The general problem is that the U.S. Air Force failed to build ECSS because it did not follow the required acquisition business processing guidelines from start to finish. As a result, the ECSS project experienced multiple schedule delays and cost overruns (Tazyeen, 2012; United States Congress. Senate, July 2014). Since the project shut down in 2012, the U.S. Air Force has tried to acquire several additional ERP applications. However, the same results recur, including schedule delays, project cancelations, and cost overruns, albeit not to the level of critical review by the U.S. Senate. The Department of Defense (DoD) continues to experience ERP failures because of the general focus on enabling information technology (IT) to the neglect of change, which must occur within organizations and on the individual level, which is necessary to accomplish transformation (Riposo et al., 2013). Another example, from the 1990s, includes when the Navy sank more than one billion dollars into implementing four ERP pilot projects

without any significant improvement in day-to-day operations (Kutz & Rhodes, 2005). The ramifications of the U.S. Air Force continuing its efforts to build and implement ERP systems may continue to develop into unnecessary costs to American taxpayers unless it improves implementation procedures.

ERP software implementation researchers suggest managing implementations by CSFs. CSFs can be understood as aspects of a project that must occur correctly for a project to succeed (Rockart, 1979), and management of CSFs is a process that must occur correctly for an ERP software implementation to succeed. Examples of CSFs include: (1) developing a business case, (2) operating with a governance board, (3) developing a business process reengineering (BPR) plan, (4) ensuring IT acquisition compliance, and (5) managing change initiatives with change management guidance to help mitigate implementation failures (Riposo et al., 2013). In their seminal study, Umble et al. (2003) listed several prominent CSFs for successful ERP software implementation: (1) business case justification, (2) top management commitment, (3) excellent project management, (4) extensive education and training, and (5) commitment to change management. Researchers have documented the causes of ERP implementation failures. However, limited research exists on U.S. Air Force supply chain managers' attitudes and the use of the five elements of the ADKAR Model for managing the changes of individuals, e.g., U.S. Air Force employees. Supply chain managers are required periodically to ensure their employees adopt, implement, and use a new software but have no change management guidance. A change management model with identified CSFs could increase successful implementation outcomes.

The use of CSFs to manage ERP software implementation has been explored extensively by scholars in multiple disciplines. However, what is underrepresented in the CSF literature are the attitudes of U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model as CSFs to implement ERP software. This information is unknown and needed to close gaps in the literature.

Purpose of the Study

The purpose of this qualitative, phenomenological study was to explore the attitudes of civilian (non-military) U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model as critical success factors (CSFs) to implement enterprise resource planning (ERP) software. A phenomenological study design was deemed most appropriate to understand the attitudes of U.S. Air Force supply chain managers because the phenomenon under investigation is relatively new. A sample of 11 participants were selected for interviews from a population of approximately 200 supply chain managers employed by the U.S. Air Force at Hill Air Force Base (AFB), Robins AFB, and Tinker AFB. Each participant was asked a set of open-ended questions from the interview guide (Appendix D). Additionally, the interviews have been designed to explore how the five elements of the ADKAR Model may enable U.S. Air Force supply chain managers to prepare and support their employees before and after an ERP implementation and to obtain recommendations to eliminate gaps between the CSFs for ERP software implementation and the five elements of the ADKAR Model.

Research Questions

The following broad research questions led the focus of this study. These questions formed the basis for the interview questions with which participants and the researcher interacted. The central research question was:

> RQ1. What are the attitudes of current U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model as CSFs to implement ERP software?

To provide additional guidance for this research, the topic of the central research question was divided into three focus areas, which were indicated by the three research sub-questions, as follows:

> SQ1. How can using the five elements of the ADKAR Model as CSFs to implement ERP software enable U.S. Air Force supply chain managers to prepare their employees before an ERP software implementation?
>
> SQ2. How can using the five elements of the ADKAR Model as CSFs to implement ERP software enable U.S. Air Force supply chain managers to support their employees after an ERP software implementation?
>
> SQ3. What are the recommendations of current U.S. Air Force supply chain managers to eliminate gaps between the CSFs for ERP software implementation and the five elements of the ADKAR Model?

Before the researcher asked the questions from the interview guide (Appendix D), each participant received a brief explanation of the CSFs and the five elements of the ADKAR

Model as applied to the context of an ERP software implementation. Additionally, each participant received the interview guide before the interview for reference during the interview.

Assumptions and Limitations

The study included the following assumptions and limitations. The study was conducted virtually using webinar or conference call technology due to COVID-19 safety and risk considerations. The honesty and accuracy of answers from the interviews must be taken into consideration when evaluating the data. It was assumed that participants would answer questions honestly and to the best of their abilities. Although the study's findings may not generalize well to the larger target population because of the low sample size, the participants' expertise should provide rich, in-depth data not obtainable from studies with higher sample sizes.

The busy schedules and time constraints of the participants may create access issues. Additionally, the study is focused on the attitudes of management personnel, not bargaining unit employees, thus limiting the findings to a management perspective. The connections created during interviews between a researcher and a participant can influence a researcher’s interpretation of the data. It is essential to understand, however, that researcher bias is not automatically prohibited in qualitative research. Steps were taken to mitigate bias, and no researcher can claim a one-hundred percent bias-free study (Kerr, MacCoun, & Kramer, 1996).

Significance and Scope of the Study

The CSF literature for ERP software implementation is abundant. However, what appears to be missing are studies regarding the use of the five elements of the ADKAR Model as CSFs to assist in the implementation of ERP software. The study's findings are expected to help eliminate gaps in the CSF literature and provide U.S. Air Force supply chain managers with a summary of attitudes regarding the use of the factors. The research will provide information that can serve as the basis for recommendations and suggestions regarding how the five elements of the ADKAR Model can be used as CSFs to ensure employees are prepared before and after an ERP software implementation. While the study's scope is focused on the ADKAR Model and CSFs, the participants are expected to provide rich, meaningful data, which could be used for a larger researcher population.

Definitions

The following terms are defined for use in this study.

448th Supply Chain Management Wing (448 SCMW): The 448 SCMW is headquartered at Tinker AFB in Oklahoma City. The organization is the official U.S. Air Force organization responsible for planning, executing, and sustaining U.S. Air Force depot maintenance of more than 5,000 aircraft and 16,000 engines worldwide. The 448 SCMW employs nearly 3,000 and military personnel at different locations, including Hill AFB in Utah, Robins AFB in Georgia, and Tinker AFB in Oklahoma (Davis, 2019).

ADKAR Model: ADKAR is a five-factor framework for understanding change occurring at an individual level. The factors can be viewed as sequential building blocks to bring

about successful change in individuals. “A” represents awareness. “D” represents desire. “K” represents knowledge. “A” represents ability. “R” represents reinforcement (Hiatt, 2006).

ADKAR Model Element – Awareness: Awareness is the first element of the ADKAR Model of change management and is achieved when an individual understands the nature of the change, why the change is necessary, and the risks of not changing (Hiatt, 2006); for the present study, it is also considered a CSF for the implementation of ERP software.

ADKAR Model Element – Desire: Desire is the second element of the ADKAR Model and represents the motivation of an individual to participate in and support a change initiative (Hiatt, 2006); for the present study, it is also considered a CSF for the implementation of ERP software.

ADKAR Model Element – Knowledge: Knowledge is the third element of the ADKAR Model and represents training about how to change (Hiatt, 2006); for the present study, it is also considered a CSF for the implementation of ERP software.

ADKAR Model Element – Ability: Ability is the fourth element of the ADKAR Model and represents an individual’s capability to change and perform according to new requirements (Hiatt, 2006); for the present study, it is also considered a CSF for the implementation of ERP software.

ADKAR Model Element – Reinforcement: Reinforcement is the fifth element of the ADKAR Model represents action to sustain changes in individuals and organizations,

also known as *making change stick* (Hiatt, 2006); for the present study, it is also considered a CSF for the implementation of ERP software.

Change Management: Change management involves encouraging and leading individuals to take risks by evaluating their core beliefs and worldviews toward the purpose of engaging with oneself, others, or new technology (Ackerman-Anderson & Anderson, 2010).

Critical Success Factor (CSF): A CSF is an aspect of a project that which must occur correctly for a project to succeed (Rockart, 1979), and management of CSFs is a process that must occur correctly for an ERP software implementation to succeed.

CSF – Business Process Alignment: This is a CSF that must be managed to ensure that the implementation of a new ERP software meets the technical requirements as opposed to replicating the capabilities from the retiring legacy system (Reitsma & Hilletofth, 2018).

CSF – Business Plan and Vision, Clear Goals and Objectives, Clear Vision and Understanding of Strategic Goals, and Realistic Expectations: This is a CSF that must be managed to enable individuals to understand why an ERP software implementation is occurring and the actual improvements the new system will deliver to the enterprise (Barth & Koch, 2019; Jiwasiddi & Mondong, 2018; Umble et al., 2003; Zouaghi & Laghouag, 2016).

CSF – Communications: This is a CSF that must be managed to enable the user population to be aware of a change initiative and why it is necessary (Altamony et al.,

2016; Barth & Koch, 2019; Jenko & Roblek, 2016; Jiwasiddi & Mondong, 2018; Kiran & Reddy, 2019; Reitsma & Hilletofth, 2018; Umble et al., 2003; Yeh & Walter, 2016).

CSF – Empowered Decision-Makers and Strategic Decision-Making: This is a CSF that must be managed wherein senior leaders strategically implement a new ERP system. If they do not, then employees will be concerned about how the new system will affect them (Jenko & Roblek, 2016; Reitsma & Hilletofth, 2018).

CSF – End User Involvement: This is a CSF that must be managed to ensure that users of the new ERP software can be involved in the complete lifecycle of the implementation change process (Altamony et al., 2016; Barth & Koch, 2019; Jenko & Roblek, 2016; Jiwasiddi & Mondong, 2018; Yeh & Walter, 2016; Zouaghi & Laghouag, 2016).

CSF – End User Training: This is a CSF that must be managed to ensure that individual employees required to use the new ERP software will receive training. This CSF is considered one of the most critical factors for implementation success. Employees must be given the knowledge required to demonstrate required skills and performance (Altamony et al., 2016; Barth & Koch, 2019; Fadelelmoula, 2018; Jenko & Roblek, 2016; Jiwasiddi & Mondong, 2018; Kiran & Reddy, 2019; Reitsma & Hilletofth, 2018; Umble et al., 2003; Yeh & Walter, 2016).

CSF – Organizational Change Management (OCM) and Change Management Plan: This is a CSF that must be used to manage the impacts on the organization and individual employees stemming from ERP software implementation. Impacts include changes to standard business processes, employee roles and responsibilities, and policies, all of

which require effective change management (Barth & Koch, 2019; Jiwasiddi & Mondong, 2018; Kiran & Reddy, 2019; Reitsma & Hilletofth, 2018; Umble et al., 2003).

CSF – Performance Measurement: This is a CSF that must be used to manage individual users' expectations and to achieve stated business objectives (Reitsma & Hilletofth, 2018; Umble et al., 2003).

CSF – Top Management Support and Involvement: This is a CSF that must be managed to ensure that top managers or leaders dedicate funding and personnel to an implementation project and are perceived from an individual employee's perspective as supporting the project both in observation and in their speech (Barth & Koch, 2019; Fadelelmoula, 2018; Jenko & Roblek, 2016; Jiwasiddi & Mondong, 2018; Kiran & Reddy, 2019; Reitsma & Hilletofth, 2018; Umble et al., 2003; Yeh & Walter, 2016; Zouaghi & Laghouag, 2016).

Enterprise Resource Planning (ERP): ERP software is configurable, commercial off-the-shelf (COTS) software packages designed to enable an organization to integrate operational and management processes across a broad range of internal business activities, including procurement, inventory management, accounting, finance, human resources, et cetera. (Riposo, et al., 2013).

Successful ERP Implementation: ERP software implementation may be considered successful if the project produces a significant proportion of benefits to costs. Benefits may include reduction of personnel, reduction of inventories, reduction in operations costs, improved customer response times, et cetera. (Umble et al., 2003).

Unsuccessful ERP Implementation: ERP software implementation may be considered unsuccessful if the project does not achieve its stated return on investment (ROI) project pre-approval phase. Failure rates occur in the range of 60-90% of implementation projects (Ptak, 2000).

CHAPTER II

REVIEW OF LITERATURE

Introduction

The purpose of this qualitative, phenomenological study was to explore the attitudes of civilian (non-military) U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model (*awareness, desire, knowledge, ability*, and *reinforcement*) as critical success factors (CSFs) to implement enterprise resource planning (ERP) software. A phenomenological study design was deemed most appropriate to understand the attitudes of U.S. Air Force supply chain managers because the phenomenon under investigation is relatively new. A sample of 11 participants were selected for interviews from a population of approximately 200 supply chain managers employed by the U.S. Air Force at Hill Air Force Base (AFB), Robins AFB, and Tinker AFB. Each participant was asked a set of open-ended questions from the interview guide (Appendix D). Additionally, the interviews have been designed to explore how the five elements of the ADKAR Model may enable U.S. Air Force supply chain managers to prepare and support their employees before and after an ERP implementation and to

obtain recommendations to eliminate gaps between the CSFs for ERP software implementation and the five elements of the ADKAR Model.

A review of the literature was conducted to identify research on the CSFs for implementing ERP software. The review is organized into four sections: (1) a discussion of a recent failed attempt by the U.S. Air Force to implement ERP software implementation; (2) an explanation of the five elements of the ADKAR Model; (3) a review of recent ADKAR Model implementation research; and (4) a review of the literature on the CSFs for ERP software implementation. Research on the CSFs for ERP software implementation is abundant. However, the literature is limited regarding the use of the five elements of the ADKAR Model as CSFs to implement ERP software.

Literature Search Strategy

A comprehensive search for CSFs for ERP implementation research was conducted using the Oklahoma State University's online library portal. Databases and search tools included Academic Search Complete, Academic Search Premier, Google Scholar, JSTOR, and SAGE. Search terms included the following keywords and combinations of words: *ADKAR*, *Air Force*, *change management*, *change management model*, *critical success factors, CSFs*, *enterprise resource planning*, *ERP*, and *organizational change*. To obtain a sense of the current state of research on the topic, locating and selecting research material focused on studies published within five to seven years of the anticipated year of graduation, 2021. Additionally, search qualifiers selected when locating articles included *peer-reviewed*, *English only*, and *full text.*

A Failed Attempt by the U.S. Air Force to Implement ERP Software

The U.S. Air Force has examined CSFs and change management regarding ERP software implementation. In 2014, the U.S. Senate Permanent Subcommittee on Investigations (Staff Report, 2014) investigated the Air Force Expeditionary Combat Support System (ECSS) program's failure to follow required ERP software implementation guidelines to update more than four hundred legacy systems. The U.S. Air Force had initially developed a plan for successfully acquiring ECSS; however, it did not execute the plan properly (Staff Report, 2014). In this case, the ECSS program experienced multiple delays in schedule and cost overruns, which ultimately led to the project's termination. The subcommittee discovered that other ERP software implementation programs were also experiencing difficulties (Staff Report, 2014). Without investigation and intervention, similar programs could be at risk of failure.

The U.S. Air Force failed to implement ECSS successfully, wasting more than one billion dollars in taxpayer dollars, in large part through leadership failure and poor communication among ECSS project personnel (Staff Report, 2014). Other ERP software implementation projects face problems such as lacking BPR requirements, developing unrealistic requirements, and exceeding budget, each threatening project success (Staff Report, 2014). The Subcommittee on Investigations (2014) provided recommendations to increase ERP software implementation success, including initiating assessments earlier in the acquisition process and ensuring a realistic program budget by involving a governance and investment review boards at the beginning of the program and budget determination processes to help budget requests match BPR objectives and investment

decisions. Additionally, DoD policy should be changed to match program executive occupancy with essential acquisition decision points (Staff Report, 2014), improving personnel accountability and offering better resource verification of self-reporting BPR certification and preventing duplication of governance structures when acquiring future ERP software.

The ADKAR Model

The present study lays the groundwork for future research on the use of the five elements of the ADKAR Model as CSFs to implement ERP software. Whereas project teams tend to focus on implementing ERP software at the organization-level and on the technical aspects of a project, the presesnt study is needed because the chances for implementation to be successful are increased by managing change at the individual level (Prosci, "Integrating", n.d., p. i). The ADKAR Model focuses on the simple, but often overlooked, reality that organizational change only happens when individuals can change.

Das (2019) referred to the ADKAR Model as an “individual-target change framework” (p. 268). It is important to note that organizations change one person at a time, and the ADKAR Model can be used to explain individual improvements to attain organizational success. The model offers a systematic strategy to help individuals faciliate organizational change, such as ERP software implementation, by moving through the five elements or steps necessary to make overall change successful (Creasey & Taylor, 2014). All five elements must be in place for a change to be successful (Hiatt, 2006). Table 1 provides the five elements of the ADKAR Model: *awareness, desire, knowledge, ability*, and *reinforcement*.

Table 1.
The ADKAR Model.

A	• Awareness of the need for change
D	• Desire to support and participate in the change
K	• Knowledge of how to change
A	• Ability to implement required skills and behaviors
R	• Reinforcement to sustain the change

Note: Reprinted from *ADKAR: A model for change in business, government and our community (1st ed.),* by J. Hiatt, 2006, p. 2. Copyright 2016 by Prosci Learning Center Publications.

ADKAR Element Number One – Awareness

The ADKAR Model element of awareness may be considered a CSF for ERP software implementation. Awareness symbolizes an individual's understanding of the need for change, why the change is occurring, and what happens if the change is not implemented (Hiatt, 2006). Awareness of the need for change also requires that a person understands what is driving the change. Next, Hiatt (2006) identified five factors that may influence an effective effort to build awareness in individuals: how a person views their current state before any change; how a person views the problem necessitating any change; how a person views the credibility of the information awareness campaigner; the fact that a person may circulate misinformation about the change initiative; and how a person may openly challenge the reasons for the change initiative. Additionally, the ADKAR Model provides four awareness tactics (see Table 2), which must be managed during a change initiative to conduct an effective information awareness campaign:

effective communication; sponsorship from organizational executives; managers and supervisors seeing their role during change as coaches and front-line implementers; and business information about the change that is readily available (Hiatt, 2006).

ADKAR Element Number Two – Desire

The ADKAR Model element of desire may be considered a CSF for ERP software implementation. The Desire element refers to an individual's willingness to participate in and to support a change initiative (Hiatt, 2006). Individuals are more likely support change they feel they can participate in developing the change initiative (Hiatt, 2006). Hiatt (2006) identified four factors that contribute to an individual's desire to participate in a change initiative: knowing the details of the change, e.g., implementation of new ERP software, which replaces a long-standing legacy system; understanding the impact of change on their environment, e.g., their place of employment; understanding the impact of change on the individual directly; and seeing how they can make a difference. Last, the ADKAR Model provides five desire tactics (see Table 2), which must be managed during a change initiative to help individuals want to participate in a change initiative: the change initiative must be effectively sponsored from top management to the bottom-level employees; change managers need to be equipped to be the organization's change leaders; anticipate employee and management resistance and measure risks; employees and management must be engaged in the various stages of the change process, e.g., project stages of an ERP software implementation; and implement appropriate incentives (Hiatt, 2006).

ADKAR Element Number Three – Knowledge

The ADKAR Model element of knowledge may be considered a CSF for ERP software implementation. The knowledge element refers to the transfer of information about the change from the organization to an individual. In this step, knowledge primarily means acquiring knowledge, especially about the skills required to perform primary behaviors required by the change (Hiatt, 2006). Next, Hiatt identified three factors about knowledge required for a change to be realized: training and education to develop necessary skills and abilities, e.g., for end-users of new software; detailed information, e.g., processes and procedures to use new software; and having a clear understanding of the new roles and responsibilities that accompany the use of new software. Finally, there are four knowledge tactics (see Table 2), which must be managed during a change initiative to enable individuals to develop the required knowledge, skills, and abilities: effective end-user training and education; helpful learning aids, e.g., online tutorial videos, workbooks, course curricula, et cetera; coaching and encouragement provided to individuals by managers or supervisors; and groups and forums for end-users to ask questions and get answers, i.e., Q&A forums after training (Hiatt, 2006).

ADKAR Element Number Four – Ability

The ADKAR Model element of ability may be considered a CSF for ERP software implementation. The ability element refers to change being visible in some manner within an individual (Hiatt, 2006) and refers to the execution of the knowledge and skills acquired through training, such as end-user training. Hiatt (2006) identified five factors that can impact an individual's ability to change: psychological issues, physical

issues, intellectual abilities, available time to demonstrate required abilities, and available resources to support a person's acquisition of new abilities. Last, there are four ability tactics (see Table 2), which must be managed during a change initiative to ensure that employees develop the required knowledge, skills, and abilities in their work environment: supervisors must be involved with employees on a day-to-day basis during the initial stages of a change initiative; employees and managers must have access to subject matter experts (SMEs), e.g., during weekly or bi-weekly Q&A forums; performance must be monitored to ensure that employees are on track with expectations; and employees must have access to hands-on exercises during training, e.g., workbooks to accompany course curricula (Hiatt, 2006).

ADKAR Element Number Five – Reinforcement

The ADKAR Model element of reinforcement may be considered a CSF for ERP software implementation. Reinforcement refers to the extrinsic and intrinsic factors that work together to help ensure change is sustained past the implementation stage (Hiatt, 2006). Examples of extrinsic change reinforcement factors include recognition by management of exemplary performance of new duties, including celebrations and awards. Examples of intrinsic change reinforcement factors include personal satisfaction for effectively performing change implementation tasks. Hiatt (2006) identified four factors that reinforce and help sustain change implementation: the extent to which the reinforcement is meaningful and specific to the person; the association of the reinforcement with actual demonstrated progress; an absence of negative consequences; and accountability mechanisms to help reinforce the change. Finally, there are five

reinforcement tactics (see Table 2), which must be managed during a change initiative to sustain individual change: recognition and celebration of individual achievements; rewards for employees; implementation of a system to collect feedback from employees; conducting audits and measuring employee performance; and the use of an accountability system (Hiatt, 2006).

Table 2.
The Five Elements of the ADKAR Model and ADKAR Model Tactics.

ADKAR Model Elements	ADKAR Model Tactics
Awareness of the need for change	• Effective communications; • Sponsorship from organizational executives; • Managers and supervisors that see their role during change as coaches and front-line change implementers; and • Business information about the change that is readily available.
Desire to support and participate in the change	• The change initiative must be effectively sponsored from top management to all employees; • Supervisors and managers need to be equipped to be the organization's change leaders; • Anticipate employee and management resistance and measure risks; • Employees and management must be engaged in the various stages of the change process, e.g., project stages of an ERP software implementation; and • Implement appropriate incentives.
Knowledge of how to change	• End-user training and education that is effective; • Helpful learning aids, e.g., online tutorial videos, workbooks, course curricula, et cetera;

	• Coaching and encouragement provided to individuals by managers or supervisors; and • Groups and forums for end-users to facilitate questions and answers, i.e., Q&A Forums, after training has occurred.
Ability to implement required skills and behaviors	• Supervisors must be involved with employees on a day-to-day basis during the initial stages of a change initiative; • Employees and managers must have access to subject matter experts (SMEs), e.g., during weekly or bi-weekly Q&A Forums; • Performance must be monitored to ensure that employees are on track with expectations; and • Employees must have access to hands-on exercises during training, e.g., workbooks to accompany course curricula.
Reinforcement to sustain the change	• Recognize and celebrate individual achievements; • Offer rewards to employees; • Put in place a system to collect feedback from employees; • Conduct audits and a system to measure employee performance; and • Use an accountability system.

Note: Reprinted from *ADKAR: A model for change in business, government and our community (1st ed.),* by J. Hiatt, 2006, p. 64, 80, 106, 113, and 121. Copyright 2016 by Prosci Learning Center Publications.

Synthesis of Findings from the Research

Figure 1 includes a project schedule to provide awareness examples of CSFs for implementing ERP software, which align with the ADKAR Model. These examples include communication activities, such as ongoing communications to all stakeholders from the start to the finish of a project; providing notice to outside stakeholders and engaging in negotiations as needed; and conducting initial high-level, i.e., "101" informational briefings and software demonstrations by the vendor.

A second type of examples focus on providing opportunities for management and end-users to be involved with the project, i.e., desire for user involvement. Examples include pre- and post-implementation planning and execution sessions provided by the ERP software project team and an opportunity for end-users to participate in pivotal project milestones, such as user acceptance testing (UAT).

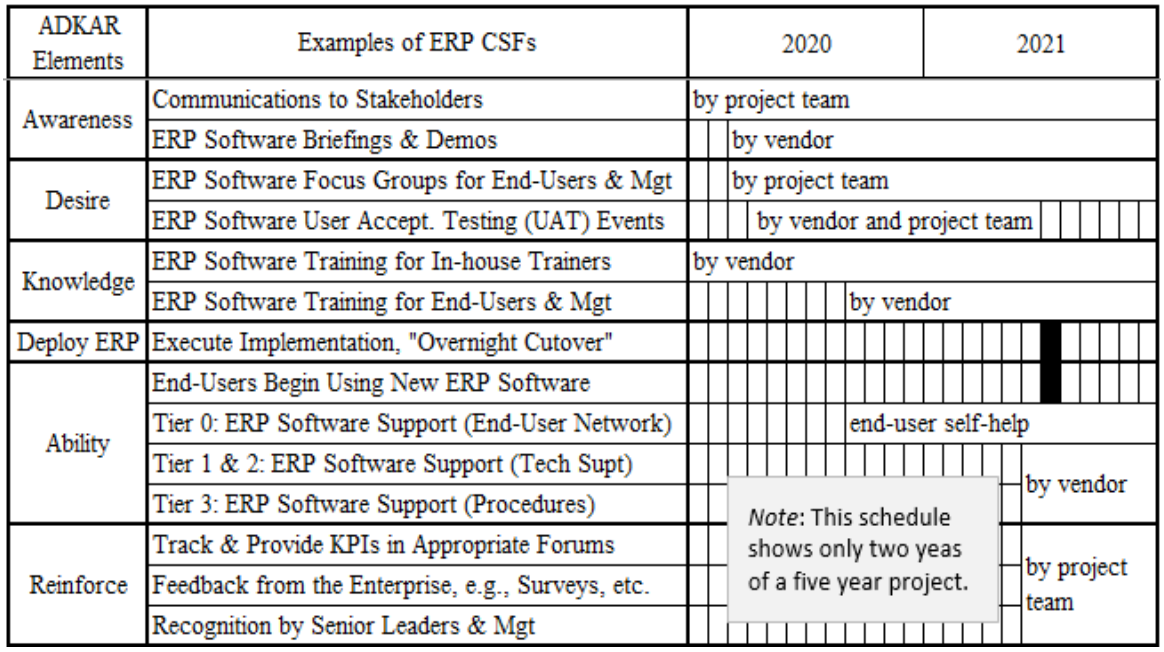
A third type of examples focus on enabling end-users to learn how to implement change, i.e., how to use the software to comply with new performance requirements. Examples include ERP software training by the vendor for in-house corporate trainers, in-house software administrators, end-users, managers, and supervisors; legacy system training, as required; and knowledge of changes in applicable laws, regulations, or organization policies.

A fourth type of examples focus on building an infrastructure of support for all end-users to ensure they can implement the required skills and abilities. Examples include project team and vendor collaboration to provide a tiered customer support help

desk to end-users and ongoing weekly Q&A forums conducted for a time determined by contract requirements.

A final type of examples focus on reinforcing the positive outcomes resulting from a change initiative, such as those required for ERP software implementation. Examples include tracking and providing key performance indicators (KPIs) in appropriate forums and requesting and obtaining customer input from the enterprise, e.g., surveys and periodic recognition by senior leaders, managers, and supervisors.

Figure 1.
Aligning ADKAR Model Elements to ERP CSFs in a project schedule format (example).



Note: Aligning critical success factors of enterprise resource planning software implementation to the five elements of the ADKAR Model in a schedule format, by J. Crowson. Copyright 2021 by James Crowson.

Recent ADKAR Model Implementation Research

This section includes discussion of two recent articles about using the five elements of the ADKAR Model to guide change initiative in the healthcare sector. The articles indicated that overall success could increase if a change is managed correctly using a change management framework, e.g., the ADKAR Model. Using the ADKAR Model, change implementation was achieved successfully, and stress testing of a healthcare system's emergency response plan worked in real-world COVID-19 pandemic circumstances. The studies showed that the ADKAR Model was useful for change implementation in a healthcare setting and may be useful for other change endeavors, such as ERP software implementation.

Leading Change with ADKAR

Recent research on the ADKAR Model has included research on change management in healthcare. Wong, Lacombe, Keller, Joyce, and O'Malley (2019) examined a hospital administration's change management experiences using the ADKAR Model to transition more than 3,000 clinicians and staff members into a new hospital facility and implement a new patient care delivery model. The researchers used a case study to examine the ADKAR Model to manage and implement the transition. The ADKAR Model provided the framework for the change initiative to ensure that each person experiencing change goes through the five stages required to make meaningful changes by supporting individual changes to achieve organizational success. The five stages of the ADKAR Model include "awareness of the need for change, desire to support the change, knowledge of how to change, ability to demonstrate skills and

behaviors, and reinforcement to make the change stick" (Prosci, "Model," n.d., "The 5 elements of the ADKAR" section).

First, to make the enterprise aware of the change, the implementation team in Wong et al.'s study (2019) used town hall events to communicate to future nursing teams, i.e., stakeholders, the tools and competencies needed to provide care in the new facility. Second, to ensure support for the change and meet the desire for change, focus groups obtained the nurses' input and identified workflow issues and potential solutions. The change management staff also requested input via an electronic survey to get the nurses involved in implementing the new care delivery model. Nearly 400 nurses received the survey, and participation was almost 80%. Third, five nurses were selected to write the training to ensure the staff acquired the proper training. Day-in-the-Life events were conducted, which assisted in the creation of lesson plans and workflow scenarios. Fourth, Tuckman's Team Development Model (storming, norming, conforming, performing) (Killiam et al., 2020; Tuckman, 1965) was used to provide 487 staff members and nurses with the ability to adapt to their new workspaces, identify and solve problems, and improve patient care through 35 team cohesion events lasting 90 minutes over two months. Last, the change was reinforced by supporting the nurses technically and clinically (Wong et al., 2019).

Wong et al. (2019) found that the change initiative was successful. Hospital administration provided surveys to patients after moving into the new hospital facility to determine patient satisfaction. Compared to the former facility, survey scores about the

new facility increased 26.8% in the initial month after move-in. The willingness of patients to recommend the new facility also increased by 23.3% (Wong et al., 2019).

Table 3 shows the alignment of the five ADKAR tactics employed to the five elements of the ADKAR Model. First, "notification to stakeholders" aligns with awareness of the need for change. Next, end-user involvement by using "focus groups" aligns with desire to participate in the change. Third, "provided training" aligns with ensuring individuals have the knowledge of how to change. Fourth, using "team-building exercises" aligns with the ability element. Finally, "provided continuous support" aligns with the reinforcement element of the ADKAR model (Hiatt, 2006; Wong et al., 2019).

Table 3.
Alignment of the Five ADKAR Model Elements Identified by Wong et al. (2019) to ADKAR Model Tactics.

ADKAR Model Elements	Tactics Employed Aligning to ADKAR
Awareness of the need for change	Notification to stakeholders
Desire to support and participate in the change	Used focus groups and end-user involvement to obtain input
Knowledge of how to change	Provided training; day-in-the-life events
Ability to implement required skills and behaviors	Used team-building exercises to identify and solve problems
Reinforcement to sustain the change	Provided continuous support

Note: Adapted from the "ADKAR Model elements" reprinted from *ADKAR: A model for change in business, government and our community (1st ed.),* by J. Hiatt, 2006, p. 2. Copyright 2016 by Prosci Learning Center Publications.

Use of the AKDAR Change Model During the COVID-19 Pandemic

In a recent study of the ADKAR Model in the healthcare sector, Balluck, Asturi, and Brockman (2020) examined the change in nurse staffing from a primary nursing model to a team nursing model in a 25-hospital nonprofit health care system in Texas.

The change was necessary to address the hospital system's challenges in managing an impending increase of patients with an emerging infectious disease called Coronavirus (COVID-19). The problem was that nursing managers across the system needed to get nurses prepared for the surge in patients. The solution involved switching from a primary nursing model to a team nursing model (Balluck et al., 2020). A primary nursing model involves one nurse caring for a patient or a group of patients (Felton, 1975). A team nursing model involves a team of nurses caring for a group of patients under a registered nurse (Balluck et al., 2020). The team nursing model was part of the healthcare system's emergency response plan when patients outnumber available nurses (Balluck et al., 2020).

The implementation team used the ADKAR Model as the framework to guide the change initiative; the ADKAR Model provided a systematic framework to ensure that each nurse changing from providing primary care to team care could transition through the five stages to make meaningful changes: *awareness, desire, knowledge, ability,* and *reinforcement* (Balluck et al., 2020). Using the ADKAR Model, the implementation team communicated to nurses across the enterprise to ensure they were aware of the change requirement from primary nursing to team nursing. This communication step helped minimize resistance to the change (Balluck et al., 2020). Next, key nurse-influencers were engaged to foster participation and involvement, which met their desire to support the change. Third, training on the team nursing model was provided before the surge of COVID-19 patients, ensuring that nurses had the knowledge to change (Balluck et al., 2020). Next, the implementation team eliminated potential barriers by offering hands-on

exercises and time to practice the new model, guaranteeing that nurses acquired the ability to demonstrate the required skills and behaviors. Last, daily shift and safety huddles helped reinforce the nursing model change to ensure the change practices continued (Balluck et al., 2020; Wong et al., 2019).

Nurse managers also used the CLARC model, a subcomponent of the ADKAR Model, throughout the change initiative to communicate, function as liaisons between senior management and nurses, advocate for the change, manage employee resistance, and coach nurses to acquire the ability to adopt the new behaviors and practices (Horlick, n.d.; Balluck et al., 2020). Balluck et al.'s (2020) study revealed three key findings regarding change management. First, change progress must occur through a change framework, such as the ADKAR Model, to direct effective change initiatives (Balluck et al., 2020). Next, continuous communication regarding coordination and cooperation is essential at all levels (Balluck et al., 2020). Last, task consistency and transparency are vital to the change model's awareness and adoption (Balluck et al., 2020). Based on Balluck et al.'s research, having a change management plan, communication, and role clarity are CSFs for effective change management (Barth & Koch, 2019; Jiwasiddi & Mondong, 2018; Kiran & Reddy, 2019).

The use of the ADKAR Model to transition from primary care nursing to team nursing also had other advantages, including the nurses' satisfaction when caring for a large group of patients, better utilization of clinical resources, high-quality patient care, and patient satisfaction in the face of a worldwide pandemic (Balluck et al., 2020). Using the ADKAR Model, change implementation was achieved successfully, and stress testing

of the healthcare system's emergency response plan worked in real-world pandemic circumstances.

Table 4 shows the alignment of the five tactics employed with the five elements of the ADKAR Model. First, "communicated across the enterprise" aligns with awareness of the need for change. Next, end-user involvement by using "focus groups" aligns with desire to participate in the change. Third, "provided training" aligns with ensuring individuals have the knowledge of how to change. Fourth, "hands-on exercises" aligns with the ability element. Finally, "reinforced the change with daily huddles" aligns with the reinforcement element (Balluck et al., 2020; Hiatt, 2006).

Table 4.
Alignment of the Five ADKAR Model Elements Identified by Balluck et al. (2020) to ADKAR Model Tactics.

ADKAR Model Elements	Tactics Employed Aligning to ADKAR
Awareness of the need for change	Communicated across the enterprise
Desire to support and participate in the change	Used focus groups to foster participation and involvement
Knowledge of how to change	Provided training
Ability to implement required skills and behaviors	Offered hands-on exercises and time to practice
Reinforcement to sustain the change	Reinforced the change with daily huddles

Note: Adapted from the "ADKAR Model elements" reprinted from *ADKAR: A model for change in business, government and our community (1st ed.),* by J. Hiatt, 2006, p. 2.

Synthesis of Findings from the Research

The overall success of a change initiative, whether for moving into a new hospital facility, reconstructing a patient care model, or implementing a new ERP software, can positively increase change initiative outcomes as much as six times if the change is

managed correctly using a change management framework such as the ADKAR Model (Wong et al., 2019). Wong et al. (2019) posited that change often fails when support and resources are rapidly reallocated to the next project soon after implementing the previous project; changes must be sustained through the continued allocation of support and resources. Wong et al. (2019) and Balluck et al. (2020) showed that the ADKAR Model is useful for change implementation in a healthcare setting and may be useful for other change initiative purposes, such as ERP software.

Critical Success Factors in Enterprise Resource Planning Software Implementation

In this section, the reviewed literature is ordered alphabetically by author. First, the purpose of the research, the research method, the findings, and the recommendations are provided for each study. Next, a list of the CSFs is provided for each study. Last, a table displays the CSFs found for each study and which align with the ADKAR Model's five elements. Research on the use of the five elements of the ADKAR Model as CSFs to implement ERP software is limited.

The Relationship Between Change Management Strategy and Successful Enterprise Resource Planning Implementations

Altamony, Tarhini, Al-Salti, Gharaibeh, and Elyas (2016) investigated the CSFs in change management strategy to determine an organization’s successful ERP software implementation. Additional research revealed five categories of CSFs: change management strategy, e.g., the ADKAR Model, top management support, ensuring BPR

occurs, technical support from the vendor, and user involvement throughout the project's lifecycle (Thomason, 2017; Umble, 2003). A change management strategy was the most cited CSF category, and two recommendations were provided. First, implement an ERP software using a change management strategy to aid in a successful outcome. Second, organizational leaders should prepare in advance for implementation challenges (Altamony et al., 2016).

Altamony et al. (2016) identified eight critical change management strategy factors when implementing ERP software: project leadership, testing, end-user training, communication, end-user involvement, implementation team, organizational culture, and organizational leadership. First, project leadership is essential to ensure the lifecycle of the project stays on course. Next, testing during the configuration stage ensures the software solution will meet contractual requirements. Third, the end-users must receive training to use the new software effectively. Next, communication with end-users must occur at each implementation stage to ensure that the user population knows when the change will occur and why it is necessary. Fifth, end-user involvement is considered part of a change management initiative, which means that users must be involved in and have a stake in developing the implementation process. Next, the implementation team should aim to be effective. A primary method to ensure effectiveness is to staff the team with a cross-function of end-users, e.g., individuals with various workforce specialties. Seventh, organizational culture and employee attitudes about implementing new technology should be taken into consideration. Finally, organizational leadership is essential to ensure the ERP software implementation strategy is successful (Altamony et al., 2016).

Of the eight factors, Altamony et al. (2016) cited determining a change management strategy as the most important.

Here is the list of CSFs identified by Altamony et al. (2016):

1. Project leadership;
2. Testing
3. End-user training;
4. Communication;
5. End-user involvement;
6. Implementation team;
7. Organizational culture; and
8. Organizational leadership.

Additionally, Altamony et al. (2016) argued that a successful change management strategy for ERP software consists of three phases: change preparation, implementing changes, and impact on end-users. First, leaders should prepare an organization for the cultural and structural changes brought about by an ERP software implementation. Second, during all phases of change implementation, continuous monitoring should occur to mitigate and prevent problems that could impact implementation success. Third, ERP software implementations tend to be disruptive to organizations and people (Altamony et al., 2016). Therefore, how the change will affect individual end-users should be considered ahead of the implementation.

Regarding the use of the five elements of the ADKAR Model as CSFs, Table 5 shows the five of eight CSFs for ERP software implementation identified by Altamony et

al. (2016). First, communication with end-users aligns with awareness of the need for change. Next, end-user involvement aligns with the desire to participate in the change. Third, end-user training aligns with ensuring individuals have the knowledge to implement change. Fourth, no CSF clearly aligns with the ability element. Finally, using a change management strategy aligns with the reinforcement element (Altamony et al., 2016; Hiatt, 2006).

Table 5.
Alignment of ERP CSFs identified by Altamony et al. (2016) to the five elements of the ADKAR Model.

Altamony et al. (2016) ERP CSFs	ADKAR Model Elements
End-user communication	Awareness of the need for change
End-user involvement, e.g., testing	Desire to support and participate in the change
End-user training	Knowledge of how to change
No ERP CSF alignment to ADKAR Model Element	Ability to implement required skills and behaviors
Change management strategy	Reinforcement to sustain the change

Note: Adapted from the "ADKAR Model elements" reprinted from *ADKAR: A model for change in business, government and our community (1st ed.),* by J. Hiatt, 2006, p. 2. Copyright 2016 by Prosci Learning Center Publications.

Critical Success Factors in ERP Upgrade Projects

In a qualitative study, Barth and Koch (2019) identified CSFs for ERP software implementation and upgrade projects in small, medium, and large organizations. Barth and Koch's (2019) study involved a literature review of CSFs for ERP software upgrade and implementation projects. In addition, the researchers interviewed 12 ERP software upgrade and implementation professionals who had recently completed an ERP software upgrade project. The interviewees lived in Austria and included 11 males and one female.

The interviewees held professional titles of chief executive officer (CEO), chief information officer (CIO), ERP software consultant, and IT project manager. The interviews were open-ended and included semi-structured questions that were asked in person, via Skype and telephone. The purpose of Barth and Koch's (2019) study was to identify the objectives of ERP software upgrade projects, the required CSFs to achieve those objectives, and if the CSFs of ERP software upgrade and implementation projects differ.

Barth and Koch (2019) found that 14 success factors are critical for ERP software upgrade projects. The 14 factors were derived by analyzing information collected from the interviews. The 14 CSFs for upgrades included project management, external support, ERP software teams, multiple system landscape, system testing, communication, key user integration, lessons learned, stick to the standard, top management support, resources and focus, change management, data and code cleansing, and the use of new potentials (Barth & Koch, 2019). While considerable overlap exists between the CSFs in ERP software upgrade projects and implementation, Barth and Koch (2019) found differences between the CSFs for upgrades versus implementations. For example, the following CSFs are considered more critical for ERP software upgrades than ERP software implementations: Multiple system landscape, key user integration, stick to the standard, resources and focus, data and code cleansing, and use of new potentials (Barth & Koch, 2019).

The research findings cannot be generalized to different parts of the world because the interviews occurred only with Austrian participants. More countries could be included in future studies to evaluate cultural differences relative to CSFs. Another

disadvantage of the study was gender bias because there was only one female participant. Lastly, the data were obtained through qualitative interviews with a small study sample, thus not generalizable to larger populations (Barth & Koch, 2019).

Regarding the use of the five elements of the ADKAR Model as CSFs, Table 6 aligns six of 14 CSFs for ERP software implementations identified by Barth and Koch (2019). First, communicating and completing a business plan and vision align with awareness of the need for change. Next, top management support and key user integration align with desire to participate in the change. Third, user training and education align with knowledge of how to change. Finally, CSFs were not provided that align with ability and reinforcement (Barth & Koch, 2019; Hiatt, 2006).

Here is the list of CSFs identified by Barth and Koch (2019):

1. Project management;
2. External support;
3. ERP software teams;
4. Multiple system landscape;
5. System testing;
6. Communication;
7. Key user integration;
8. Lessons learned;
9. Stick to the standard;
10. Top management support;
11. Resources and focus;

12. Change management;

13. Data and code cleansing; and

14. The use of new potentials.

Table 6.
Alignment of ERP CSFs identified by Barth and Koch (2019) to the five elements of the ADKAR Model.

Barth and Koch (2019) ERP CSFs	ADKAR Model Elements
Communication, Business plan and vision	Awareness of the need for change
Key user integration, External support, Top management support	Desire to support and participate in the change
User training and education, Lessons learned	Knowledge of how to change
No ERP CSF alignment to ADKAR Model Element	Ability to implement required skills and behaviors
Change management, Stick to the Standard	Reinforcement to sustain the change

Note: Adapted from the "ADKAR Model elements" reprinted from *ADKAR: A model for change in business, government and our community (1st ed.),* by J. Hiatt, 2006, p. 2. Copyright 2016 by Prosci Learning Center Publications.

The Effects of the Critical Success Factors for Enterprise Resource Planning Implementation

Researchers have recently studied ERP software implementation CSFs in computer-based information systems (CBIS). For example, using a case study design, Fadelelmoula (2018) examined the effects of six CSFs when implementing an ERP software in a university in Saudi Arabia. Fadelelmoula (2018) observed that much research was conducted to determine which CSFs mitigate and prevent implementation failures; however, very little research has been conducted to assess the effects of CSFs on

organizations' benefits after implementation. Fadelelmoula (2018) conducted a case study at a single university to determine the adoption of implementation by crucial employee functions. Data collection included a two-part questionnaire on the most frequently used measurement items in ERP software implementation. The first part of the questionnaire collected respondent information, and the second part grouped measurement items by model construct. The study population consisted of university stakeholders, including employees, teaching staff, and administrators. The sample population consisted of 219 participants (Fadelelmoula, 2018).

Fadelelmoula (2018) identified six CSFs relative to the comprehensive attainment of three crucial employee functions of CBISs. The six CSFs included top management support, training, project management, technical resources, business process reengineering (BPR), and consultant support. The three crucial employee functions of CBISs included supporting business processes, improving decision-making processes, and ensuring survival (Fadelelmoula, 2018). Because the six CSFs influenced the comprehensive achievement of the three crucial employee functions of CBISs, Fadelelmoula (2018) concluded that an organization should use these CSFs to achieve the three crucial employee functions of CBISs after a change implementation. Fadelelmoula's (2018) findings suggest that top managers and other critical stakeholders should manage the implementation project using the CSFs to achieve the promised ERP software benefits and CBIS roles.

Here is the list of CSFs identified by Fadelelmoula (2018):

1. Top management support;

2. Training;
3. Project management;
4. Technical resources;
5. Business process reengineering (BPR); and
6. Consultant support.

Regarding the use of the five elements of the ADKAR Model as CSFs, Table 7 aligns with two of six CSFs for ERP software implementation identified by Fadelelmoula (2018). First, there is no CSF provided that aligns with awareness of the need for change. Next, top management support aligns with the desire to participate in the change. Third, end-user training is provided and aligns with knowledge of how to change. Finally, there is no alignment of CSFs with the final two ADKAR Model elements, ability and reinforcement (Fadelelmoula, 2018; Hiatt, 2006).

Table 7.
Alignment of ERP CSFs identified by Fadelelmoula (2018) to the five elements of the ADKAR Model.

Fadelelmoula's (2018) ERP CSFs	ADKAR Model Elements
No ERP CSF alignment to ADKAR Model Element	Awareness of the need for change
Top management support	Desire to support and participate in the change
End user training	Knowledge of how to change
No ERP CSF alignment to ADKAR Model Element	Ability to implement required skills and behaviors
No ERP CSF alignment to ADKAR Model Element	Reinforcement to sustain the change

Note: Adapted from the "ADKAR Model elements" reprinted from *ADKAR: A model for change in business, government and our community (1st ed.),* by J. Hiatt, 2006, p. 2.

A Primary Human Critical Success Factors Model for ERP System Implementation

Researchers have also examined the human dimensions of CSFs. For example, Jenko and Roblek (2016) conducted a literature review and survey to examine human CSFs. Human CSFs are defined as the people-related factors that impact the outcome of an ERP software implementation project; examples include top management support, end-user involvement, and individuals' ability to demonstrate skills to use a new system (Jenko & Roblek, 2016). Jenko and Roblek (2016) examined whether human CSFs are the most critical group of CSFs. Also examined are primary human CSFs, which can be linked to a comprehensive research model and have a causal influence on traditional CSFs. In their literature review, Jenko and Roblek (2016) identified more than 53 non-human and human CSFs used to create a comprehensive model to address the impact of critical factors on successful ERP software implementation projects. Organizational and technical CSFs are considered non-human factors, and examples include organizational culture, team members' availability, ERP software architecture, data accuracy, and data availability (Jenko & Roblek, 2016). Human CSFs were grouped into four categories of primary human factors (PHFs), and the researchers created two-levels of primary human CSFs. The first level consists of four elements: competence, behavior, communication, and team composition. Examples of human CSFs include project team capability, knowledge transfer, support by top management, communication across departments, end-user involvement, end-user training, empowered decision-makers, a senior project champion, et cetera (Jenko & Roblek, 2016).

Here is the list of CSFs used by Jenko and Roblek (2016) in their study:

1. Project team capability;
2. Knowledge transfer;
3. Top management support;
4. Communication across departments;
5. End-user involvement;
6. End-user training;
7. Empowered decision-makers; and
8. A senior project champion.

Jenko and Roblek (2016) also mailed a 30-question survey to 58 experts employed by 35 Slovenian organizations. Eighteen experts completed the survey representing 21 companies. The survey asked participants to assess the impact of human CSFs on implementation in three areas using a Likert scale: ERP software implementations using the human CSFs; the quality of the CSFs groupings such as human, organizational, and technical; and the quality of 15 selected CSFs in an implementation project (Jenko & Roblek, 2016). Analysis of the data revealed that human CSFs are the most critical CSFs because they have the most substantial impact on an implementation project's success (Jenko & Roblek, 2016). Furthermore, out of the four human CSFs assessed, Jenko and Roblek (2016) found that competence and team composition were the only factors that had a significant positive statistical impact on project success.

The study also revealed that a project team could increase the likelihood of an ERP software implementation being successful when managing the project by human

CSFs (Jenko & Roblek, 2016). Additionally, the human CSFs model can help a project team to understand the importance and influence of human CSFs and predict and mitigate potential project risks. Jenko and Roblek's (2016) proposed model also facilitates research on developing human-oriented models of ERP software implementations.

Regarding the use of the five elements of the ADKAR Model as CSFs, Table 8 aligns six of eight 30 CSFs for ERP software implementation identified by Jenko and Roblek (2016). First, interdepartmental communication aligns with awareness of the need for change. Next, top management support, end-user involvement and support, senior project champion, and empowered decision-makers align with desire to participate in the change. Third, adequate end-user training aligns with ensuring individuals have the knowledge to implement a change. Finally, there is no alignment of the CSFs provided to the ADKAR Model elements of ability and reinforcement (Hiatt, 2006; Jenko & Roblek, 2016).

Table 8.
Alignment of ERP CSFs identified by Jenko and Roblek (2016) to the five elements of the ADKAR Model.

Jenko and Roblek's (2016) ERP CSFs	ADKAR Model Elements
Interdepartmental communication	Awareness of the need for change
Top management support, End user involvement and support, Senior project champion, Empowered decision makers	Desire to support and participate in the change
Adequate end user training, Knowledge transference	Knowledge of how to change
No ERP CSF alignment to ADKAR Model Element	Ability to implement required skills and behaviors
No ERP CSF alignment to ADKAR Model Element	Reinforcement to sustain the change

Note: Adapted from the "ADKAR Model elements" reprinted from *ADKAR: A model for change in business, government and our community (1st ed.),* by J. Hiatt, 2006, p. 2. Copyright 2016 by Prosci Learning Center Publications.

Analysing ERP Implementation Critical Success Factors for Small and Medium Enterprises

Jiwasiddi and Mondong (2018) analyzed the CSFs for ERP software implementation in Indonesia's small and medium enterprises (SMEs). The study was qualitative, and primary data were collected through interviews with eight Indonesian ERP software implementation experts and by documenting observations of an ERP software implementation project. Analysis of the data revealed these CSFs: clear goals and objectives, top management support and involvement, project management, user training, communication, balanced project teams, the involvement of end-users, and change management (Jiwasiddi & Mondong, 2018). Other research reviewed ranked the

top three CSFs as top management support, change management, and end-user training (Kiran & Reddy, 2019; Reitsma & Hilletofth, 2018). Top management support is the most important because leaders influence the organization's decision-making and emphasize delivering an ERP software according to specified requirements, including timeliness and staying within budget. The next CSF includes top management using a change management method, and the third CSF includes providing proper training to end-users (Jiwasiddi & Mondong, 2018).

Jiwasiddi and Mondong (2018) concluded that in addition to the three CSFs to successful implementation, assembling a team with a good understanding and capability to communicate with consultants helps achieve successful implementation. Jiwasiddi and Mondong (2018) recommended that a top management member oversee the implementation process. Top management should possess excellent decision-making skills and understand the ERP software well.

Here is the list of CSFs identified by Jiwasiddi and Mondong (2018):

1. Clear goals and objectives;
2. Top management support and involvement;
3. Project management;
4. User training;
5. Communication;
6. Balanced project teams;
7. Involvement of end-users; and
8. Change management.

Regarding the use of the five elements of the ADKAR Model as CSFs, Table 9 aligns six of eight CSFs for ERP software implementation identified by Jiwasiddi and Mondong (2018). First, developing clear goals and objectives and communicating to the enterprise align with awareness of the need for change. Next, top management support and involvement of end-users and stakeholders align with the desire to participate in the change. Third, user training aligns with knowledge of how to change. Next, a CSF was not provided, which aligns to ability. Finally, using a change management plan to sustain individual changes aligns with reinforcement (Hiatt, 2006; Jiwasiddi & Mondong, 2018).

Table 9.
Alignment of ERP CSFs identified by Jiwasiddi and Mondong (2018) to the five elements of the ADKAR Model.

Jiwasiddi and Mondong (2018) ERP CSFs	ADKAR Model Elements
Clear goals and objectives; Communication	Awareness of the need for change
Top management support and involvement; Involvement of end users and stakeholders	Desire to support and participate in the change
User training	Knowledge of how to change
No ERP CSF alignment to ADKAR Model Element	Ability to implement required skills and behaviors
Change management	Reinforcement to sustain the change

Note: Adapted from the "ADKAR Model elements" reprinted from *ADKAR: A model for change in business, government and our community (1st ed.),* by J. Hiatt, 2006, p. 2.

Critical Success Factors of ERP Implementation in SMEs

Researchers have also examined CSFs for ERP software implementation in various organizations (Barth & Koch, 2019; Jiwasiddi & Mondong, 2018; Kiran & Reddy, 2019). For example, Kiran and Reddy (2019) investigated ERP software implementation success and failure factors in small and medium enterprises. The research design included longitudinal analysis of CSF literature from 1998-2018. The researchers grouped their results into several ERP software implementation categories, including parameters of success, success factors, factors of failure, and technical challenges. Parameters of success included executing a project on schedule, within budget, and the subsequent realization of ERP software benefits (Kiran & Reddy, 2019).

Kiran and Reddy (2019) focused their literature review on five primary factors critical for successful ERP software implementation: organizational factors, top management support, BPR with minimal customization, communication to stakeholders, and selecting the right ERP software. First, organizational factors include a strong commitment by the organization, a substantial change management plan and procedures, and proper training for system end-users (Kiran & Reddy, 2019). Next, top management support means that organizational leaders must dedicate funding and personnel to the project. Third, BPR with minimal customization means that an ERP software should be implemented into the organization with as few changes as possible to take advantage of its benefits. Next, communication to all stakeholders is critical because everyone whom the change will impact must understand its purpose, benefits, and timeline. Finally, selecting the right ERP software is critical because it should align as much as possible

with the organization's existing business processes (Kiran & Reddy, 2019). Other CSFs identified but not explained were teamwork, business planning and organizational vision, managing the project, having a champion for the project, legacy system usage, testing and troubleshooting, and evaluation and monitoring (Kiran & Reddy, 2019).

Here is the list of CSFs identified by Kiran and Reddy (2019):

1. Organizational factors, e.g., change management plan;
2. Top management support;
3. BPR with minimal customization;
4. Communication to stakeholders; and
5. Selecting the right ERP system.

Kiran and Reddy's (2019) research provided ERP software implementation failure factors in addition to success factors. Failure factors include improperly managed resistance by employees, inadequate commitment from top-level management, insufficient end-user training, and scarce resources such as funding and project personnel. Additional failure factors include vague requirements definitions when determining ERP software selection criteria, unrealistic expectations of what the ERP software can deliver in terms of return-on-investment, selecting an ERP software that is not compatible with the organization's existing business processes, and change management procedures. Kiran and Reddy (2019) identified critical failure factors from their review and analysis of the literature. ERP software implementation in SMEs can be useful when factors critical for success are appropriately managed. On the other hand, when implementations

fail, the organization's critical implementation factors can often be traced, which the project team did not manage properly.

Regarding the use of the five elements of the ADKAR Model as CSFs, Table 10 aligns four of five CSFs for ERP software implementation identified by Kiran and Reddy (2019). First, communication to stakeholders aligns with awareness of the need for change. Next, top management support aligns with the desire to participate in the change. Third, training for end-users aligns with knowledge of how to change. Next, change management plan aligns with the ability element. Finally, no CSFs were not provided, which align with reinforcement (Hiatt, 2006; Kiran & Reddy, 2019).

Table 10.
Alignment of ERP CSFs identified by Kiran and Reddy (2019) to the five elements of the ADKAR Model.

Kiran and Reddy (2019) ERP CSFs	ADKAR Model Elements
Communication to stakeholders	Awareness of the need for change
Top management support	Desire to support and participate in the change
Training for end users	Knowledge of how to change
No ERP CSF alignment to ADKAR Model Element	Ability to implement required skills and behaviors
Change management plan	Reinforcement to sustain the change

Note: Adapted from the "ADKAR Model elements" reprinted from *ADKAR: A model for change in business, government and our community (1st ed.),* by J. Hiatt, 2006, p. 2. Copyright 2016 by Prosci Learning Center Publications.

Critical Success Factors for ERP System Implementation: A User Perspective

Researchers have also examined CSFs concerning end-users. For example, Reitsma and Hilletofth (2018) evaluated ERP software implementation factors from the

end-user perspective. Getting end-users involved in implementing ERP software may lead to effective system implementation and ongoing sustainment of change (Reitsma & Hilletofth, 2018). Reitsma and Hilletofth (2018) reviewed CSF literature to determine essential CSFs. The researchers derived 13 CSFs from the literature review. Survey data were collected by administering a questionnaire about the 13 CSFs. The survey was administered to 127 ERP software users employed by a German manufacturer, which had successfully implemented a new ERP software in 2011. The employees were asked to rank the 13 CSFs in order of importance on a Likert scale from 1 to 5 (1 = not important and 5 = very important).

The results of the questionnaire indicated that seven of the 13 CSFs were ranked in the following order as most important by the users, and they agreed with the importance determined by the literature: project team, technical possibilities, strategic decision-making, training and education, minimum customization, software testing, and performance measurement. The least important CSFs were top management support, communication, project management, project support, organizational change management, and business process alignment (Reitsma & Hilletofth, 2018).

Here is the list of CSFs identified by Reitsma and Hilletofth (2018):

1. Project team;
2. Technical possibilities;
3. Strategic decision-making;
4. Training and education;
5. Minimum customization;

6. Software testing;
7. Performance management;
8. Top management support;
9. Communication;
10. Project management;
11. Project support;
12. Organizational change management (OCM); and
13. Business process realignment (BPR).

First, users stated that the essential CSF is a project team with a project champion to ensure the project receives proper funding and meets the organization's technical requirements (Reitsma & Hilletofth, 2018). Next, users stated that technical possibilities are the second most critical factor because ERP software must be evaluated based on its unique needs. Next, users noted that strategic decision-making is the third most critical factor because senior leaders must strategically implement a new ERP software. If they do not, then employees will be concerned about how the new system will affect them. For training and education, end-users stated that these are the fourth most critical factor because they must be trained to use the new ERP software to perform their job properly. For minimum customization, users stated that it is the fifth most critical factor because customizing an ERP software must be kept to a minimum. All departments must have access to the same data across the enterprise. For software testing, users stated that it is the sixth most critical factor because thorough and rigorous testing of an ERP software must occur before implementation into the organization. Finally, for performance

measurement, users stated that it is the seventh most critical factor because performance measures must manage expectations and achieve stated business objectives (Reitsma & Hilletofth, 2018).

Whereas Reitsma and Hilletofth's (2018) literature review indicated that organizational change management (OCM) and top management involvement is critical, ERP software end-users do not consider these factors essential during implementation. For OCM, users stated that OCM techniques and tools are not necessary to implement a new ERP software successfully. For top management involvement, users said they are happy to improve their work performance using a new ERP software if management adequately supports them.

Regarding the use of the five elements of the ADKAR Model as CSFs, Table 11 aligns four of five CSFs for ERP software implementation identified by Reitsma and Hilletofth (2018). First, strategic decision-making and communication to users align with awareness of the need for change. Next, top management involvement and project support align with the desire to participate in the change. Third, education and training for users is provided and aligns with knowledge of how to change. Next, there is no CSF provided, which aligns with ability. Finally, performance measures for individual and organizations in relation to milestones and objectives align with reinforcement (Reitsma & Hilletofth, 2018; Hiatt, 2006).

Table 11.
Alignment of ERP CSFs identified by Reitsma and Hilletofth (2018) to five elements of the ADKAR Model.

Reitsma and Hilletofth's (2018) ERP CSFs	ADKAR Model Elements
Strategic decision-making, Communication	Awareness of the need for change
Top management involvement, Project support	Desire to support and participate in the change
Education and training for users	Knowledge of how to change
No ERP CSF alignment to ADKAR Model Element	Ability to implement required skills and behaviors
Performance measurement; Organizational change management	Reinforcement to sustain the change

Note: Adapted from the "ADKAR Model elements" reprinted from *ADKAR: A model for change in business, government and our community (1st ed.),* by J. Hiatt, 2006, p. 2. Copyright 2016 by Prosci Learning Center Publications.

Enterprise Resource Planning Implementation Procedures and Critical Success Factors

In their seminal study, Umble, Haft, and Umble (2003) used a qualitative case study research method to examine a large manufacturing company to identify the implementation procedures and CSFs in implementing new ERP software. Umble et al. (2003) found nine factors critical to ERP software implementation success: clear understanding of strategic goals, a commitment by top managers, project management excellence, organizational change management, a top-notch implementation team, data accuracy, end-user education and training, focused performance measures, and multi-site issues. Following are CSFs one through five. First, the entire enterprise must understand why the implementation is occurring and the new system's actual improvements to the

organization. Next, top management must demonstrate support for the implementation project, and a respected company executive must champion the project. Third, the project must be managed excellently throughout the project's lifecycle. Next, the ERP software implementation will impact an organization's business processes, policies, and people, necessitating effective organizational change management. Fifth, the project should comprise an excellent cross-functional implementation team, whose members are important because they are entrusted with determining and accomplishing the milestones and tasks to complete the project (Umble et al., 2003).

Following are Umble et al.'s (2003) CSFs six through nine. Sixth, the implementation team must communicate the criticality of data accuracy and proper data entry procedures to end-users. Seventh, training end-users on using the new ERP software is considered one of the most critical factors for implementation success. Employees must be given the knowledge required to use the new system successfully. Eighth, performance measures must be determined and used to know if improvements have occurred, which benefits everyone when comparisons can be made between the old and new systems. Last, additional considerations are necessary when an ERP software must be implemented to multiple sites, which is essential because organizations differ by location and tend to be unique. Therefore, organizations should carefully consider the cutover strategy (Umble et al., 2003).

Here is the list of CSFs identified by Umble et al. (2003):

1. A clear understanding of strategic goals;
2. Top management support;

3. Project management excellence;
4. Organizational change management (OCM);
5. A top-notch implementation team;
6. Data accuracy;
7. End-user education and training;
8. Focused performance measures; and
9. Multi-site issues.

Umble et al. (2003) concluded that a successful ERP software implementation could reduce operating costs, create more accurate demand prediction, speed up the production cycle, and improve customer service. Moreover, clearly defined project objectives and a clearly defined plan will help avoid stretching an ERP program budget. Umble et al. (2003) also found that chief executives did not fully understand that implementing a new ERP software may change an organization's work processes and culture. The study was conducted on a single organization, and thus the findings have a minimal basis for generalization.

Regarding the use of the five elements of the ADKAR Model as CSFs, Table 12 aligns six of nine CSFs for ERP software implementation identified by Umble et al. (2003). First, a clear understanding of strategic goals aligns with awareness of the need for change. Next, a commitment by top management aligns with the desire to participate in the change. Third, extensive education and training aligned with knowledge of how to change. Next, no CSF aligns with the ability element of the ADKAR Model. Finally,

using an organizational change management plan and focused performance measures align to reinforcement of the change. (Hiatt, 2006; Umble et al., 2003).

Table 12.
Alignment of ERP CSFs identified by Umble et al. (2003) to the five elements of the ADKAR Model.

Umble et al. (2003) ERP CSFs	ADKAR Model Elements
Clear understanding of strategic goals	Awareness of the need for change
Support by top management	Desire to support and participate in the change
End-user education and training	Knowledge of how to change
No ERP CSF alignment to ADKAR Model Element	Ability to implement required skills and behaviors
Organizational change management Focused performance measures	Reinforcement to sustain the change

Note: Adapted from the "ADKAR Model elements" reprinted from *ADKAR: A model for change in business, government and our community (1st ed.),* by J. Hiatt, 2006, p. 2. Copyright 2016 by Prosci Learning Center Publications.

Critical Success Factors for Integrated Library System Implementation

Researchers have studied ERP software implementation success factors in various organizational settings, including university libraries (Yeh & Walter, 2016) and automotive parts manufacturers (Zouaghi & Laghouag, 2016). For example, Yeh and Walter (2016) conducted a qualitative case study of four university libraries implementing a new integrated library system (ILS). The purpose of the research was to discover the factors that contribute to a smooth transition when implementing a new ILS and discover what constitutes a successful implementation project. Yeh and Walter (2016) used a two-step research process. First, a review of the literature produced a list of 90 CSFs. Yeh and Walter (2016) created a list of the ten most essential CSFs for an ILS

implementation. Second, ten CSFs were used to guide semi-structured interviews using open-ended questions. The study participants included up to 20 prior team members from the four university libraries that implemented a new ILS within the last three years (Yeh & Walter, 2016).

Yeh and Walter (2016) discovered that implementing an ERP software, referred to as an ILS in the article, affects the whole library operation from one generation to the next. The change process is rarely consistent and can fall behind schedule because of its complexity and scale; moreover, changing to a new system leads to an academic library's financial and personnel costs (Yeh & Walter, 2016). Therefore, to have a successful implementation outcome, there should be a careful application of critical factors. Based on their data analysis, Yeh and Walter (2016) categorized their list of CSFs as strategic and tactical. There were five strategic CSFs: top management, support from vendors, involvement by staff or end-users, communication, and managing end-user emotions. The four tactical CSFs included project team competence, managing and tracking the project, data analysis and conversion, and end-user training. Yeh and Walter (2016) did not state why they did not classify "careful selection process," the first of the ten CSFs, as strategic or tactical.

Here is the list of CSFs identified by Yeh and Walter (2016):

1. Top management support;
2. Vendor support;
3. Involvement by staff or end-users;
4. Communication;

5. Managing end-user emotions;
6. Project team competence;
7. Managing and tracking the project;
8. Analysis and conversion of data;
9. End-user training; and
10. Careful ERP selection process.

Yeh and Walter (2016) also provided several conclusions. First, a team should have a competent project team to implement a new ILS successfully. Next, communication should also be across functional and departmental boundaries, as it is essential for project success. Last, there should be clear and meaningful project objectives and a formal implementation plan. When implementing a commercial-the off-shelf ERP software in a university library system, decision-makers should understand that outcomes may differ radically from one library to another. Therefore, to ensure successful implementation, critical factors must be carefully managed and applied throughout a project's lifecycle (Yeh & Walter, 2016).

Regarding the use of the five elements of the ADKAR Model as CSFs, Table 13 aligns five of ten CSFs for ERP software implementation identified by Yeh and Walter (2016). First, interdepartmental communication aligns with awareness of the need for change. Next, top management involvement and staff user involvement and support align with a desire to participate in the change. Third, staff user education and training align to ensuring individuals have the knowledge to implement a change. Next, there is no alignment to the ADKAR ability element. Finally, performance management tracking

during a project can be used during an implementation project's reinforcement or sustainment phase (Hiatt, 2006; Yeh & Walter, 2016).

Table 13.
Alignment of ERP CSFs identified by Yeh and Walter (2016) to the five elements of the ADKAR Model.

Yeh and Walter's (2016) ERP CSFs	ADKAR Model Elements
Interdepartmental communication	Awareness of the need for change
Top management support, Staff end-user involvement	Desire to support and participate in the change
Staff end-user education and training	Knowledge of how to change
No ERP CSF alignment to ADKAR Model Element	Ability to implement required skills and behaviors
Performance management and tracking	Reinforcement to sustain the change

Note: Adapted from the "ADKAR Model elements" reprinted from *ADKAR: A model for change in business, government and our community (1st ed.),* by J. Hiatt, 2006, p. 2. Copyright 2016 by Prosci Learning Center Publications.

Aligning Key Success Factors to Enterprise Resource Planning Implementation Strategy

Zouaghi and Laghouag (2016) conducted a case study of an automotive parts manufacturer to examine the CSFs, also known as key success factors (KSFs), that align best with either a gradual implementation strategy (GIS) or an overall implementation strategy (OIS). Zouaghi and Laghouag's (2016) study included a mixed-methods approach and employed open-ended exploratory interviews and a survey distributed to managers. A GIS method involves implementing a new ERP software gradually in phases, i.e., a phased approach. An OIS method involves implementing new ERP software by a predetermined date, i.e., a "big bang" or "overnight cutover" approach (Zouaghi & Laghouag, 2016).

Zouaghi and Laghouag (2016) used 10 KSFs from the Standish Group, a research advisory firm, to assess risks when managing an implementation project. The 10 KSFs are: user involvement during implementation, top management support, a clear statement of requirements, proper planning, realistic expectations, smaller project milestones, the competence of the project team, project ownership, vision and objectives are clear, and a project team's focus and motivation (Zouaghi & Laghouag, 2016; see also Cobb, 1996). Zouaghi and Laghouag (2016) analyzed the advantages and disadvantages of the OIS and GIS methods. The GIS method can help an organization spread risk over a more extended period and direct them to less risky enterprise segments. Zouaghi and Laghouag (2016) found the following advantages of GIS: GIS enables resource allocation over an implementation lifecycle and retains the old system to enable fallback if the new system does not produce intended results. Disadvantages include that the implementation lifecycle tends to be lengthy, leads to instability because of difficulty in overcoming intermediate challenges, and is cost prohibitive (Zouaghi & Laghouag, 2016).

Here is the list of CSFs identified by Zouaghi and Laghouag (2016):

1. User involvement during the implementation;
2. Top management support;
3. A clear statement of requirements;
4. Proper planning;
5. Realistic expectations;
6. Smaller project milestones;
7. Project team competence;

8. Project ownership;
9. Clear vision and objectives; and
10. Project team's focus and motivation.

When the OIS method is selected, all functional users across the enterprise must be involved on the "cutover" day, when the new implementation begins; however, OIS was determined to be a high-risk implementation method (Zouaghi & Laghouag, 2016). Additionally, this method has two critical aspects: cross-functional needs assessments and global risk assessments must occur during all aspects of the project's lifecycle. The project team must be cross-functional to represent the community of end-users. Zouaghi and Laghouag (2016) also found the following advantages of OIS: reduced transition time from the legacy or previous system to the new ERP software and no need for intermediate programming patches. Disadvantages included that the implementation tends to be complicated; has small margins for error; user training tends to be slow; and requires users to be operational immediately (Zouaghi & Laghouag, 2016).

Zouaghi and Laghouag (2016) also found three challenging KSFs, regardless of the implementation method. These challenging KSFs include writing a clear statement of requirements, project ownership, and a project team's focus and motivation. Zouaghi and Laghouag (2016) concluded that requirements should be determined before chartering a project and should contain an analysis of the current state, a developed future state, and a business case that justifies the change. Whereas the determination of requirements is a challenge, the more difficult part is ensuring the ERP software is configured according to those predetermined requirements, and according to the research, this is an area where

many project teams falter (Jenko & Roblek, 2016; Yeh & Walter, 2016). Project ownership is also a risk when team roles and responsibilities and accountability are not appropriately determined (Zouaghi & Laghouag, 2016). Incentives should motivate team members and increase individual and collective project commitment (Zouaghi & Laghouag, 2016). Additionally, project team focus and motivation are risks when quantifiable deliverables are not created and communicated to individuals (Zouaghi & Laghouag, 2016).

Regarding the use of the five elements of the ADKAR Model as CSFs, Table 14 aligns four of ten CSFs for ERP software implementation identified by Zouaghi and Laghouag (2016). First, clear vision and objectives and realistic expectations align with awareness of the need for change. Next, top management support and user involvement align with the desire to participate in the change. Finally, there is no alignment of CSFs provided to the final ADKAR Model elements of knowledge, ability, and reinforcement (Zouaghi & Laghouag, 2016; Hiatt, 2006).

Table 14.
Alignment of ERP CSFs identified by Zouaghi and Laghouag (2016) to the five elements of the ADKAR Model.

Zouaghi and Laghouag's (2016) ERP CSFs	ADKAR Model Elements
Clear vision and objectives; realistic expectations	Awareness of the need for change
Top management support; users' involvement	Desire to support and participate in the change
No ERP CSF alignment to ADKAR Model Element	Knowledge of how to change
No ERP CSF alignment to ADKAR Model Element	Ability to implement required skills and behaviors
No ERP CSF alignment to ADKAR Model Element	Reinforcement to sustain the change

Note: Adapted from the "ADKAR Model elements" reprinted from *ADKAR: A model for change in business, government and our community (1st ed.),* by J. Hiatt, 2006, p. 2. Copyright 2016 by Prosci Learning Center Publications.

Synthesis of Findings from the Research

As mentioned, there are five stages of the ADKAR Model, a common framework for explaining the individual change process, which includes *awareness, desire, knowledge, ability*, and *reinforcement*. This review of recent research includes literature on the CSFs for ERP software implementation and the five elements of the ADKAR Model. Surprisingly, the literature is limited regarding the use of the five elements of the ADKAR Model as CSFs to implement ERP software.

Several findings emerge from the literature regarding the use of the five elements of the ADKAR Model as CSFs for ERP software implementation. First, as depicted in Table 15 (p. 143) regarding the awareness element, seven of the ten (70%) of the authors

reviewed provide communication as a CSF. Next, regarding the desire element, as depicted in Table 16 (p. 144), ten of the ten (100%) authors reviewed provide "top management support" or a similarly worded factor as a CSF. Third, regarding the knowledge element, as depicted in Table 17 (p. 145), eight of the ten (80%) authors reviewed provide "end-user training" or a similarly worded factor as a CSF. Next, regarding the ability element, as depicted in Table 18 (p. 146), two of the ten (20%) authors reviewed provide "coaching by supervisors" or a similarly worded factor as a CSF. Fifth, regarding the reinforcement element, as depicted in Table 19 (p. 147), ten of the ten (100%) authors reviewed provide "management of the project" or a similarly worded factor as a CSF. Last, Table 20 (p. 148) shows the reviewed literature and the corresponding CSFs for ERP software implementation, which do not directly align with any element of the ADKAR Model. In summary, there is a need to learn more from the literature about the use of ability as a CSF for ERP software implementation.

Implementing ERP software tends to be costly, complicated, time-consuming, and brings about organizational culture changes. Therefore, CSFs are essential considerations. In this section about CSFs for ERP software implementation, ten recent articles were reviewed. The most frequently occurring CSFs from this review were project management and include project leadership, project management excellence, and implementation team. Interesting, however, is that project management terms do not align with the five elements of the ADKAR Model. The CSFs occurring with the second through seventh frequency are top management support, communication, end-user training, end-user involvement, performance measures, and clear vision and objectives.

Here is the list of most frequently occurring CSFs for ERP software implementation from the reviewed literature.

1. Project management;
2. Top management support;
3. Communication;
4. End-user training;
5. End-user involvement;
6. Performance measures; and
7. Clear vision and objectives.

The importance of these CSFs and others is how they align with the five elements of the ADKAR Model to implement ERP software.

CHAPTER III

RESEARCH METHODOLOGY

This section outlines the research design, a theoretical perspective, participants, data collection, instruments, and data analysis related to the study and provides a summary.

The purpose of this qualitative, phenomenological study was to explore the attitudes of civilian (non-military) U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model (*awareness*, *desire*, *knowledge*, *ability*, and *reinforcement*) as critical success factors (CSFs) to implement enterprise resource planning (ERP) software. A phenomenological study design was deemed most appropriate to understand the attitudes of U.S. Air Force supply chain managers because the phenomenon under investigation is relatively new. A sample of 11 participants was selected for interviews from a population of approximately 200 supply chain managers employed by the U.S. Air Force at Hill Air Force Base (AFB), Robins AFB, and Tinker AFB. Each participant was asked a set of open-ended questions from the interview guide (Appendix D). Additionally, the interviews were designed to explore how the five elements of the ADKAR Model may enable U.S. Air Force supply chain managers to

prepare and support their employees before and after an ERP implementation and to obtain recommendations to eliminate gaps between the CSFs for ERP software implementation and the five elements of the ADKAR Model.

Theoretical Perspective

Epistemology

This research project employed a four-element construction based on Crotty's (1998) contributions to social research methodology (Table 21). Crotty (1998) offers a convenient approach to build a research project by answering four primary questions. First, what theory of knowledge, e.g., epistemology, is used to view the world and create meaning? Next, what theoretical lens functions as the foundation for the chosen research method? Third, what research process is used to oversee the choice of research method? Last, what research techniques or procedures will be used by a researcher to gather and analyze data? (Crotty, 1998).

The epistemology for this study is social constructivism. Creswell (2009) discusses Crotty's (1998) research about social constructivism and says that people construct meaning because of interacting with the reality in which they exist, i.e., their "context." A qualitative researcher's intent with this theoretical perspective is to step into the context in which the participant exists because doing so can provide rich, thematic, and valuable information about their environment.

The theoretical perspective of this study is interpretivism. Interpretivism, as a perspective, can enable a researcher to understand and explain the unique realities of the

research participants. Interpretivism is different than positivism. Interpretivism is a method of interpreting data, which is not required to strictly adhere to the scientific inquiry method such as positivism (Crotty, 1998). Instead, this research aimed to accurately explain the findings derived by interviewing the participants and the researcher's personal experience as a U.S. Air Force supply chain manager and former naval officer.

The research methodology of this study is qualitative phenomenological research. The phenomenological method can be designed to further knowledge about virtually any topic and is especially popular for its utility in the social sciences such as education, law, psychology, political science, et cetera. Cresswell (2007) says that a phenomenological study "describes the meaning for several individuals of their *lived experiences* of a concept or phenomenon" (p. 57). This study's primary outcome was to reduce the lived experiences of the U.S. Air Force supply chain managers with ERP software implementations down to their universal essence (Cresswell, 2007).

The research method of this study employed qualitative interviews. The interviews were conducted with 11 U.S. Air Force supply chain managers at Hill Air Force Base (AFB) in Ogden, Utah; Robins AFB in Warner-Robbins, Georgia; or Tinker AFB in Oklahoma City, Oklahoma. Each participant was asked a set of open-ended questions from an interview guide. Interviews were considered appropriate for this study given the category of the evidence sought and the exact type of documentation compulsory to determine the participants' attitudes about ERP software implementation. Furthermore, the interviews were translated into various contexts, ideas, themes,

meanings, attitudes, and opinions from the research participants in the study (Cresswell, 2009).

Table 21.
Research Philosophy in Four Elements: Social Constructionism, Interpretivism, Phenomenological Research, and Interviews.

Epistemology	Theoretical Perspective	Research Methodology	Research Method
Element #1 Social Constructionism	Element #2 Interpretivism	Element #3 Phenomenological Research	Element #4 Interviews

Note: Adapted from *The foundations of social research: Meaning and perspective in the research process,* by M. Crotty. Copyright 1998 Michael Crotty.

Research Questions

The following broad research questions led the focus of this study. These questions formed the basis for the interview questions with which participants and the researcher interacted. The central research question was:

> RQ1. What are the attitudes of current U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model as CSFs to implement ERP software?

To provide additional guidance for this research, the topic of the central research question was divided into three focus areas, which were indicated by the three research sub-questions, as follows:

SQ1. How can using the five elements of the ADKAR Model as CSFs to implement ERP software enable U.S. Air Force supply chain managers to prepare their employees before an ERP software implementation?

SQ2. How can using the five elements of the ADKAR Model as CSFs to implement ERP software enable U.S. Air Force supply chain managers to support their employees after an ERP software implementation?

SQ3. What are the recommendations of current U.S. Air Force supply chain managers to eliminate gaps between the CSFs for ERP software implementation and the five elements of the ADKAR Model?

Before the researcher asked the questions from the interview guide (Appendix D), each participant received the interview guide before the interview to use as a reference during the interview. If requested, each participant received a verbal explanation from the researcher of the CSFs and the five elements of the ADKAR Model as applied to the context of an ERP software implementation. The CSFs and five elements identified in the Definitions section of the Introduction were read aloud to the interview participant, if requested. The explanation portion of the interview lasted less than five minutes.

Population and Sample

Population

This study's population, from which to draw a sample, was approximately 200 civilian (non-military) persons employed by the U.S. Air Force at Hill Air Force Base (AFB), Robins AFB, or Tinker AFB in the profession of supply chain management. The

population was selected because it represents persons who currently implement change management initiatives related to 448th Supply Chain Management Wing (448 SCMW) software implementations. In addition, this population possesses in-depth knowledge about how current ERP software implementations impact 448 SCMW employees or colleagues as individuals, thus connecting the research questions to this population.

To be eligible for inclusion in this study, potential participants were required to meet the following criteria: (1) must be civilian (non-military) employees employed by the U.S. Department of the Air Force at Hill AFB, Robins AFB, or Tinker AFB; (2) must be employed in the 448 SCMW organization; and (3) must be currently or previously employed as a supervisor or manager in U.S. Air Force supply chain management.

Sample Size and Method

Cresswell (1998) recommends that phenomenological studies have between five to 25 interview participants. Whereas up to of 25 interview participants were the target sample size population determined in the research proposal stage, 12 candidates were contacted, and 11 candidates agreed to interviews and participated, equating to a ninety-two percent (92%) participation rate. A sample size of 11 participants is justifiable because the target population was homogeneous and yielded meaningful themes and useful interpretations (Cresswell, 2007; Guest et al., 2006; Polkinghorne, 1989). Information about how saturation was determined is available in the "Data Saturation" section of the Findings chapter of this dissertation (p. 93).

The sampling method used by the researcher in this study was purposive and non-random. Because the researcher is employed as a U.S. Air Force supply chain manager in

the 448 SCMW at Tinker AFB, the researcher had authorized access to the 448 SCMW organizational charts and prospective research participants. The researcher selected the participant sample deliberately using two methods: (1) from the 448 SCMW candidate population listed on the charts and (2) the researcher's knowledge of the candidates' experience with implementing software initiatives. This sample size determination method may be considered judgment sampling or authoritative sampling. For example, Patton (2002) writes that there are "no rules for sample size in qualitative inquiry" (p. 244). To be sure, Patton (2002) posits that sample populations can be determined by several judgmental factors in a researcher's opinion, e.g., the purpose of a study, its usefulness, sample credibility, and what can be accomplished given time and resource constraints. Denscombe (2007) says this about selecting participants: "Given what I already know about the research topic and about the range of people or events being studied, who or what is likely to provide the best information?" (p. 17). While judgment sampling may limit a researcher's ability to generalize results, Gay, Mills, and Airasian (2011) support Patton's (2002) and Denscombe's (2007) postulations that a researcher's knowledge and experience guide the sample selection process, which in the researcher's opinion was a suitable protocol for this study. In summary, the researcher determined that a purposive, homogeneous, and non-random selection of participants would be most appropriate for this study's purpose.

Contact Procedures

Participants were contacted via their personal email addresses or personal phone numbers to schedule a remote one-hour appointment with the researcher. Each

appointment was confirmed with a Microsoft Outlook meeting invitation delivered via email. The date, time, and purpose of the appointment was specified in the invitation email. In addition, interviews were scheduled and conducted at the participant's convenience after the normal working hours of 7:00 AM to 4:00 PM. Finally, the researcher complied with U.S. Air Force policy and did not contact the employees through official U.S. government email addresses or phone numbers to solicit research participants.

Research Instrumentation

The primary research instrument was an interview guide containing open-ended questions (Appendix D). Interview questions were written to elicit the attitudes of U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model as CSFs to implement ERP software. The questions were also developed to identify how the five ADKAR elements could be used to prepare employees before implementation, to provide support to employees after implementation, and to obtain recommendations from supply chain managers to eliminate gaps between the CSFs for ERP software implementation and the five elements of the ADKAR Model.

Oklahoma State University Institutional Review Board

Another researcher’s responsibility is to obtain permission and approval to enter a participant’s setting and secure permissions to interview the participants for any proposed research. To start the process, the Oklahoma State University Institutional Review Board (IRB) requires completion and submission of the *Application for Review of Human Subjects Research*. This application form requires information about the purpose and

problem in a proposed study; a description of the study; detailed descriptions of any methods, procedures, interventions, or manipulations of human subjects; explanations and justifications if any inducements will be offered to participants; et cetera. The IRB also requires written consent from a participant granting permission to the researcher to commence the interview.

The researcher began recruiting and conducting interviews after the OSU IRB issued an approval letter (Appendix A) for this research project. Each participant was provided a participant letter (Appendix B) via email before interviews. Each participant was also provided an informed consent document (Appendix C), which explained the purpose of the research, procedures, risks of participation, a confidentiality statement, a non-compensation statement, a benefits statement, participant rights, and contact information for the researcher.

Interview Protocol

The interviews followed standard practices to acquire data. After the researcher verified that a participant provided a signed consent document, this was the permission needed to begin an interview. The interview protocol included properly beginning each interview by establishing rapport, asking questions to get data, and ending the interview according to the timeline promised beforehand, 60 minutes or less. Once completed, each participant was thanked for their contribution (Dawson, 2009). The researcher also provided a copy of the interview transcripts to the participants. Each participant will also receive a copy of the dissertation upon acceptance and approval by the committee and graduate college.

Data Recording Procedures

Data were collected by conducting one-on-one interviews using a set of interview questions. The interviews were audio-recorded using an Apple iPad. Because face-to-face interviews were not prudent at the time of the interviews (June 2021) due to the COVID-19 pandemic, participants were interviewed by telephone.

Strengths and Weaknesses of Data Collected

There are numerous potential strong and weak points in any study. Data collected through interviews can be robust if, for example, the researcher is confident, poised, and composed. Confidence tends to put most people at ease. This type of researcher tends to handle sensitive issues as they arise and phrase and negotiate questions the participant may not understand (Dawson, 2009).

A few weak data collection points may involve how a researcher sets up an interview project. The interview setup process occurs before, during, and after the interview. For example, this study could be identified as weak if the researcher did not write and communicate understandable interview instructions to a participant. If a person does not understand a question, then their answer will not be accurate. Also, data could be weak if the researcher and participant's relationship is not professional (Dawson, 2009). For example, tension or anxiety produced by the researcher may put the participant in a similar state. If so, the participant may shut down, thus ending any further hope of valuable cooperation and fact-finding for the study.

Data Analysis

Procedures for Analysis

The general data analysis procedures set forth by Moustakas (1994) are cited by Creswell (2007). The general procedures for analyzing phenomenological data are summarized into six steps. First, the researcher should describe the participant's input in the participant's voice to put aside the researcher's personal experiences. Next, the participants' list of noteworthy sentences is documented to enable the researcher to understand the essence of how the participant is interacting with the phenomenon under study. Third, group the noteworthy sentences from each participant into themes. Next, give the noteworthy sentences more contextual consideration by explaining what happened in the participants' vocabulary. Fifth, provide a structural description of the participants' experience. In this step, the researcher reflects on the context of the participants' experiences. Last, summarize or provide a composite of the experience for each participant (Cresswell, 2007).

Briefly analyzing qualitative data is essential immediately after each interview. Interview summary forms can capture the value gained from the interviewee's responses (Dawson, 2009). These forms can be thought of as a post-interview data dump that assists the researcher to capture the essence of the interview on the paper before the researcher's short-term memory begins to fade. For this study, data analysis included reading summary forms and transcripts of the audio-recorded interviews. The interview audio recordings were valuable because they provided the spoken word and contextual data that provides additional meaning from subtle nuances.

Coding and Types of Codes

The collected data were coded in a straightforward process (Ryan & Bernard, 2003). There are multiple ways in which to code qualitative data. Coding is a language. Consider the following examples:

1. Interviews: interview 1, 2, 3, et cetera, is coded as I1, I2, I3;
2. Participants: participant 1, 2, 3, et cetera, is coded as P1, P2, P3; and
3. The participant used the term "critical success factor" or CSF without prompting by the researcher: P1-CSF.

In addition to creating unique codes, the following are coding methods. First, the researcher can read data to identify repeated words, indigenous categories such as any words that indicate specialized vocabulary, and key-words-in-context (KWIC), such as specialized vocabulary used in a sentence. Next, additional coding methods include comparing similar or different text, identifying missing information such as any themes that are not present in the text, identifying metaphors and analogies, et cetera. Last, color-coding, cutting and sorting, and piecing together are additional ways to organize data to create codes (Ryan & Bernard, 2003, pp. 85-109).

Computer Data Analysis

NVivo 12 computer-assisted qualitative data analysis software was used to conduct deep levels of analysis and code creation. While computer analysis of qualitative data offers value to researchers, one must remember that over-dependence is risky because the actual significance of aspects of the findings could lose uniqueness, richness,

context, and individual character. The researcher ensured that all codes were tied to the underlying data, which requires human intervention.

Strategies for Validating Findings

Several methods were used to validate the findings. For example, the interview transcripts were sent to the interviewees to ensure they agree to the transcription accuracy. This process is known as member checking, and it is vital to ensure that there were no blatant mistakes in the transcripts (Cresswell, 2007). The following writing strategies were also helpful to convey participant quotes and researcher-participant dialoguing. The researcher described personal experiences with the study and generated a list of the interviewees' significant statements, e.g., their attitudes about the use of the five elements of the ADKAR Model as CSFs for ERP software implementation. Significant statements were grouped into themes, also known as bulking or chunking. Textual descriptions of the significant statements were written along with verbatim examples provided by the interviewees. A structural description, i.e., setting or context, was written to explain where or how the participants developed their attitudes (Cresswell, 2007). There was also a substantial amount of written content from both the textual and contextual descriptions. Thus, a narrative summary of all the interviews was written by memory when appropriate.

Trustworthiness and Credibility

Patton (2002) said that trustworthiness means that the academic community must judge research as credible, externally valid, dependable in terms of reliability, and confirmable as it relates to objectivity. Credibility is a researcher’s ability to present all

the study complexities and effectively explain the patterns that are not easily explained (Guba, 1981). Following are Guba's methods as cited by Gay et al. (2011) that the researcher used to ensure the research findings and recommendations are trustworthy and credible. First, "slice of life" data, i.e., audio recordings of each interview, were collected. Next, "member checks" were performed, i.e., providing each participant with a copy of their respective interview transcripts and were provided the opportunity to correct any inaccuracies. Third, data and themes emerging from the analysis were corroborated with participants' original language to ensure no contradictions were present. Finally, the researcher also intentionally practiced reflexivity to identify and consider the researcher's biases, which could influence findings in a particular manner (pp. 393-394). It is essential to understand, however, that researcher bias is not automatically prohibited in qualitative research. Biased interpretations are defensible in certain situations, and no researcher can claim a one-hundred percent bias-free study (Kerr, MacCoun, & Kramer, 1996).

Concerning reflexivity, when interpreting data, a researcher should be able to step back from the smaller details of one interview experience (Creswell, 2007). For example, if an interview yielded valuable data, that does not mean that a theme between multiple participants should be drawn quickly. Not all people hold the same attitudes about any issue. The connections created during interviews between a researcher and participant and the surroundings can influence a researcher's interpretation of the data (Kerr, MacCoun, & Kramer, 1996).

Role of the Researcher

The researcher considered the importance of their role when interacting with the participants. For example, will the researcher be viewed as an insider or outsider? How will a professional, respectful, and courteous relationship be initiated, maintained, and concluded? In other words, entry to and exit from the research site and any subsequent participant contact must be positive and valuable to both parties. Whose voice will be represented in the final report of findings, the researcher's or the participants' Creswell (2007).

Anticipated Ethical Issues

The study poses no serious ethical problems. Before conducting research, the researcher understood that sensitivity to ethical considerations is vitally important and obtained permission from the university IRB to conduct interviews and report the analysis results. All IRB requirements were followed. In academic research, protecting the anonymity and confidentiality of research participants is required. The researcher presented the code of ethics to the participants. The details of the code included information about anonymity, confidentiality, the researcher's right to comment, receipt of the final report, and protection of data (Dawson, 2009).

Summary

Qualitative interviews were conducted to explore the attitudes of current U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model as CSFs to implement ERP software. This study was thoughtfully designed to ensure that the eventual findings and recommendations are trustworthy and accurately

represent the research participants' data. This research closes gaps in the CSF literature from the unique perspective of U.S. Air Force supply chain managers, of which there is little research on the subject.

CHAPTER IV

FINDINGS

The purpose of this qualitative, phenomenological study was to explore the attitudes of civilian (non-military) U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model (*awareness, desire, knowledge, ability,* and *reinforcement*) as critical success factors (CSFs) to implement enterprise resource planning (ERP) software. The central research question in this study was:

RQ1. What are the attitudes of current U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model as CSFs to implement ERP software?

To provide additional guidance for this research, the topic of the central research question was divided into three focus areas, which were indicated by the three research sub-questions, as follows:

SQ1. How can using the five elements of the ADKAR Model as CSFs to implement ERP software enable U.S. Air Force supply chain managers to prepare their employees before an ERP software implementation?

SQ2. How can using the five elements of the ADKAR Model as CSFs to implement ERP software enable U.S. Air Force supply chain managers to support their employees after an ERP software implementation?

SQ3. What are the recommendations of current U.S. Air Force supply chain managers to eliminate gaps between the CSFs for ERP software implementation and the five elements of the ADKAR Model?

The following section of this chapter is a description of the demographic characteristics of the study participants. Next, this chapter includes a description of the execution of the data analysis procedure described in Chapter 3. This chapter then proceeds with a presentation of the study findings, which are organized by research sub-question. A summary of the findings concludes this chapter.

Participant Demographics

The sample of 11 participants was recruited for interviews from a population of approximately 200 supply chain managers employed by the U.S. Air Force at Hill Air Force Base (AFB), Robins AFB, or Tinker AFB. Table 22 indicates the demographic characteristics of the study participants.

Table 22.
Participant Demographics.

Partici-pant	Gender	Air Force Base	Highest level of education	Years of U.S. Air Force supply-chain management experience	ERP implementation experience
P1	M	Hill AFB	Masters	12	ESCAPE SPM
P2	M	Robins AFB	Masters	35	D200A, ESCAPE SPM, PRPS
P3	F	Robins AFB	Masters	40	ESCAPE SPM, EXPRESS, DO31, DO33, D043A, D143, D200A
P4	M	Hill AFB	College, No Degree	36	CDMS, D143C, D200A, ESCAPE SPM, EXPRESS, J090B
P5	M	Tinker AFB	Masters	12	ESCAPE SPM
P6	M	Tinker AFB	Masters	14	ESCAPE SPM
P7	M	Robins AFB	Masters	7	ESCAPE SPM
P8	F	Tinker AFB	Bachelors	16	ESCAPE SPM
P9	M	Robins AFB	Masters	11	ESCAPE SPM, LIMS-EV
P10	M	Hill AFB	Masters	5	ESCAPE SPM
P11	M	Tinker AFB	Masters	5	ESCAPE SPM

Data Analysis

The audio-recorded interviews were transcribed verbatim and imported into NVivo 12 software for data analysis. The data were analyzed using Creswell's (2007) recommended phenomenological procedure based on Moustakas's (1994) procedure.

In the first step of the analysis, significant statements in participants' transcripts were highlighted in the process that Moustakas (1994) referred to as horizontalization. Statements were identified as significant when they were potentially relevant to describing participants' attitudes toward using the five elements of the ADKAR Model as CSFs to implement ERP software. In NVivo, this process was conducted by assigning each significant statement to a node.

The second step of the analysis involved clustering significant statements with similar meanings into preliminary themes (Creswell, 2007). In NVivo, this step involved compiling nodes containing data with similar meanings into a single node. The compiled nodes were labeled with a brief, descriptive phrase that summarized the common meaning of the data assigned to them.

In the third step of the analysis, a textural description was created to indicate what participants had experienced (Creswell, 2007). The textural description was compiled from the relevant themes identified in the transcripts, and it included direct quotes from the data as evidence. Thus, the textural description indicated participants' experiences of ERP software implementation, including the consequences of using or failing to use the ADKAR elements as CSFs. Table 23 lists the textural description themes and the participants in whose data the themes appeared.

Table 23.
Data Analysis: Textural (Experiential) Description Themes.

Textural theme indicating what participants experienced	Theme appeared in participant's data										
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11
Building knowledge		✓	✓	✓				✓	✓	✓	
Closing the gap between management goals and end-user awareness and desire	✓			✓		✓	✓		✓	✓	✓
Closing the gap between training and ability	✓		✓			✓		✓			✓
Cultivating ability	✓		✓	✓	✓	✓	✓				✓
Enhancing ability		✓	✓					✓		✓	✓
Experienced need for ADKAR Model elements		✓	✓	✓	✓		✓	✓	✓		
Increasing desire		✓	✓	✓	✓	✓		✓	✓	✓	✓
Knowledge assessed		✓					✓	✓		✓	
Ongoing reinforcement		✓		✓	✓	✓	✓	✓	✓		✓
Raising awareness	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Revitalizing awareness and desire	✓					✓	✓			✓	

The fourth step of the analysis consisted of creating structural descriptions of the contexts that influenced participants' experiences of the phenomenon (Creswell, 2007). As with textural descriptions, the structural description was compiled from the relevant preliminary themes, and they incorporated direct quotes from the data as evidence. The structural description indicated the contexts in which participants' attitudes toward using the elements of the ADKAR Model as CSFs were formed. Table 24 is a list of the structural description themes and the participants in whose data they appeared.

Table 24.
Data Analysis Structural Description (Context) Themes.

Structural theme indicating contexts that influenced participants' experiences	Theme appeared in participant's data										
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11
All ADKAR elements employed		✓	✓	✓	✓		✓	✓	✓		
Assessing and addressing training deficits		✓	✓					✓		✓	✓
Communicating the benefits of the change	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Communication from management	✓			✓		✓	✓		✓	✓	✓
Extensive education and training		✓	✓	✓				✓	✓	✓	
Iterations of the ADKAR cycle	✓					✓	✓			✓	
Ongoing, positive communication about the change		✓	✓	✓	✓	✓		✓	✓	✓	✓
Performance measurement		✓					✓	✓		✓	
Solicitation of end-user feedback	✓		✓			✓		✓			✓
Training and assessment	✓		✓	✓	✓	✓	✓				✓

The last step of the analysis process involved combining the textural and structural descriptions into a composite description that indicated the common elements, or essence, of the participants' attitudes toward using the ADKAR Elements as CSFs. The preliminary composite themes were formed by combining each textural description theme with its corresponding structural description theme. Table 25 indicates how the textural and structural description themes were combined to form the preliminary composite description themes.

Table 25.
Data Analysis: Combining Textural (Experience) Description Themes with Structural Description (Context) Themes to Form Preliminary Composite Description Themes.

Textural (experience) theme	+	Corresponding structural (context) theme	→	Preliminary composite description theme
Cultivating ability	+	Training and assessment	→	Ability can be cultivated through training and assessment
Raising awareness	+	Communicating the benefits of the change	→	Awareness can be raised by communicating the benefits of the change
Increasing desire	+	Ongoing, positive communication about the change	→	Desire can be built through ongoing, positive communication about the change
Building knowledge	+	Extensive education and training	→	Knowledge can be built through extensive education and training
Enhancing ability	+	Assessing and addressing training deficits	→	Ability can be enhanced by assessing and addressing training deficits
Revitalizing awareness and desire	+	Iterations of the ADKAR cycle	→	Awareness and desire can be continually revitalized through iterations of the ADKAR cycle
Knowledge assessed	+	Performance measurement	→	Knowledge can be assessed through performance measurement
Ongoing reinforcement	+	N/A	→	Reinforcement can be provided on an ongoing basis
Experienced need for ADKAR Model elements	+	All ADKAR elements employed	→	All ADKAR model elements are CSFs

Textural (experience) theme	+	Corresponding structural (context) theme	→	Preliminary composite description theme
Closing the gap between management goals and end-user awareness and desire	+	Communication from management	→	Communication can be used to close the gap between management goals and end-user awareness and desire
Closing the gap between training and ability	+	Solicitation of end-user feedback	→	End-user feedback can be used to close the gap between training and ability

The preliminary composite description themes were then grouped into three overarching, finalized composite themes to indicate the common essences of participants' experiences. Table 26 indicates how the preliminary composite themes were grouped to form the finalized composite themes.

Table 26.
Data Analysis: Grouping of Preliminary Composite Themes into Finalized Composite Themes.

Final composite theme *Preliminary composite theme grouped to form final theme*	Theme appeared in participant's data										
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11
Theme 1. The ADKAR model can be used to gain buy-in and build ability before implementation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ability can be cultivated through training and assessment	✓		✓	✓	✓	✓	✓				✓
Awareness can be raised by communicating the benefits of the change	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓

Final composite theme *Preliminary composite theme grouped to form final theme*	Theme appeared in participant's data										
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11
Desire can be built through ongoing, positive communication about the change		✓	✓	✓	✓	✓		✓	✓	✓	✓
Knowledge can be built through extensive education and training		✓	✓	✓				✓	✓	✓	
Theme 2. The ADKAR model can be applied iteratively to support employees after implementation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ability can be enhanced by assessing and addressing training deficits		✓	✓					✓		✓	✓
Awareness and desire can be continually revitalized	✓					✓	✓			✓	
Knowledge can be assessed through performance measurement		✓					✓	✓		✓	
Reinforcement can be provided on an ongoing basis		✓		✓	✓	✓	✓	✓	✓		✓
Theme 3. Gaps are minimal but can be eliminated through two-way communication between management and end users	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
All ADKAR model elements are CSFs		✓	✓	✓	✓		✓	✓	✓		
Communication can be used to close the gap between management goals and vision and end-user awareness and desire	✓			✓		✓	✓		✓	✓	✓

Final composite theme *Preliminary composite theme grouped to form final theme*	Theme appeared in participant's data										
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11
End-user feedback can be used to close the gap between training and ability	✓		✓			✓		✓			✓

Lastly, each of the finalized composite themes was used to address the research sub-question to which it was relevant. Table 27 indicates which theme was used to address each sub-question.

Table 27.
Data Analysis: Research Sub-questions and the Themes Used to Address Them.

Research sub-question	Theme used to address sub-question
SQ1. How can using the five elements of the ADKAR Model as CSFs to implement ERP software enable U.S. Air Force supply chain managers to prepare their employees before an ERP software implementation?	Theme 1. The ADKAR model can be used to gain buy-in and build ability before implementation
SQ2. How can using the five elements of the ADKAR Model as CSFs to implement ERP software enable U.S. Air Force supply chain managers to support their employees after an ERP software implementation?	Theme 2. The ADKAR model can be applied iteratively to support employees after implementation
SQ3. What are the recommendations of current U.S. Air Force supply chain managers to eliminate gaps between the CSFs for ERP software implementation and the five elements of the ADKAR Model?	Theme 3. Gaps are minimal but can be eliminated through two-way communication between management and end users

Data Saturation

There is no single method to reach data saturation in qualitative research because qualitative studies are rarely designed similarly. However, scholars agree that saturation occurs when no new data, themes, new codes, or the ability to replicate the study exists (Fusch & Ness, 2015).

For this study, data saturation was assessed as achieved with six participants. Two conditions were met for the determination of data saturation. First, analysis of two consecutive interviews yielded no new textural or structural themes, indicating that additional collection and analysis of data was unlikely to identify new ideas or insights.

Second, every textural and structural theme identified in the data had been identified in at least two interviews, reducing the likelihood that any of the themes resulted from the bias or error of a single participant. All textural and structural themes were identified within the interview data from P1 and P2, so analysis of P3's and P4's interviews met the first condition, in that two consecutive interviews were analyzed without any new ideas or themes being identified.

However, data saturation was assessed as achieved with six participants because P6 provided the first supporting attestation to the textural theme 'knowledge assessed' and the structural theme 'iterations of the ADKAR cycle,' which had previously been identified only in P1's data. P6's data also included supporting attestation for the textural theme 'revitalizing awareness and desire' and the structural theme 'performance measurement,' which had previously been identified only in P2's data.

Findings

The central research question used to guide this study was: What are the attitudes of current U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model as CSFs to implement ERP software? The central research question was addressed by addressing the three sub-questions developed from it to specify focus areas for this study. Therefore, this presentation of the findings is organized by sub-question, and under sub-question by theme, i.e., finalized composite theme.

Sub-question 1

SQ1 was: How can using the five elements of the ADKAR Model as CSFs to implement ERP software enable U.S. Air Force supply chain managers to prepare their employees before an ERP software implementation? The theme identified during data analysis to address this theme was: the ADKAR model can be used to gain buy-in and build ability before implementation. The following subsection is a presentation of this theme.

Theme 1: The ADKAR Model Can Be Used to Gain Buy-In and Build Ability Before Implementation

All 11 participants contributed data to this theme. The data indicated that awareness, desire, knowledge, and ability were the four ADKAR Model elements that participants explicitly described as CSFs that can be used to enable U.S. Air Force supply chain managers to prepare their employees before an ERP software implementation. The first stage of employee preparation involved using awareness as a CSF, followed by using

desire. Awareness and desire could both be achieved, according to participants, through ongoing, positive communication from managers to end-user employees about the benefits of the implementation. Next, knowledge could be achieved as a CSF through extensive education and training of employees. Lastly, ability was cultivated as a CSF through training and assessment. Reinforcement did not emerge as a distinct CSF in responses associated with Theme 1. However, it was implicit in participant responses indicating that desire and awareness were raised through ongoing communication from managers to end-users, and that training should be followed by assessment and retraining as necessary to address knowledge and ability gaps.

Awareness. Participants indicated that using ADKAR elements as CSFs should begin with managers' building awareness of the oncoming ERP software implementation. Ten out of 11 participants expressed this view explicitly, and the remaining participant did not express a divergent view. P2 provided a representative response in associating awareness-raising with communicating the need for the implementation to end-users:

> If the thought process is, "Do we need change?" then the awareness part of it answers that. Because it says this is why we need change, and that communication part of it falls in line with that thought process, because it allows your audience to realize change is needed.

P11 corroborated P2's response in stating awareness as a CSF that it was, "Predicated on communication. I believe there has to be a value proposition, what's in it for them, what's in it for the user?" Thus, like P2, P11 believed that management needed to communicate to end-users why the approaching implementation was needed, and P11

added to P2's view that managers should frame the communications in terms of how the change was in the best interests of end-users, to begin to build desire. P3 also concurred with P2's view, stating, "The critical factors that [managers] must help their employees with, they have to make them aware of the need to change." P3 also agreed with P11's attitude toward awareness as a CSF, stating that awareness needed to be raised in such a way that it would begin to build desire among end-users by making them aware of how the change was in their best interests: "Tell [users] how this is going to make their job easier, how you're going to work smarter, not harder." P5 also spoke of aligning awareness-raising with building employee desire: "Employees want to know what is in it for them. What's the benefit? What's in it for them to change? . . . ADKAR is an incredible methodology that can provide you with a clear path to success." Therefore, participants perceived awareness as a CSF that can be used to enable U.S. Air Force supply chain managers to prepare their employees before an ERP software implementation. The participants further indicated that managers' communications to employees to build awareness should emphasize the need for the change and the benefits the change would bring to employees. By emphasizing direct benefits to employees, managers can segue effectively from raising awareness to building desire, according to participants.

Desire. Participants indicated that desire as a CSF can help prepare employees before implementation when ongoing, positive communication to build awareness about the approaching change and its benefits to end-users is sufficiently persuasive. P6 described the perceived relationship between awareness and desire as CSFs in stating,

“When it comes to the desire, I think the desire is the end result of [employees’] awareness. Awareness and desire are directly related. One begets the other.” P10 described communication to build awareness as achieving a tipping point (“the light bulb goes off”), beyond which end-users’ awareness of the approaching change transitioned into desire and buy-in:

> I’m only communicating with you [the employee]. But when the light bulb goes off, it automatically switches from awareness to desire. Because [as the manager,] you've shown the individual [employee] that this is a critical aspect, now they have the desire to change . . . So, you've gone from awareness to desire because now the [employee] wants to do it.

Four participants emphasized that transitioning from building awareness of the change to building desire for the change should involve hands-on demonstrations of the incoming ERP software. P10, for example, added to the previously quoted response that managers should convey to employees, “Everything that you do from day to day on the old ERP system, I want you to do on the new ERP system. Then I want you to tell me what worked, what didn't work, where can we improve.” P9 described building awareness that would transition into desire through workshops in which employees could experiment with the new ERP software and raise questions and concerns for managers to address:

> I think the biggest thing is the desire to participate in the change. In previous software implementations I’ve been involved with, the way we did that is we just held a workshop with the workforce. We got the workforce involved and basically

> just a roundtable discussion of why we're doing it and then answered the questions that came up during those workshops . . . communication is paramount in everything you do. So, I think good supervisors communicate and take everybody's concerns seriously and try to find them answers when we're going through a change.

Knowledge. Like awareness and desire, knowledge was built through manager communications to employees, except that the communications to build knowledge were formal education and trainings, instead of less-structured demonstrations and question-and-answer sessions. Participants indicated that to support knowledge as a CSF, manager communications to build awareness and desire needed to transition into extensive education and training. The knowledge employees gained through education and training also contributed to building the ADKAR element of ability as a CSF. P2 stated that to ensure employees had adequate knowledge, "Getting employees trained and ready for the implementation is critical." P3 agreed, stating that to build knowledge and ability, "You've got to make sure that you provide that education and training." P9 indicated how knowledge and ability were related and how both elements were achieved through training before implementation: "You have to be able to train employees on the new system. They must be able to use it. If employees do not know how to use a new software system [knowledge], they can't do their job [ability]." P4 described knowledge-building through training and education as essential to giving employees the ability to use a complex, new system:

> There are hundreds of different screens in this [ESCAPE] system. And to just turn it on cold one day and say, “Find your way around, ask questions, and we'll show you what to do,” is not going to be a very successful way to turn this on. That's why this training, and the hands-on clinics, and the demo clinics, and giving people lunch-and-learns and the chance to learn how to navigate this system . . . If [employees] utilize both the training and the workbooks, I think we're going to have a pretty high success rate once we turn this [ERP software] on.

Ability. Seven out of 11 participants indicated that ability can also be achieved as a CSF through assessing employee knowledge gains and addressing knowledge gaps through additional training. Reinforcement was not discussed as a distinct element but was implicit in retraining. P4 described assessing employees by asking them to demonstrate their knowledge:

> Every one of my people, I would either walk around their desk and say, “Hey, walk me through one of the exercises in the workbook so that I know you're understanding it.” Or I would have them come in and do it on my computer so that I knew they were doing what they were supposed to do . . . I was very hands-on in the fact that I made sure they were knowledgeable and understood the computer systems and their job.

P5 indicated that employee knowledge assessments were conducted by listening to and acting on employee feedback about training methods: “If I made videos so that everybody's going to be able to learn how to do this, well, people that look at a video, they come up, they go, ‘Well, I don't understand it . . . I don't learn that way.’” When

employees indicated that they were not learning effectively from a given training method, P5 stated, it was the manager's responsibility to try a different method to ensure that knowledge and ability were effectively built in all users: "We've got to find different ways to be able to assist [employees'] learning." P5 also corroborated P4's response in reporting a process of assessing employees' knowledge and ability on the job, and, if necessary, providing retraining and reinforcement to address knowledge gaps: "You would be hitting the road, and go back into the ability itself and see whether or not that person can be able to do it, and help them to be successful."

Summary. In summary, participants indicated that using awareness, desire, knowledge, and ability is helpful for U.S. Air Force supply chain managers in preparing employees before ERP software implementation. Reinforcement was not described as a distinct CSF, but it was implicit in the cumulative nature of manager-to-subordinate communications used to build awareness and desire, and in the retraining used to address knowledge and ability gaps. Awareness and desire were built as CSFs through manager-to-employee communications that emphasized the organizational need for the change and the direct benefits the change would bring to employees, e.g., more efficient processes that reduced workloads. Knowledge was built through formal education and training. Knowledge contributed to ability, and knowledge and ability were further reinforced through manager assessments of employee demonstrations, followed by retraining as needed to address gaps.

Sub-question 2

SQ2 was: How can using the five elements of the ADKAR Model as CSFs to implement ERP software enable U.S. Air Force supply chain managers to support their employees after an ERP software implementation? The theme used to address this question was: the ADKAR model can be applied iteratively to support employees after implementation. The following subsection is a presentation of this theme.

Theme 2: The ADKAR Model Can Be Applied Iteratively to Support Employees After Implementation

All 11 participants contributed to this theme. Participants indicated that all five elements of the ADKAR Model can be used as CSFs to support employees after an ERP software implementation by applying them on an ongoing, iterative basis. Through managers' ongoing communication with employees about the software implementation and its benefits, awareness and desire could be continually revitalized. Knowledge and ability could be assessed on an ongoing basis through direct assessments and performance measurements to identify any need for retraining to address gaps. Whether or not knowledge or ability gaps were identified, reinforcement could be provided frequently to strengthen the other four ADKAR elements as CSFs.

***Awareness and Desire*.** Participants indicated that supporting employees after an ERP software implementation should involve continually revitalizing awareness and desire as CSFs through positive communications from managers to employees about implementation benefits. P1 spoke of the potential for the ADKAR Model elements to be used iteratively as CSFs in stating,

> You can end the ADKAR Model at deployment, or you can turn right back around again and bring in a different level of awareness, what's needed after deployment . . . you could basically end one ADKAR Model process and start a whole new ADKAR Model process with where they're at now.

P10 corroborated P1's response in stating, "Just because the software has been implemented and into sustainment doesn't mean you can't come in with the ADKAR process. Go through the awareness, go through the desire. Because these people could have lost that desire." P7 suggested that iterative use of the five ADKAR elements as CSFs should never stop because change, and employees' need for support surrounding change, were continual: "The enterprise would have to become accustomed to change via the ADKAR Model because it's never going to stop . . . I would call it change management sustainment." P6 suggested that iterative use of awareness and desire as CSFs to support employees after implementation could beneficially occur through ongoing, two-way communication between managers and employees. Such communication could allow employees to express and resolve any lingering misgivings about the change, and could allow managers to maintain employee awareness of how their duties contributed meaningfully to an overarching organizational vision, P6 indicated:

> I think the more we talk about [change in the form of an ERP software implementation], the less scary it is. The more we talk about our fears, the less afraid we are. And so, I think it's just maintaining that [manager-employee] dialogue about all of these different things [ADKAR elements], and it goes back

> to what we need as people. It's like in my job, I need to feel useful. And so, it's just like alleviating all of those very basic needs as humans.

Knowledge and Ability. Participants indicated that knowledge and ability could both be used as CSFs to support employees after implementation through assessments and performance measurements to identify and remedy employees' knowledge and ability gaps, if any existed. Participants described performance measurement as particularly important because it was the most effective way to determine whether employee knowledge and ability were sufficient for achieving organizational goals. For example, P8 stated, "Performance measurement is critical . . . [managers] need to take time to monitor the success, and even failure, and make sure that everybody was progressing the way they needed to." P2 expressed that performance measurement was both needed and easily quantifiable in supply chain management:

> Performance measurement is a critical success factor for us in supply chain, very critical, because we're moving parts . . . If I were looking at delivering a service, as opposed to delivering parts, performance is more nebulous, but performance measurement is easy to measure when I've got hard items that I can count and see where they are.

Performance measurement was significant using the ADKAR elements of knowledge and ability as CSFs because it was an indirect measure of how well those elements were being achieved. However, participants also indicated that supporting employees after implementation should involve direct assessments of employees' knowledge and ability. P10 spoke of assessing employee knowledge and ability as a

process of validating training and education efficacy: “You have to validate that those skills are now retained [knowledge], they're [employees] effective in exercising the new skills that you have trained them in [ability].” P3 spoke of monitoring employee knowledge and ability on an ongoing basis as necessary for determining when additional training was needed: “After it's been implemented, you're going to go back and see where [employees] are in this whole process, and if it's working for them, and show your support of them, make yourself available and keep on providing training.” P3 elaborated on this response by describing how the process of assessing employee knowledge and ability (“seeing where employees are”) and measuring performance (“making sure everything went as planned”) were applied after an ERP software implementation:

> We all know that you can go to a class and not get what you really need. So, you can break it down into different areas and have workshops on those areas until people feel comfortable. And that's what we did with EXPRESS. I wrote a user's guide . . . and we kept that updated. We kept circling back and making sure everything went as planned and made it better, through training, through workshops, whatever, just positive reinforcement.

Reinforcement. Reinforcement emerged as a distinct CSF in eight out of 11 participants’ responses related to supporting employees after implementation. However, participants indicated somewhat different perceptions of what reinforcement involved. P11 suggested that reinforcement as a CSF included iterative application of the other four ADKAR elements, stating that after implementation, supporting employees was, “All about the reinforcement. So, just because we find ourselves with a newly deployed

software, you don't necessarily want to forget about the other ADKAR elements." P11 spoke of the importance of reinforcing all of the ADKAR elements as CSFs to support employees after implementation in stating, "I think, to me, the ADKAR elements serve as a reminder that I need to maintain that focus and to not let off the gas. Otherwise, I may forfeit some of the progress that I've made." P7 corroborated P11's response in describing reinforcement as the iterative application of the other four ADKAR elements:

> [Reinforcement is] a continuous loop of the five [ADKAR elements]. So, it's not only linear. It touches all four of those preceding elements. We want to make sure we're reinforcing awareness, desire, giving [employees] the opportunity to participate, ensuring that that's a continuous activity, and then training for knowledge. So, yes, it keeps going. It's circuitous, if you will.

In contrast to P11 and P7, P2 distinguished reinforcement as a CSF from iterative application of awareness, knowledge, and ability, stating that after one ERP software implementation, "The awareness was finished, and the knowledge was out there. People were learning the ability and they were sharing that in the workplace, but they were missing the reinforcement." P2 clarified that reinforcement of the needed kind was conducted when, "You've got [employees'] attention, so reinforce your belief in your own system that you're teaching by answering the students' questions." Thus, managerial investment in the new ERP software was demonstrated through having the knowledge or doing the research necessary to answer employees' questions about the system, rather than, "Putting people off on others if you don't know the answers to questions." P9 corroborated P2's view of reinforcement as managerial modeling of commitment to the

new ERP software in describing reinforcement as, “Just management reinforcement, you have to have management on board, and they have to back the change and reinforce it on a weekly, quarterly, monthly basis.” P2’s and P9’s responses partly diverged from P7’s and P11’s perceptions that reinforcement was an iterative application of all four of the other ADKAR elements as CSFs. However, P2’s and P9’s did not represent complete disagreement with P7’s and P11’s perceptions, but rather a narrower focus, in which reinforcement targeted desire as a CSF (via managerial modeling of commitment to the new ERP software), instead of more broadly iterating all four of the other ADKAR elements. P5 offered a different perspective on reinforcement in stating that it specifically involved retraining: “You must have reinforcement . . . Go back into the ability itself and see whether or not that person can be able to do it and help them to be successful.” While P7’s and P11’s responses indicated that reinforcement involved iteration of all four of the other ADKAR elements, and P2’s and P9’s responses suggested that reinforcement specifically involved a partial iteration of the desire element, P5’s response indicated that reinforcement involved iteration of knowledge and ability as CSFs through assessment and retraining.

Summary. In summary, participants perceived all five ADKAR elements as useful in helping U.S. Air Force supply chain managers to support employees after an ERP software implementation. Awareness and desire should be continually revitalized through ongoing communication between managers and employees about the change, participants indicated, and knowledge and ability should be sustained and expanded through direct assessment, performance measurement, and retraining as needed.

Reinforcement was identified specifically as a useful CSF for supporting employees after an ERP software implementation. Participants expressed that it should involve the iterative application of all four of the other ADKAR elements as CSFs, or that it should be focused specifically on reinforcing desire or knowledge and ability.

Sub-question 3

SQ3 was: What are the recommendations of current U.S. Air Force supply chain managers to eliminate gaps between the CSFs for ERP software implementation and the five elements of the ADKAR Model? The theme used to address this question was: gaps are minimal but can be eliminated through two-way communication between management and end-users. The following subsection is a presentation of this theme.

Theme 3: Gaps Are Minimal but Can Be Eliminated Through Two-Way Communication Between Management and End-Users

All 11 participants contributed to this theme. In expressing the perception that gaps between the CSFs for ERP software implementation and the five elements of the ADKAR Model were minimal, seven out of 11 participants indicated that the five ADKAR elements already were (or were equivalent to) existing CSFs, but that the ADKAR elements were not universally met. As an example, P2 expressed this perception in describing the following example:

> With ESCAPE, we've provided awareness. It's just that people didn't believe us initially because of the failure of ECSS. But that wasn't ESCAPE's fault. Regarding the desire element, initially we were trying to build desire. The

> knowledge, we're spreading that now. When the software is deployed, we'll find out about the ability and whether employees are able to do the new functions. And then, we have some reinforcement from some squadrons and not some from others.

Thus, P2's response indicated that awareness was a CSF but that it was not met completely in the instance of ESCAPE implementation ("people didn't believe us"). P2's reference to desire was ambiguous, but the choice of wording suggested that the attempt to build desire lacked adequate follow-through ("initially we were trying to build desire"). Knowledge was in process of being spread, and ability would be assessed after implementation, P2 added. Reinforcement was regarded as a CSF but described as being met unevenly between different operational units. Other participants spoke more confidently of the perceived equivalence between existing CSFs and the ADKAR elements. In comparing existing CSFs to the ADKAR elements, for example, P8 said, "I think that the critical success factors give examples of the steps of ADKAR. I think they're almost synonymous," suggesting that an equivalence existed, whether or not the CSFs were borne out during implementation. P9 corroborated P8's perception in stating, "You can single out those critical success factors and then align them into an element of the ADKAR Model." Thus, most participants described the gap between existing CSFs and the ADKAR elements as minimal, adding only that if gaps existed, they were shortfalls in implementation rather than conceptual gaps between ADKAR elements and CSFs.

Gap One. Participants noted two specific gaps between existing CSFs and the ADKAR elements, however. The first gap was between the overall management vision or goal for an ERP software implementation and employee awareness and desire. Seven out of 11 participants referenced this perceived gap. These participants recommended closing the gap through improved manager-employee communication. For example, P1 spoke of a gap between management vision for the change represented by an ERP software implementation and employee desire: "One of the biggest challenges for any manager or leader is changing culture and convincing people that the change is good . . . it's a huge challenge to get all 1,000+ people wanting to change." P10 also perceived the gap between managerial goals and employee desire as a significant barrier:

> The biggest challenge that you'll run into is the D, the Desire. And this is based on my experience . . . I've seen this over and over and over. For example, I can stand in front of you and tell you this is why we need to change the software. Your light bulb will go off, but you still may not have the desire to do it, because it's too much, it takes too long, I'm getting ready to retire—I mean, I can give you a thousand different reasons why that roadblock is at desire.

P10 was also able to report an experience in which managerial communications to employees were effective in building desire, however. P10 stated that the ESCAPE software implementation process was successful in building employee desire because the communications to employees were framed as information about an opportunity rather than as directives:

> The ESCAPE change management team started off with, “This is why we're doing it.” But it wasn’t directive; it was informative . . . I’m informing you that this is why we need to do this. I’m giving you the opportunity to accept it.” It's not being thrown down their throats as every other system has. The ESCAPE message has been something like: “We are giving you this opportunity to see the value of why we're doing this.”

As in Themes 1 and 2, participant responses under Theme 3 indicated that desire was built through raising employee awareness, specifically awareness of the benefits of the implementation for the organization and employees themselves. Like P1, P10, and four other participants, P6 agreed that lack of employee desire was the most significant barrier to achieving organizational goals. Like other participants, P6 recommended that desire should be built by raising awareness of benefits. P6 added to other participants’ responses that when desire was lacking, managers should seek employee feedback about any gaps in their awareness of benefits and then fill those gaps:

> [Desire] goes back to the very beginning thing of awareness. We have to make sure we're effectively communicating . . . if [employees] don't understand the clear benefits of some new process, then you have to ask them why, and you have to listen to what they're saying . . . that's where that effective communication comes in, because they're telling you what they need to hear and what they don't want to hear.

P9 corroborated P6’s response in emphasizing the foundational nature of employee awareness of implementation benefits: “The awareness is the biggest thing,

because you got to start off with that . . . So, I would say the awareness of the need to change, and with that goes the buy-in of the workforce." P7 stated that employee "Reluctance to even accept the change," the opposite of desire to participate in the change, was a significant barrier to managers' achievement of their goals, regardless of, "Whatever the change is. You could come in there and tell everybody they're going sit in a blue chair instead of a pink chair, and it could really upset the apple cart." P7 recommended that supervisors, "Manage the early adopters to encourage the naysayers into a paradigm shift," to close the gap between employee desire and organizational goals. P7 recommended that to recruit early adopters to help build awareness and desire in late adopters, managers should, "Identify the ones that are going to have the hardest time with [the change], and then identify the ones that you know will help lead the fight. Having those two groups working together, intersecting early on, is critical." Thus, participants indicated that closing the gap between employee desire and managers' vision and goals for implementation was a significant barrier. To close the gap, participants recommended that managers communicate with employees to identify and fill gaps in employees' awareness of the benefits of the change, build awareness informatively rather than prescriptively, and recruit proponents of change from the workforce to serve as intermediaries in building awareness and desire in resistant employees.

Gap Two. The second gap that participants identified between existing CSFs and the ADKAR elements was between training and ability. Five out of 11 participants referenced this gap. These participants recommended that the gap be closed through solicitation of, and action based on, end-user feedback. For example, P8 described

assessment of employee ability, rather than taking for granted that training would build ability uniformly across all employees, as necessary because, “Not everybody's going to be on the same step at the same time. And that can be a challenge. Somebody might say, I've been to class, but I can't do anything in the system.” P11 said of soliciting employee feedback regarding training efficacy and resulting ability, “There are various ways to do that, e.g., surveys, polling, etc.” P3 recommended listening to and acting on employee feedback, both about the training itself and about the ERP software being implemented, because flaws in the training or software could negatively impact ability:

> As an ERP is being implemented, management must listen to the workforce when they're going through their training and they're going through this change. And if they say this is not going to work, and this is why, management needs to listen to that and then take it back and say, okay, this is what the workforce is saying. Let's re-examine this and see if this is really true.

Summary. In summary, participants perceived the ADKAR elements as implicit in or equivalent to existing CSFs. However, participants identified shortfalls in implementation processes as causing gaps between ADKAR elements and existing CSFs. As one example, participants noted a significant gap between the CSFs of goals or vision and the ADKAR elements of awareness and desire when communication from managers to employees about the change was ineffective. To close the gap, participants recommended that management communicate with employees to identify and fill gaps in employees’ awareness of the benefits of the change, build awareness informatively rather than prescriptively, and recruit proponents of change from the workforce to serve as

intermediaries in building awareness and desire in resistant employees. Participants also noted a gap between the CSF of training and the ADKAR element of ability, as employees did not gain the intended level of ability from the training they participated in. The recommended means of addressing this gap was to solicit employee feedback about shortfalls in training and the new ERP software itself and then act on that feedback when appropriate to remove barriers to ability.

Summary

The central research question used to guide this study was: What are the attitudes of current U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model as CSFs to implement ERP software? The central research question was addressed by addressing the three sub-questions.

SQ1 was: How can using the five elements of the ADKAR Model as CSFs to implement ERP software enable U.S. Air Force supply chain managers to prepare their employees before an ERP software implementation? The theme identified during data analysis to address this question was: the ADKAR model can be used to gain buy-in and build ability before implementation. All 11 participants contributed data to this theme. Participants indicated that using awareness, desire, knowledge, and ability is helpful for U.S. Air Force supply chain managers to prepare employees before ERP software implementation. Reinforcement was not described as a distinct CSF, but it was implicit in the cumulative nature of manager-to-subordinate communications used to build awareness and desire and the retraining used to address knowledge and ability gaps. Awareness and desire were built as CSFs through manager-to-employee communications

that emphasized the organizational need for the change and the direct benefits the change would bring to employees, e.g., more efficient processes that reduced workloads. Knowledge was built through formal education and training. Knowledge contributed to ability, and knowledge and ability were further reinforced through manager assessments of employee demonstrations, followed by retraining as needed to address gaps.

SQ2 was: How can using the five elements of the ADKAR Model as CSFs to implement ERP software enable U.S. Air Force supply chain managers to support their employees after an ERP software implementation? The theme used to address this question was: the ADKAR model can be applied iteratively to support employees after implementation. Participants perceived all five ADKAR elements as useful in helping U.S. Air Force supply chain managers to support employees after an ERP software implementation. Awareness and desire should be continually revitalized through ongoing communication between managers and employees about the change, participants indicated, and knowledge and ability should be sustained and expanded through direct assessment, performance measurement, and retraining as needed. Reinforcement was identified specifically as a useful CSF for supporting employees after an ERP software implementation. Participants expressed that it should involve the iterative application of all four of the other ADKAR elements as CSFs, or that it should be focused specifically on reinforcing desire or knowledge and ability.

SQ3 was: What are the recommendations of current U.S. Air Force supply chain managers to eliminate gaps between the CSFs for ERP software implementation and the five elements of the ADKAR Model? The theme used to address this question was: gaps

are minimal but can be eliminated through two-way communication between management and end users. Participants perceived the ADKAR elements as implicit in or equivalent to existing CSFs. However, participants identified shortfalls in implementation processes as causing gaps between ADKAR elements and existing CSFs. As one example, participants noted a significant gap between the CSFs of goals or vision and the ADKAR elements of awareness and desire when communication from managers to employees about the change was ineffective. To close the gap, participants recommended that management communicate with employees to identify and fill gaps in employees' awareness of the benefits of the change, build awareness informatively rather than prescriptively, and recruit proponents of change from the workforce to serve as intermediaries in building awareness and desire in resistant employees. Participants also noted a gap between the CSF of training and the ADKAR element of ability, as when employees did not gain the intended level of ability from the training in which they participated. The recommended means of addressing this gap was to solicit employee feedback about shortfalls in training and in the new ERP software itself and then act on that feedback when appropriate to remove barriers to ability. In Chapter 5, discussion, interpretation, and recommendations based on these findings are presented.

CHAPTER V

CONCLUSION

The purpose of this qualitative, phenomenological study was to explore the attitudes of civilian (non-military) U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model (*awareness, desire, knowledge, ability,* and *reinforcement*) as critical success factors (CSFs) to implement enterprise resource planning (ERP) software. Approximately 90% of change initiatives are unsuccessful (Phelan, 2010), despite identifying CSFs to successfully manage an implementation. The ADKAR Model is an effective five-element framework for understanding change occurring in individuals (Deloitte, n.d., p. ii). Change management is one of the most crucial success factors for ERP implementations (Finney & Corbett, 2007). However, it was unknown whether U.S. Air Force supply chain managers regard the use of the five elements of the ADKAR Model as CSFs to implement ERP software. This study was conducted to address this gap in the literature.

Here is a summation of this study's central research question, data collection method, data analysis method, listing of the three themes resulting from the three sub-questions, and overall findings. The central research question used to guide this study

was, What are the attitudes of U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model as CSFs to implement ERP software? The central research question was addressed by addressing the three sub-questions developed to specify focus areas for this study. Data collection was conducted through one-to-one interviews with 11 U.S. Air Force supply chain managers with experience of ERP software implementation. Data analysis was conducted in NVivo 12 computer-assisted qualitative data analysis software using the phenomenological analysis procedure described by Creswell (2007) and based on a procedure described by Moustakas (1994). Analysis of the interview transcripts yielded three major themes to address the three sub-questions used to guide this study. The three themes were: (1) the ADKAR model can be used to gain buy-in and build ability before implementation, (2) the ADKAR model can be applied iteratively to support employees after implementation, and (3) gaps are minimal but can be eliminated through two-way communication between management and end users. Overall, the findings indicated that U.S. Air Force supply chain managers' attitudes regard all five of the ADKAR Model elements as CSFs for supporting employees before and after an ERP software implementation, but that shortfalls in implementation practices occasionally resulted in gaps between the ADKAR elements and actual results.

Conclusions

The following section of this chapter presents the conclusions based on the findings. Then, this chapter includes recommendations for practice and future research

based on the findings and the previous literature. Finally, a concluding section is then presented to summarize the study outcomes.

The conclusions in this section indicate how the findings in this study confirm, disconfirm, or extend the previous literature. The conclusions are organized by research sub-question to demonstrate the alignment of the findings with the study objectives. Under each sub-question, the conclusions first include a summary of the finding, followed by interpretations of the finding with the literature.

Sub-question 1

SQ1 was: How can using the five elements of the ADKAR Model as CSFs to implement ERP software enable U.S. Air Force supply chain managers to prepare their employees before an ERP software implementation? The theme identified during data analysis to address this question was: the ADKAR model can be used to gain buy-in and build ability before implementation. This finding confirmed and extended previous literature.

The ADKAR Model indicates four strategies which must be managed during a change initiative to conduct an effective information awareness campaign: (1) effective communication; (2) sponsorship from organizational executives; (3) managers and supervisors seeing their role during change as coaches and front-line implementers; and (4) business information about the change that is readily available (Hiatt, 2006). In the data provided by participants in the present study in relation to supporting employees before implementation, effective communication was the most frequently referenced strategy. Findings in this study extended those of Hiatt (2006) by indicating that

communication to raise awareness may be most effective when it emphasizes two types of information. First, participants indicated that communication to raise awareness should emphasize how an ERP software implementation will benefit the organization. Second, participants indicated that communication to raise awareness should emphasize how an implementation will benefit employees. Hiatt identified five factors that may influence an effective effort to build awareness in individuals: How a person views their current state before any change; how a person views the problem necessitating any change; how a person views the credibility of the information awareness campaigner; the fact that a person may circulate misinformation about the change initiative; and how a person may openly challenge the reasons for the change initiative. Findings in the present study have suggested a sixth factor: How a person views their expected state after the change is accomplished.

For participants in this study, the importance of raising awareness among employees before an implementation about their expected state after the implementation was that this form of communication bridged the ADKAR elements of awareness and desire. By raising awareness about how an implementation might benefit employees, participants believed that managers could generate desire for the change (buy-in) among employees. Hiatt (2006) identified four factors that contribute to an individual's desire to participate in a change initiative, two of which are (1) understanding the impact of change on their environment, e.g., their place of employment, and (2) understanding the impact of change on the individual directly. Participants in the present study emphasized awareness-raising of these two factors as the most effective strategy for building desire as

a CSF before implementation. In confirming the findings of Hiatt (2006), participants in this study added to those findings that strategies to raise awareness and desire may be the same and may be conducted concurrently, and that manager communication to build awareness in employees about expected benefits to the individual and the organization may be the most effective strategy for cultivating awareness as well as desire. Among the specific methods participants suggested for communication to raise awareness and desire were meetings involving demonstrations of the new ERP software and an open forum for employees to raise questions and concerns, confirming the finding by Wong et al. (2019) that townhall-style meetings were effective forums for communication. The finding in the present study also confirmed the finding by Balluck et al. (2020) that communication to employees to ensure they were aware of the change requirement helped minimize resistance to the nurses' change. The finding also confirmed those of Altamony et al. (2016) indicating that the CSF communication with end-users aligns with awareness of the need for change, and that the CSF end-user involvement aligns with the desire to participate in the change.

Hiatt (2006) defined knowledge as the acquisition of knowledge, especially about the skills required to perform primary behaviors required by the change, and identified three factors about knowledge required for a change to be realized: training and education to develop necessary skills and abilities, e.g., for end-users of new software; detailed information, e.g., processes and procedures to use new software; and having a clear understanding of the new roles and responsibilities that accompany the use of new software. Participants in the present study confirmed the importance of training and

education to develop necessary skills and abilities and extended Hiatt's findings by prioritizing this knowledge factor. Participants in this study also confirmed the importance of all four knowledge-raising tactics identified by Hiatt (2006), which include: effective end-user training and education; helpful learning aids, e.g., online tutorial videos, workbooks, course curricula, et cetera; coaching and encouragement provided to individuals by managers or supervisors; and groups and forums for end-users to ask questions and get answers, e.g., Q&A forums after training. The finding in the present study also confirmed that of Altamony et al. (2016) indicating that end-user training aligns with ensuring individuals have the knowledge to implement change.

Hiatt (2006) defined ability as the execution of the knowledge and skills acquired through training, such as end-user training. Of the five factors Hiatt (2006) identified as influencing an individual's acquisition of ability through training, only the availability of resources to support a person's acquisition of new abilities was confirmed by the findings in this study. Participants did not disagree that psychological issues, physical issues, intellectual abilities, and available time to demonstrate required abilities were important. However, they appeared to assume that U.S. Air Force personnel would have the necessary traits to benefit from training, and that providing employees with time to demonstrate abilities, e.g., through assessments, was within the discretion of managers.

Of the four tactics that Hiatt recommended for building ability, participants in the present study referenced performance monitoring and hands-on training as effective. This finding confirmed the finding of Balluck et al. (2020) that hands-on exercises and time to practice a new model effectively ensured that employees acquired the ability to

demonstrate required skills and behaviors. The close relationship that participants in the present study perceived between knowledge and ability, in which knowledge was the enabler of ability in an ERP software implementation, diverged from the lack of correspondence found in studies by researchers such as Altamony et al. (2016), Barth and Koch (2019), Fadelelmoula (2018), and Jenko and Roblek (2016) between the ability ADKAR element and any CSF. Findings in the present study instead suggested that the CSF end-user training aligns with both knowledge and ability, because training builds knowledge, and ability is the application of that knowledge. However, participants' attitudes confirmed Hiatt's (2006) description of ability as the execution of the knowledge and skills acquired through training.

Sub-question 2

SQ2 was: How can using the five elements of the ADKAR Model as CSFs to implement ERP software enable U.S. Air Force supply chain managers to support their employees after an ERP software implementation? The theme used to address this question was: the ADKAR model can be applied iteratively to support employees after implementation. This finding was focused heavily on the reinforcement of manager-employee communication to revitalize and remove barriers to awareness and desire continually, and on performance measurement, direct assessment, and retraining to reinforce knowledge and ability.

Notably, the kinds of reinforcement described by participants in this study diverged significantly from the change reinforcement factors identified by Hiatt (2006), which include recognition by management of exemplary performance of new duties,

including celebrations and awards, and personal satisfaction for effectively performing change implementation tasks. Participants in the present study did not reference these change reinforcement factors. Instead, they described cyclical iterations of the ADKAR elements to reinforce awareness, desire, knowledge, and ability as the most effective means of supporting employees after an ERP software implementation.

In addition, while Hiatt (2006) described reinforcement as a form of conditioning to build the association between required behaviors and extrinsic and intrinsic rewards, participants in the present study described reinforcement as repetition of informative and prescriptive manager-to-employee communications and assessment of their effects, followed by further repetitions, e.g., retraining, as needed. The discrepancy between the responses of participants in this study and Hiatt's recommendation of extrinsic and intrinsic rewards as change reinforcement factors may indicate an area for improvement in U.S. Air Force ERP software implementation frameworks. However, participants confirmed the importance of Hiatt's (2006) reinforcement strategies of collecting employee feedback and conducting audits through a system to measure employee performance.

Reinforcement corresponded to an identified CSF only in some studies by previous researchers, such as Wong et al. (2019), Altamony et al. (2016), and Reitsma and Hilletofth (2018). However, it did not correspond to any CSF identified in studies by other researchers, such as Fadelelmoula (2018) and Jenko and Roblek (2016). Participants in the present study confirmed the findings of researchers such as Hiatt (2006), Wong et al. (2019), Altamony et al. (2016), and Reitsma and Hilletofth (2018)

that reinforcement is or should be a CSF for supporting employees after an ERP software implementation. Additionally, participants indicated that in a recent ERP software implementation (ESCAPE), extensive reinforcement was provided to employees via direct assessment and performance measurement to determine the need for retraining, if any existed.

Overall, findings in the present study extended those of researchers such as Fadelelmoula (2018) and Jenko and Roblek (2016) by suggesting that reinforcement is a useful CSF for supporting employees after an ERP software implementation. However, the absence from participants' responses of references to any consideration of rewards to employees (Hiatt, 2006) may indicate a weakness in U.S. Air Force ERP software implementations. Participants' attitudes in this study appeared instead to believe that the extrinsic rewards indicated by manager-to-employee communications describing work-related benefits to employees, e.g., greater efficiency resulting in decreased workload, and benefits to the organization, were sufficient to build and reinforce employee desire.

Sub-question 3

SQ3 was: What are the recommendations of current U.S. Air Force supply chain managers to eliminate gaps between the CSFs for ERP software implementation and the five elements of the ADKAR Model? The theme used to address this question was: gaps are minimal but can be eliminated through two-way communication between management and end users.

Participants identified two specific gaps between existing CSFs and the achievement of ADKAR elements. The first gap was between manager goals or vision

and employee awareness and desire. According to a 2014 report to the U.S. Senate Permanent Subcommittee on Investigations, the primary contributors for the demise of the Expeditionary Combat Support System (ECSS) program initiated in 2004 included a culture of resistance to change in the U.S. Air Force. Participants' views in the present study confirmed this finding. Specifically, most participants perceived lack of employee desire, referred to as reluctance or resistance to change, as the most significant barrier to successful ERP software implementation. Participants attributed lack of desire to many employees' aversion to making the additional effort required to change longstanding work habits associated with legacy systems in favor of new skills and behaviors associated with the implementation of new software. One recommended practice for overcoming employee resistance confirmed Balluck et al.'s (2020) finding that recruiting influential, early adopter employees to function as intermediaries in building awareness and desire among late adopters was effective. Although participants recommended several practices for overcoming employee resistance to build the desire to change, they attributed those practices to individual managers' initiative rather than to an established and uniform U.S. Air Force implementation framework.

The second gap participants in the present study cited between ADKAR elements and existing CSFs was between training and ability. This finding was consistent with those of researchers such as Fadelelmoula (2018) and Jenko and Roblek (2016) indicating no CSF that corresponded to the ability element of ADKAR. However, participants' recommendations for closing the gap confirmed the recommendation by researchers such as Hiatt (2006), Wong et al. (2019), and Altamony et al. (2016) indicating that change

management (the CSF corresponding to reinforcement in these studies) should involve assessment and performance measurement. Participants described performance measurement and direct assessment of employee knowledge and ability as common practices. However, the participants' attitudes and responses suggested that the practices were at least partly at the discretion of managers and that no established, uniform framework existed across the U.S. Air Force for applying the practices before or after an ERP software implementation.

Recommendations

This section comprises two subsections. The first subsection indicates recommendations for practice based on the findings in this study and on previous research. The second subsection indicates recommendations for future research based on the limitations and delimitations of this research.

Recommendations for Practice

Standard Framework Involving the Five ADKAR Elements as CSFs

The first recommendation for practice is that a standardized framework for ERP software implementation involving all five ADKAR elements as CSFs be developed and made compulsory within U.S. Air Force supply chain management. Participants in this study indicated that all five ADKAR elements would or should be CSFs, and that failure to achieve any of those elements was a detriment to successful implementation. Specifically, participants agreed in part with the Senate Permanent Subcommittee on Investigations (2014) in citing a culture of resistance to change in the U.S. Air Force as a

primary factor in the failure of ECSS implementation. Participants further indicated that the culture of resistance to change was still prevalent and that it constituted the primary barrier to present and future implementations of ERP software. Researchers such as Balluck et al. (2020) and Das (2019) have also confirmed that implementing a change management framework such as the ADKAR Model effectively removes the barriers to individual change, on which organizational change depends. Participants in the present study perceived the ADKAR Model as a highly effective means of identifying focus areas for management and employee effort and achievement during ERP software implementations, but some ADKAR elements may not be sufficiently distinguished and targeted in some CSF frameworks. Therefore, it is recommended that the U.S. Air Force take the opportunity to raise the ADKAR elements explicitly to the status of CSFs and identify a framework of factors and strategies for supporting and achieving each element.

Standard Employee Extrinsic and Intrinsic Rewards

Second, it is recommended that employee extrinsic and intrinsic rewards be included in a standardized U.S. Air Force supply chain ERP software implementation framework. Most participants in this study indicated that lack of employee desire was the primary barrier to successful implementation. However, participants' recommendations for building and reinforcing desire, e.g., communicating what the benefits of the change will be for the organization and individual employee, omitted recommendations by Hiatt (2006), Wong et al. (2019), Altamony et al. (2016), and others indicating that reinforcement should involve incentives targeting extrinsic and intrinsic employee motivation. Incentivizing employee intrinsic motivation, e.g., by making use of new ERP

software more enjoyable, is unlikely to be feasible. However, incorporating extrinsic rewards such as formal and informal recognition to perform desired skills and behaviors should be easy to accomplish. Given the apparent challenge represented by employee resistance to change, all reasonable measures that can be undertaken to remove this barrier should not only be attempted but should be standardized. As Riposo et al. (2013) and Prosci ("Model," n.d., "Organizational change requires individual change" section) indicated, organizational change only happens when individuals change, and individual change is more likely to occur effectively when individuals have a desire to change.

Standard Direct and Indirect Assessments of Employee Knowledge and Ability Via Performance Measures

Third, it is recommended that direct assessments of employee knowledge ability, e.g., via supervised demonstrations of skills, and indirect assessments of employee knowledge and ability via performance measures, also be standardized and mandated. Participants perceived a gap between the training provided to U.S. Air Force supply chain employees and subsequent demonstrations of employee ability. However, they indicated that procedures for measuring this gap to target retraining were at least partly at the discretion of managers and were not standardized. As one participant in this study indicated, supply chain performance may be easy to measure because it is easy to quantify factors such as numbers of items delivered and the timeliness of deliveries in relation to expectations. Researchers such as Hiatt (2006), Wong et al. (2019), Altamony et al. (2016), and Reitsma and Hilletofth (2018) have argued that assessment and performance measurement are critical to adequate reinforcement and change sustainment.

From the perspective of the U.S. Air Force, standardized assessments of employee knowledge and ability, and standardized performance measurements, in relation to an ERP software implementation may be a low-hanging fruit, in the sense that these practices may be comparatively easy to implement. However, the U.S. Air Force should not neglect the opportunity to institute best practices concerning performance measurement and provide any needed retraining or alternative training.

Recommendations for Future Research

Replicate the Study with Other U.S. Armed Services

As a qualitative study delimited to a small sample of participants and data collection through self-report, this study had limitations arising from its methodology and procedures. It is recommended that future research be conducted to develop a more robust characterization or refinement of the findings in this study that is free of those limitations. First, the delimitation of the sample in this study to 11 members of the target population, while aligned with best practices for qualitative research (Creswell, 2007), necessarily limited the potential transferability of the findings to other populations and settings.

Therefore, it is recommended that this study be replicated with other populations and settings to assess the transferability of the findings and refine them for broader application if appropriate. Specifically, it is recommended that similar research be conducted with participants from other U.S. Air Force populations and participants from other branches of the U.S. Armed Forces. Similar research in the U.S. Navy may be

particularly fruitful, given that failure to implement ERP software effectively has also occurred there (Kutz & Rhodes, 2005).

Replicate the Study Using Mixed-Methods Case Study Methodology

To address the threats to credibility and dependability associated with the reliance of the findings in this study on participants' self-report, it is recommended that qualitative or mixed-methods case study research be undertaken using the same target population, potentially expanding the scope to other target populations in later iterations of the research. Case study research can involve data triangulation, in which findings from multiple sources of data are compared to identify commonalities and discrepancies (Creswell, 2007). An advantage of the case study research design is that it can yield more robust findings that incorporate analyses of multiple data streams instead of findings based on a single source of data, as is common in phenomenological research of the kind undertaken in the present study. Case study research to refine and extend the findings in this study can involve interviews with end-user employees, researcher observations, and document reviews in addition to manager interviews. Triangulation of the findings from the different perspectives represented in these data streams can yield a more robust characterization of whether and how ADKAR elements are utilized in U.S. Air Force supply chains for ERP software implementations.

Replicate the Study Using Quantitative Methodology

It is recommended that quantitative research be conducted to confirm or disconfirm the robust findings from the previously recommended research in a manner that will be objective and generalizable.

Unfortunately, methodological limitations prevent qualitative research from being objective or generalizable.

As a result, readers of qualitative studies must be cautious in assessing the transferability of the findings and the recommendations based on those findings to other populations and settings in which they may be interested.

However, quantitative research in which a validated survey instrument is administered to a sufficiently large, random sample can be conducted to confirm or disconfirm the findings from exploratory qualitative research on an objective and generalizable basis.

Therefore, it is recommended that the findings from the previously recommended research be utilized as the basis for developing a quantitative questionnaire instrument, which should then be validated and administered.

Replicate the Study Using Comparative Methodology

Lastly, it is recommended that a comparative study be conducted to understand the attitudinal themes, similarities, and differences by geographic location, i.e., Hill Air Force Base (AFB) in Utah, Robins AFB in Georgia, and Tinker AFB in Oklahoma, of the supply chain managers' regarding the use of the five elements of the ADKAR Model as critical success factors for enterprise resource planning software implementations. A benefit of the comparative method is in establishing similarities and variations for the purpose of examining greater meaning and depth. Lincoln and Guba (1989) posit the effectiveness of a case study in that it provides "thick description" (p. 181) of facts,

experiences, and insights. Each location would provide the context and boundary to explore the phenomena and consideration of historical and social contexts that differ given the organizational cultures are unique of each military installation.

Summary

The purpose of this qualitative, phenomenological study was to explore the attitudes of civilian (non-military) U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model (*awareness*, *desire*, *knowledge*, *ability*, and *reinforcement*) as critical success factors (CSFs) to implement enterprise resource planning (ERP) software. The significance of this research was based on the costly failure of the multiyear implementation of ERP software (ECSS) in the U.S. Air Force and the subsequent struggles to implement other such software.

Findings in this study indicated that U.S. Air Force supply chain managers' attitudes show that they consider all five ADKAR elements as helpful and even necessary CSFs for supporting employees before and after an ERP software implementation. Practical implications of the findings indicated: (1) the U.S. Air Force may benefit from integrating the ADKAR Model into a standardized change framework for ERP software implementation in its supply chain; (2) the framework should address employee extrinsic motivation by standardizing and mandating formal and informal recognition for employee demonstrations of required skills and behaviors; and (3) performance measurement should likewise be standardized and mandated to assess the need for reinforcement of required skills and behaviors through retraining or alternative training.

Overall, the findings indicated that the culture of the U.S. Air Force may still involve significant and pervasive employee resistance to change, and that removing the barrier of this resistance is critical to success in future ERP software implementations. While duty and the desire to work more efficiently may be powerful motivations for U.S. Air Force personnel to implement change, the U.S. Air Force should not neglect opportunities in two key areas. First, further strengthen employee motivation through low-cost practices such as recognition by managers. Second, further strengthen employee knowledge and ability whenever possible through targeted skills reinforcement based on accurate, standardized performance measures.

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TABLES

TABLE 15

Alignment of ERP CSFs to the Awareness Element of the ADKAR Model.

The below listed ERP CSFs were provided in the reviewed literature and align to the *awareness* element of the ADKAR Model with corresponding authors of ERP CSFs literature.

CSFs from the Reviewed Literature	Authors of Reviewed Literature
Communicate throughout the change initiative; communication; communication to end-users; communication to stakeholders; communicate to the workforce to ensure all are aware of change requirement	Altamony et al. (2016); Balluck et al. (2020); Barth and Koch (2019); Horlick (n.d.); Kiran and Reddy (2019); Umble et al. (2003); Wong et al. (2019); Yeh and Walter (2016)
Understanding why change is necessary	Umble et al. (2003)
A clear statement of requirements; realistic expectations; vision, and objectives are clear	Zouaghi and Laghouag (2016)

TABLE 16

Alignment of ERP CSFs to the Desire Element of the ADKAR Model.

The below listed ERP CSFs were provided in the reviewed literature and align to the *desire* element of the ADKAR Model with corresponding authors of ERP CSFs literature.

CSFs from the Reviewed Literature	Authors of Reviewed Literature
Top management support; resources and focus; advocate for the change; strategic decision-making	Altamony et al. (2016); Balluck et al. (2020); Barth and Koch (2019); Fadelelmoula (2018); Horlick (n.d.); Jiwasiddi and Mondong (2018); Kiran and Reddy (2019); Reitsma and Hilletofth (2018); Umble et al. (2003); Yeh and Walter (2016); Zouaghi and Laghouag (2016)
End-user involvement; foster workforce participation and involvement; fulfill workforce desire to be included in the change; involvement by staff or end-users; key user integration; user involvement during implementation	Altamony et al. (2016); Balluck et al. (2020); Barth and Koch (2019); Wong et al. (2019); Yeh and Walter (2016); Zouaghi and Laghouag (2016)
Consultant support; external support; support from vendors	Barth and Koch (2019); Fadelelmoula (2018); Yeh and Walter (2016)
Cross-functional implementation team; implementation team; project leadership; project ownership; project team's focus and motivation	Altamony et al. (2016); Umble et al. (2003); Zouaghi and Laghouag (2016)
Manage employee resistance; manage end-user emotions; manage employee resistance	Balluck et al. (2020); Horlick (n.d.); Yeh and Walter (2016)
Testing; software testing; system testing	Altamony et al. (2016); Barth and Koch (2019); Reitsma and Hilletofth (2018)
Technical resources	Fadelelmoula (2018)

TABLE 17

Alignment of ERP CSFs to the Knowledge Element of the ADKAR Model.

The below listed ERP CSFs were provided in the reviewed literature and align to the *knowledge* element of the ADKAR Model. Presented with corresponding authors of ERP CSFs literature.

CSFs from the Reviewed Literature	Authors of Reviewed Literature
End-user training; ensure workforce acquires proper training; provide training before the change occurs to ensure workforce has knowledge to effect change; train end-users; training; training and education	Altamony et al. (2016); Balluck et al. (2020); Fadelelmoula (2018); Jiwasiddi and Mondong (2018); Reitsma and Hilletofth (2018); Umble et al. (2003); Yeh and Walter (2016); Wong et al. (2019)
Coaching by supervisors and change agents to ensure workforce has knowledge to change	Balluck et al. (2020); Horlick (n.d.)

TABLE 18

Alignment of ERP CSFs to the Ability Element of the ADKAR Model.

The below listed ERP CSFs were provided in the reviewed literature and align to the *ability* element of the ADKAR Model. Presented with corresponding authors of ERP CSFs literature.

CSFs from the Reviewed Literature	Authors of Reviewed Literature
Coaching by supervisors and change agents to ensure workforce can demonstrate ability to change	Balluck et al. (2020); Horlick (n.d.)
Ensure the workforce has sufficient time to acquire the ability to demonstrate required skills and behaviors	Balluck et al. (2020)
Provide ability for workforce to adapt to new environments or processes, identify and solve problems, and deliver improvements	Wong et al. (2019)

TABLE 19

Alignment of ERP CSFs to the Reinforcement Element of the ADKAR Model.

The below listed ERP CSFs were provided in the reviewed literature and align to the *reinforcement* element of the ADKAR Model. Presented with corresponding authors of ERP CSFs literature.

CSFs from the Reviewed Literature	Authors of Reviewed Literature
Change management; change manager liaison between top management and the workforce; organizational change management (OCM)	Balluck et al. (2020); Barth and Koch (2019); Horlick (n.d.); Jiwasiddi and Mondong (2018); Umble et al. (2003)
Business process alignment; BPR with minimal customization; business process reengineering; changes to business processes	Fadelelmoula (2018); Kiran and Reddy (2019); Reitsma and Hilletofth (2018); Umble et al. (2003)
Managing and tracking the project; performance measurement; performance measures	Reitsma and Hilletofth (2018); Umble et al. (2003); Yeh and Walter (2016)
Help the workforce to reinforce the required changes to last through sustainment; support the workforce technically and practically	Balluck et al. (2020); Wong et al. (2019)
Organizational culture; organizational factors; organizational leadership	Altamony et al. (2016); Kiran and Reddy (2019)
Apply lessons learned	Barth and Koch (2019)

TABLE 20

ERP CSFs not Aligning to Any Element of the ADKAR Model.

The below listed ERP CSFs were provided in the reviewed literature but do not align to any element of the ADKAR Model. Presented with corresponding authors of ERP CSFs literature.

CSFs from the Reviewed Literature	Authors of Reviewed Literature
Project management excellence; project team competence; competence of the project team ERP teams; implementation team; project leadership; project management; project support; project team; project team competence; proper planning; team composition	Altamony et al. (2016); Barth and Koch (2019); Fadelelmoula (2018); Jenko and Roblek (2016); Reitsma and Hilletofth (2018); Umble et al. (2003); Yeh and Walter (2016); Zouaghi and Laghouag (2016)
Analysis and conversion of data; data and code cleansing	Barth and Koch (2019); Yeh and Walter (2016)
Minimum customization; selecting the right ERP system; technical possibilities	Kiran and Reddy (2019); Reitsma and Hilletofth (2018)
Multiple system landscape	Barth and Koch (2019)
Multi-site issues	Umble et al. (2003)
Smaller project milestones	Zouaghi and Laghouag (2016)
Stick to the standard	Barth and Koch (2019)
Use of new potentials	Barth and Koch (2019)

APPENDICES

APPENDIX A

IRB APPROVAL FORM

Oklahoma State University Institutional Review Board

Date:	05/14/2021
Application Number:	IRB-21-233
Proposal Title:	US AIR FORCE SUPPLY CHAIN MANAGERS SHARE ATTITUDES REGARDING THE USE OF THE FIVE ELEMENTS OF THE ADKAR MODEL AS CRITICAL SUCCESS FACTORS TO IMPLEMENT ENTERPRISE RESOURCE PLANNING SOFTWARE
Principal Investigator:	Jimbo Crowson
Co-Investigator(s):	
Faculty Adviser:	Chad Depperschmidt
Project Coordinator:	
Research Assistant(s):	
Processed as:	Exempt
Exempt Category:	

Status Recommended by Reviewer(s): Approved

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in 45CFR46.

This study meets criteria in the Revised Common Rule, as well as, one or more of the circumstances for which continuing review is not required. As Principal Investigator of this research, you will be required to submit a status report to the IRB triennially.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any unanticipated and/or adverse events to the IRB Office promptly.
4. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 405-744-3377 or irb@okstate.edu.

Sincerely,
Oklahoma State University IRB

APPENDIX B

PARTICIPANT LETTER

Dear Sir or Ma'am,

The U.S. Air Force implements new software from time to time. Examples include the failed, monumental AF-wide 400+ legacy system implementation project called the Expeditionary Combat Support System (ECSS), to the much smaller but successful Purchase Request Processing System (PRPS), or to the current Air Force Materiel Command (AFMC) enterprise resource planning (ERP) software implementation project called the Enterprise Supply Chain Analyses, Planning and Execution (ESCAPE) program. Research shows that whether it is the Air Force or industry, ERP implementations tend to fail upwards of 75% of the time to meet implementation objectives. Researchers say that "the single biggest failure point for ERP implementations is the need for change management" (Deloitte, n.d., p.ii). Change management in this context is about managing the people involved in change.

Though failure is common in ERP software implementations, it is unavoidable in part because the people-side of the change can be managed. For example, the ADKAR Model (*awareness, desire, knowledge, ability,* and *reinforcement*) is an effective five-element framework for understanding change occurring in individuals. The elements can be viewed as sequential building blocks to bring about successful change in individuals.

> In summary, here is the one question I want to answer: Do civilian (non-military) U.S. Air Force supply chain managers think the five elements of the ADKAR Model are critical to successfully implementing a new ERP software?

Please review the enclosed Informed Consent Document. It details the purpose and procedures of the study, as well as provides important information regarding confidentiality. If you would be willing to participate in my study, please sign and date the document and return to me. If you have any questions about the study or the interview process, please contact me at James.Crowson@OkState.edu or at (405) 633-3683. Thank you in advance for your willingness to participate in this study. I look forward to hearing from you.

//SIGNED//
James W. Crowson, MBA, MPA, Ed.D. Candidate
School of Educational Foundations
Leadership and Aviation
College of Education and Human Sciences
Oklahoma State University

APPENDIX C

INFORMED CONSENT DOCUMENT

Project Title: U.S. AIR FORCE SUPPLY CHAIN MANAGERS SHARE ATTITUDES REGARDING THE USE OF THE FIVE ELEMENTS OF THE ADKAR MODEL AS CRITICAL SUCCESS FACTORS TO IMPLEMENT ENTERPRISE RESOURCE PLANNING SOFTWARE

Background Information

You are invited to be in a research study to explore the attitudes of civilian U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model (awareness, desire, knowledge, ability, and reinforcement as critical success factors (CSFs) to implement enterprise resource planning (ERP) software. We ask that you read this form and ask any questions you may have before agreeing to be in the study. Your participation in this research is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this project at any time. You can skip any questions that make you uncomfortable and can stop the interview at any time. Your decision whether to participate in this study will not affect your employment.

This study is being conducted by:

James Crowson, an Oklahoma State University doctoral candidate in the College of Education and Human Sciences, under the direction of Dr. Chad Depperschmidt, School Head of Educational Foundations (Leadership and Aviation).

Procedures:

If you agree to be in this study, we will ask you to do the following things:

1. Prior to the interview, please read the interview questions and the definitions provided in the interview guide.
2. You will be asked a series of 13 questions related to the ADKAR Model and the implementation of ERP software.

3. Please answer the interview questions truthfully and honestly to the best of your knowledge and ability.
4. During the interview, if you do not understand the meaning of a question or a word, please ask the researcher to explain.
5. When the interview starts, the researcher will notify you that the interview is being recorded. The researcher will notify you when the interview finishes and will stop the audio recording.

Participation in this Study Involves the Following Time Commitment:

One interview session consisting of 60 minutes or less.

Confidentiality:

The information that you give in the study will be handled confidentially. The researcher will do everything in his power to maintain your privacy. The researcher will know your identity, but it will not be disclosed to anyone else. We will collect your information through an interview, which will be audio recorded. This audio recording will be stored in a password-protected folder in a cloud-based storage system. The audio recording will be transcribed. The audio recording will be deleted after the transcription is complete and verified, within 30 days of transcription. The transcripts will be kept as part of the study records indefinitely. However, the transcripts will not have any information to identify you. Only the researcher James Crowson and the researcher's advisor Dr. Depperschmidt will have access to the transcripts.

Contacts and Questions:

The Institutional Review Board (IRB) for the protection of human research participants at Oklahoma State University has reviewed and approved this study. If you have questions about the research study itself, please contact the Principal Investigator at 405-633-3683, james.crowson@okstate.edu. If you have questions about your rights as a research volunteer or would simply like to speak with someone other than the research team about concerns regarding this study, please contact the IRB at (405) 744-3377 or irb@okstate.edu. All reports or correspondence will be kept confidential.

Statement of Consent:

I have read the above information. I have had the opportunity to ask questions and have my questions answered. I consent to participate in the study.

Indicate Yes or No:

I give consent to be audio-taped during this study.

___Yes ___No

I give consent for my data to be used in future research studies:

___Yes ___No

I give consent to be contacted for follow-up in this study or future similar studies:

___Yes ___No

Signature: _____ Date: _____

Signature of Investigator: _____ Date: _____

APPENDIX D

INTERVIEW GUIDE (RESEARCH QUESTIONS)

From: James Crowson
RE: Interview Guide of Questions about the Attitudes of Current or Former U.S. Air Force Supply Chain Managers Regarding using the Five Elements of the ADKAR Model as Critical Success Factors to Implement Enterprise Resource Planning Software

Dear Sir or Ma'am,

My name is James Crowson, and I am conducting a study as part of my doctoral dissertation at Oklahoma State University. This interview contains 13 research questions to explore the attitudes of current or former U.S. Air Force supply chain managers regarding the use of the five elements of the ADKAR Model (*awareness, desire, knowledge, ability,* and *reinforcement*) as critical success factors (CSFs) to implement enterprise resource planning (ERP) software.

> In summary, here is the one question I want to answer: Do civilian (non-military) U.S. Air Force supply chain managers think the five elements of the ADKAR Model are critical to successfully implementing a new ERP software?

The informed consent document, which you signed is your agreement to be a confidential research participant. This interview will be audio recorded and will last 60 minutes or less.

Please feel at ease to share your honest opinions. Your thoughts are essential to the outcome of this study. If you want to pause at any time to take a break, please let me know.

If you do not want to answer a question, please let me know, and I will skip that question. If you have any questions before we get started, please let me know.

//SIGNED//
James W. Crowson, MBA, MPA, Ed.D. Candidate
School of Educational Foundations
Leadership and Aviation
College of Education and Human Sciences
Oklahoma State University

RESEARCH QUESTIONS

1. How long have you been associated or employed with U.S. Air Force supply chain management?
2. Please briefly share any U.S. Air Force experience you have with deploying enterprise resource planning (ERP) software or other types of U.S. Air Force legacy system enterprise-wide software implementations.
    a. Examples: D032, D035A, D041, D043A, D143C, RMS/D200 Suite, ABCS, CAV-AF, ECSS, ESCAPE SPM, EXPRESS, GCSS-AF, LIMS-EV (SMART), MROi, PRPS, RBL, etc.
3. Please briefly share any U.S. Air Force experience you have using any change management method to lead employees through changes resulting from new ERP software implementations.
    a. Examples: ADKAR Model (*awareness*, *desire*, *knowledge*, *ability*, and *reinforcement*), Kotter's 8 Steps, Air Force Smart Operations Twenty-first Century (AFSO-21), Air Force 8-Step Practical Problem-Solving Method, the AFSC Way or the Art of the Possible (AoP), etc.
4. What does the term "enterprise resource planning" mean to you?
5. What does the term "critical success factor" (CSF) mean to you?
6. What are a few examples of CSFs that must be managed to help employees adopt and use a new ERP software, such as the examples in question 2a. above?
7. What is the greatest potential challenge that a supply chain manager or supervisor faces when on the receiving end of new ERP software, such as the examples in question 2a. above? Do you think the five *ADKAR* elements could help manage this challenge?
8. What is the greatest potential challenge when you are faced with an ERP software implementation, such as the examples in question 2a. above and others that will no doubt be deployed in the future? Could the ADKAR Model help you help your employees? If yes, why? If no, why?
9. Think of a successful U.S. Air Force supply chain manager, such as a first-line supervisor, branch chief, flight chief, division chief, squadron director or commander, or group director or commander, etc. that you know personally or respect highly. How do you think this person would manage their employees'

success through a new ERP software implementation by using the five *ADKAR* elements? Do you share the same thoughts?

10. What advantages or disadvantages do you see in aligning (or matching) ERP CSFs with the five elements of the ADKAR Model? Refer to table below.

Common Enterprise Resource Planning Critical Success Factors	ADKAR Model Elements as Critical Success Factors
Communication to workforce/end-users Inter-departmental communications	Awareness of the need to change
End-user involvement Top management support	Desire to support and participate in a change
End-user training Provide training before the change occurs	Knowledge of how to change, aka, training, and skill development
Provide ability for workforce to adapt to the new changes Ensure the workforce has sufficient time to learn newly required skills	Ability to perform new required activities
Organizational change management Performance management Continue to support the workforce technically and practically	Continuous reinforcement of the previous 4 elements (ADKA) to sustain a change

11. As a supervisor or manager, how can using the five elements of the ADKAR Model to manage change help you to *prepare* your employees *before* an ERP software implementation, such as the examples in question 2a. above? Can you provide an example?

12. As a supervisor or manager, how can using the five elements of the ADKAR Model to manage change help you to *support* your employees *after* an ERP software implementation into sustainment? Can you provide an example?

13. Do you consider any or all the five elements of the ADKAR Model to be CSFs to implement an ERP software successfully or are there gaps between ERP CSFs and the five ADKAR elements?

HELPFUL DEFINITIONS

ADKAR Model: ADKAR is a five-factor framework for understanding change occurring at an individual level. The factors can be viewed as sequential building blocks to bring about successful change in individuals. “A” represents awareness. “D” represents desire. “K” represents knowledge. “A” represents ability. “R” represents reinforcement (Hiatt, 2006).

ADKAR Model Element – Awareness: Awareness is the first element of the ADKAR Model of change management and is achieved when an individual understands the nature of the change, why the change is necessary, and the risks of not changing (Hiatt, 2006); for the present study, it is also considered a CSF for the implementation of ERP software.

ADKAR Model Element – Desire: Desire is the second element of the ADKAR Model and represents the motivation of an individual to participate in and support a change initiative (Hiatt, 2006); for the present study, it is also considered a CSF for the implementation of ERP software.

ADKAR Model Element – Knowledge: Knowledge is the third element of the ADKAR Model and represents training about how to change (Hiatt, 2006); for the present study, it is also considered a CSF for the implementation of ERP software.

ADKAR Model Element – Ability: Ability is the fourth element of the ADKAR Model and represents an individual’s capability to change and perform according to new requirements (Hiatt, 2006); for the present study, it is also considered a CSF for the implementation of ERP software.

ADKAR Model Element – Reinforcement: Reinforcement is the fifth element of the ADKAR Model represents action to sustain changes in individuals and organizations, also known as *making change stick* (Hiatt, 2006); for the present study, it is also considered a CSF for the implementation of ERP software.

Critical Success Factor (CSF): A CSF is an aspect of a project that which must occur correctly for a project to succeed (Rockart, 1979), and management of CSFs is a process that must occur correctly for an ERP software implementation to succeed.

CSF – Business Process Alignment: This is a CSF that must be managed to ensure that the implementation of a new ERP software meets the technical requirements as opposed to replicating the capabilities from the retiring legacy system (Reitsma & Hilletofth, 2018).

CSF – Business Plan and Vision, Clear Goals and Objectives, Clear Vision and Understanding of Strategic Goals, and Realistic Expectations: This is a CSF that must be managed to enable individuals to understand why an ERP software implementation is occurring and the actual improvements the new system will deliver to the enterprise (Barth & Koch, 2019; Jiwasiddi & Mondong, 2018; Umble et al., 2003; Zouaghi & Laghouag, 2016).

CSF – Communications: This is a CSF that must be managed to enable the user population to be aware of a change initiative and why it is necessary (Altamony et al., 2016; Barth & Koch, 2019; Jenko & Roblek, 2016; Jiwasiddi & Mondong, 2018; Kiran & Reddy, 2019; Reitsma & Hilletofth, 2018; Umble et al., 2003; Yeh & Walter, 2016).

CSF – Empowered Decision-Makers and Strategic Decision-Making: This is a CSF that must be managed wherein senior leaders strategically implement a new ERP system. If they do not, then employees will be concerned about how the new system will affect them (Jenko & Roblek, 2016; Reitsma & Hilletofth, 2018).

CSF – End User Involvement: This is a CSF that must be managed to ensure that users of the new ERP software can be involved in the complete lifecycle of the implementation change process (Altamony et al., 2016; Barth & Koch, 2019; Jenko & Roblek, 2016; Jiwasiddi & Mondong, 2018; Yeh & Walter, 2016; Zouaghi & Laghouag, 2016).

CSF – End User Training: This is a CSF that must be managed to ensure that individual employees required to use the new ERP software will receive training. This factor is considered one of the most critical factors for implementation success. Employees must be given the knowledge required to demonstrate required skills and performance (Altamony et al., 2016; Barth & Koch, 2019; Fadelelmoula, 2018; Jenko & Roblek, 2016; Jiwasiddi & Mondong, 2018; Kiran & Reddy, 2019; Reitsma & Hilletofth, 2018; Umble et al., 2003; Yeh & Walter, 2016).

CSF – Organizational Change Management (OCM) and Change Management Plan: This is a CSF that must be used to manage the impacts on the organization and individual employees stemming from ERP software implementation. Impacts include changes to standard business processes, employee roles and responsibilities, and policies, all of which require effective change management (Barth & Koch, 2019; Jiwasiddi & Mondong, 2018; Kiran & Reddy, 2019; Reitsma & Hilletofth, 2018; Umble et al., 2003).

CSF – Performance Measurement: This is a CSF that must be used to manage individual users' expectations and to achieve stated business objectives (Reitsma & Hilletofth, 2018; Umble et al., 2003).

CSF – Top Management Support and Involvement: This is a CSF that must be managed to ensure that top managers or leaders dedicate funding and personnel to an implementation project and are perceived from an individual employee's perspective as supporting the project both in observation and in their speech (Barth & Koch, 2019; Fadelelmoula, 2018; Jenko & Roblek, 2016; Jiwasiddi & Mondong, 2018; Kiran & Reddy, 2019; Reitsma & Hilletofth, 2018; Umble et al., 2003; Yeh & Walter, 2016; Zouaghi & Laghouag, 2016).

Enterprise Resource Planning Software: Enterprise resource planning software is configurable, commercial off-the-shelf (COTS) software packages designed to enable an organization to integrate operational and management processes across a broad range of internal business activities, including procurement, inventory management, accounting, finance, human resources, et cetera.

APPENDIX E

DISSERTATION TIMELINE

Following is the proposed timeline of this research plan.

1. Obtain approval of research proposal by dissertation committee by April 30, 2021.
2. Obtain approval to conduct interviews from IRB by May 31, 2021.
3. Conduct interviews in June 2021.
4. Analyze data and write findings and conclusions from June to August 2021.
5. Submit the initial dissertation draft to dissertation committee in August 2021.
6. Submit the subsequent dissertation draft with committee's change requirements in September 2021.
7. Prepare for the dissertation defense in October 2021.
8. Defend the dissertation October 25, 2021.
9. Complete all requirements to graduate in November 2021.
10. Graduate in December 2021.

APPENDIX F

STUDY DEMOGRAPHICS

(Refer to Table 22, p. 85)

Demographic aspects of the eleven research participants were identified by:

1. Gender.
2. Air force base location.
3. Highest level of education.
4. Years of U.S. Air Force supply chain management experience.
5. U.S. Air Force-related major software implementation experience by system name.

VITA

JAMES W. CROWSON

Candidate for the Degree of

Doctor of Education

Dissertation: U.S. AIR FORCE SUPPLY CHAIN MANAGERS SHARE ATTITUDES REGARDING THE USE OF THE FIVE ELEMENTS OF THE ADKAR MODEL AS CRITICAL SUCCESS FACTORS TO IMPLEMENT ENTERPRISE RESOURCE PLANNING SOFTWARE

Major Field: Applied educational studies with an emphasis on aviation and space science

Education:

Completed the requirements for the Doctor of Education in applied educational studies at Oklahoma State University, Stillwater, Oklahoma in December 2021.

Completed the requirements for the Master of Business Administration at Aspen University, Denver, Colorado, in 2017.

Completed the requirements for the Master of Public Administration at the University of Oklahoma, Norman, Oklahoma, in 2010.

Completed the requirements for the Bachelor of Arts in political science at the University of Oklahoma, Norman, Oklahoma, in 1998.

Experience: Thirty-two years of combined U.S. Navy enlisted and commissioned service and U.S. Air Force civilian service. Currently employed as the Enterprise Supply Chain Analyses, Planning and Execution (ESCAPE) Functional Director/Lead for the 448th Supply Chain Management Wing, Air Force Sustainment Center, Headquarters Air Force Materiel Command, Tinker Air Force Base, Oklahoma, providing technical executive authority for Information Technology (IT) system transformation, and functioning as the incumbent senior project manager and change manager for the ESCAPE ERP implementation.

Professional Memberships: Air Force Association, Navy League of the United States, Space Force Association, Change Management Institute.