A Framework to Improve Enterprise-Wide Implementations: The Case of the Veterans Health Administration Telehealth Expansion

by

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Abstract
This research applies an implementation framework derived from enterprise systems thinking to the Veterans Health Administration (VHA) Telehealth Expansion in order to characterize and evaluate the implementation methods used to expand Telehealth nation-wide. An in-depth, multi-disciplinary literature review was conducted to identify how enterprise-wide implementations are characterized in the literature and then was used to inform the development of a baseline enterprise implementation framework, the Timeline Implementation Framework. Said framework aims to characterize enterprise-wide implementations over time, from conceptualization to evaluation and sustainment, by breaking down an implementation into four phases (Enterprise Analysis, Implementation Planning, Implementation Execution and Innovation Evaluation) based on the nature of the activities and concepts that occur during each phase.

The Timeline Implementation Framework was then applied to the VHA Telehealth Expansion. The framework guided study methods and facilitated analysis of a Clinical Video Telehealth clinic implementation. Further analysis was conducted in order to understand the VHA Telehealth expansion by considering an enterprise perspective of Telehealth’s impact on VHA, and vice versa. Data collection included qualitative and quantitative evidence sources (e.g., interviews, observation, internal documents, and archival records) in order to gather information required to populate the developed framework.

Fifteen interviews were conducted with VHA employees to allow for various perspectives emerging from multiple stakeholders with different roles across the enterprise.

Conclusions aim to improve VHA implementation strategies in three key ways. First, by applying the framework to a Telehealth clinic, study findings help depict Telehealth expansion at a facility level. Second, results are used to provide constructive recommendations regarding implementation strategies throughout VHA. Third, this study tests the generalizability of the framework before applying it in further implementations.

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Disclaimer: The views presented here are those of the author and do not necessarily represent the views of the Departments of Veterans Affairs, or of the United States government.
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1 Introduction

1.1 Motivation

Given the fragile state of the American economy, the United States government is committed to transforming its financial system through innovative methods in order to reduce the deficit, cut wasteful spending and create a sustainable system that benefits the country as a whole, as well as its citizens (Obama 2012). During this current economic crisis, the Department of Veterans Affairs (VA) is determined to "ensure accountability, maximize efficiency and effectiveness, and eliminate waste while improving the delivery of high quality and timely benefits and services to Veterans" (Department of Veterans Affairs 2012). However, VA's requested budget of 140.3 billion dollars' for Fiscal Year (FY) 2013 is nearly 4.5% over their FY2012 budget (Department of Veterans Affairs 2012). With evident uncertainties in the federal budget and changing Veteran demographics (e.g., influx of Operation Iraqi Freedom and Operation Enduring Freedom Veterans, and growing female Veteran population), it is important for VA to recognize these uncertainties, understand their potential influence on VA operations, and embrace the national aim of using innovative techniques to become a more cost-effective, Veteran-centric system.

Veterans Health Administration (VHA) is one of three administrations managed by VA. One of VHA's highest priorities is to expand the use of Telehealth services in order to increase Veteran access to quality health care by allowing providers to treat patients remotely. Specifically, in 2011 VHA tasked all of its regional entities with the objective of creating a "3-year plan to ensure that 50% of [unique patients] are receiving services through virtual care on or before October 2014" (VHA Office of Healthcare Transformation 2011). Although virtual care is comprised of six electronic health care methods, the three Telehealth modalities could arguably provide a more valuable service (with respect to the type and benefit of medical treatment offered) than alternative methods (e.g., the value of expediting eye treatment

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1 Approximately 64 billion dollars in discretionary resources and 76.4 billion dollars in mandatory funds
2 The remaining two include National Cemetery Administration and Veterans Benefits Administration.
3 Telehealth is comprised of three modalities: Clinical Video Telehealth (CVT) where patients and providers are linked over a secure video-conference link, Store-and-Forward (SF), where an medical information of a patient's condition is captured and stored in the patient's electronic medical record and consulted by a provider at a later date, and Home Telehealth (HT) where some type of monitoring device is set up in the home and health information is communicated to a Care Coordinator.
4 The six virtual care modalities include: the three Telehealth modalities (CVT, SF, and HT); opting in for secure messaging (SM) through MyHealthVet, a secure, online patient portal; e-consults, where providers asynchronously consult another provider regarding a particular patient case; and SCAN-ECHO (Specialty Care Access Network-Extension for Community Healthcare Outcomes) where primary care providers connect with specialist as a way to provide specialty care treatment to their patients (performed through a video-conferencing system similar to CVT).
through a Store-and-Forward diabetic retinal screening relative to value in one instance of communication via secure messaging).

![Map of the 21 Veterans Integrated Service Networks](image)

**Figure 1-1: Map of the 21 Veterans Integrated Service Networks (Department of Veterans Affairs 2009)**

For the purpose of this research, investigation of VHA Telehealth expansion efforts began with the collaboration between Massachusetts Institute of Technology (MIT) and the New England Veterans Engineering Resource Center (NE VERC); this collaboration was inspired by a graduate course project completed in the fall of 2011. While studying VHA and its national Telehealth expansion in the context of the course project, the author began to appreciate the value of understanding both macro and micro level operations of such a large-scale, complex organization. VHA is divided into twenty-one regional entities or "networks" (see Figure 1-1 for a map of the regional networks) known as Veterans Integrated Service Networks (VISNs). Although VISNs receive directives, guidance and resources from multiple national entities, each network is separately responsible for creating its own vision and managing internal operations in line with VA National policies. VA medical centers and outpatient clinics are distributed throughout each VISN and organized in a hub and spoke model, such that one (or more) VA medical center(s) is associated with multiple outpatient clinics distributed throughout the surrounding community.

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5 Although VISNs are numbered up to VISN 23, VISNs 13 and 14 merged to form VISN 23, leaving 21 regional networks.
for geographic convenience. For instance, New England (VISN 1\(^6\)) has 11 medical centers, 43 outpatient clinics, and serves approximately 250,000 unique patients.

![Number of patients and operating budget allocations for each VISN in FY 2012](image)

Figure 1-2: Number of patients and operating budget allocations for each VISN in FY 2012\(^7\)

If Telehealth is implemented in a way that reduces the overall cost of health care, it could be an effective way for VHA to increase access to care for Veterans while becoming a more cost-effective system. Figure 1-2 was derived in order to illustrate VHA costs associated with providing health care to Veterans across the United States in FY 2012. The black data points represent the number of patients served along with the annual operating budget in each VISN\(^8\). Although other factors influence the annual expenditure carried by each VISN, the linear trend (R\(^2\) of 0.93) of the data shows how VHA funding allocations to VA medical centers are distributed as a capitated model based on the number of unique patients\(^9\) served at the facility. Consider the blue (urban distribution) and red (rural distribution) lines above and below each black data point in Figure 1-2, respectively. The differences in rurality\(^10\) between VISNs show that the

\(^{6}\) For reference, VISN 1 expenditure in FY 2012 was approximately 2.1 billion dollars.

\(^{7}\) Black points indicate the total number of patients vs. expenditure. Blue/red lines above/below each black point represent the percentage of patients located in urban/rural setting in that region.

\(^{8}\) Patient information found in an internal VA database, and budget information found in an internal VA report respectively.

\(^{9}\) “Unique patients” refers to distinct individuals who receive care by the VA. This measure does not take into account the number a patients appointment frequency; for example, a patient having one encounter (a single encounter with one health care provider for a specific medical task, e.g. EKG test, appointment with a specialist) is measured equally to a patient having multiple encounters in a given year.

\(^{10}\) Patient rurality is categorized as follows: "urban" are areas defined as urban by United States Census; "rural" are areas excluded as urban by United States Census; "highly rural" are rural counties were the average population is less than 7.0 citizens per square mile; and "unknown" is used when a patient address is unknown.
number of unique patients is not the only factor that influences VISN expenditure (e.g., VISN 3 and VISN 19, each serving approximately 200,000 unique patients in FY 2012). Therefore, the VHA may want to consider additional factors on a national level (such as rurality\textsuperscript{11}) when planning, implementing and evaluating national Telehealth programs.

Through the course project, the author was introduced to VHA and motivated to better capture and assess enterprise-wide implementations. This research takes advantage of the 2011-2014 VHA Telehealth expansion in order to understand the concepts that should be considered during the planning, execution and evaluation of an enterprise-wide implementation, as well as how this information can be utilized to improve current and future implementations. An analysis of a Clinical Video Telehealth (CVT) clinic, combined with national and network level perspectives, helps form a richer understanding of the current state of Telehealth in VISN 1 and how high level strategies influence implementation efforts at the facility level, and vise versa. Results from the study are then used to provide recommendations to improve current and future VHA implementations.

1.2 Research Questions

This thesis aims to address five research questions:

Q1) How have enterprise-wide implementations and innovation been characterized in the literature?

Q2) How can enterprise-wide implementations be characterized over time, from implementation conceptualization to evaluation and sustainment, in a way that informs current and future implementation efforts?

Q3) What is the current state of the VHA Telehealth expansion?

Q4) Given the current state and objectives of the VHA Telehealth expansion, how can Telehealth implementation be improved?

Q5) How can the characterization and evaluation of Telehealth implementation efforts inform the development and execution of implementation strategies for current and future VHA initiatives?

Research questions are described below, along with an overview of the research methods used to answer each question. Throughout the course of the research, the author has been in contact with VHA representatives for input on study design, execution and conclusions. Refer to Chapter 4 for details on research methods and their relation to the research questions.

\textsuperscript{11} The Veterans Equitable Resource Allocation (VERA) model responsible for distributing funds to VISNs currently does not include rurality as a contributing factor (Veterans Equitable Resource Allocation 2012).
Question 1: How have enterprise-wide implementations and innovation been characterized in the literature?

The literature is dense with concepts, hypotheses and results pertinent to understanding and informing enterprise-wide implementations. In reviewing well-cited publications on three main topics of interest (organizations, implementation and evaluation), key concepts relevant to enterprise-wide implementations emerged. Chapter 2 answers Question 1 by describing these key concepts and highlighting how they lay the foundation for addressing Question 2.

Question 2: How can enterprise-wide implementations be characterized over time, from implementation conceptualization to evaluation and sustainment, in a way that informs current and future implementation efforts?

An implementation framework can help an enterprise identify factors that influence, and are influenced by, implementation, which in turn could allow for correctional intervention by the enterprise, if necessary. An inherent assumption is that a greater understanding of the process will lead to a more informed response that will improve current implementation activities and future implementations plans, as these are components of an implementation itself. To address Question 2, the Timeline Implementation Framework is developed to (a) identify and categorize concepts and activities important during an enterprise-wide implementation, and (b) understand the relationship between different concepts and phases of the implementation timeline. The overview of the Timeline Implementation Framework in Figure 1-3 highlights four phases of implementation. See Chapter 3 for a detailed description of the framework.

![Timeline Implementation Framework](image)

**Figure 1-3: High level overview of the Timeline Implementation Framework developed in answering Research Question 2**

Question 3: What is the current state of the VHA Telehealth expansion?

Chapter 5 provides an overview of VHA and the VHA Telehealth expansion. After discussing the three Telehealth modalities and how it is characterized throughout VHA, a detailed account of key Telehealth
stakeholders in the organization is provided. Finally, the utilization and growth of Telehealth nationally and in VISN 1 are discussed.

**Question 4: Given the current state and objectives of the VHA Telehealth expansion, how can Telehealth implementation be improved?**

While VHA is currently expanding three Telehealth modalities (CVT, Store-and-Forward and Home Telehealth), implementation of a CVT clinic in New England was selected to be part of the study. Interviews with four VHA employees directly involved with the implementation of a CVT clinic provide knowledge of Telehealth implementation at a clinic-level. Quantitative analyses provide descriptive statistics of VHA and its Telehealth expansion, as well as a quantitative account of the qualitative interview responses (e.g., the number of times a particular concept was referenced relative to another). Interview responses are compared and contrasted across interviews to establish internal validity, as well as with alternative evidence sources (i.e., observation, internal documents, and archival records) to establish external validity. Findings give rise to key insights and repeated themes that indicate areas in which the Telehealth implementation is going well and areas where implementation efforts could improve. Preliminary recommendations are provided at the end of Chapter 6 to highlight potential improvements specific to the Telehealth expansion at the facility and regional level.

**Question 5: How can the characterization and evaluation of Telehealth implementation efforts inform the development and execution of implementation strategies for current and future VHA initiatives?**

Capturing the current state of the Telehealth expansion (Question 3) and identifying potential improvements to Telehealth implementation by gathering evidence of a CVT implementation (Question 4) together help illustrate VHA implementation efforts with regards to Telehealth. Question 5 extends the discussion to include interviews with 15 VHA employees from throughout VHA, allowing for perspectives from eight different roles in the Telehealth expansion. Interview questions focused on understanding different stakeholder perspectives, existing enterprise capabilities, as well as the interactions between internal entities, with the purpose of understanding how these relate to Telehealth implementation. Preliminary recommendations in Chapter 6 are revisited in Chapter 7 to provide final recommendations with respect to how an understanding of the Telehealth expansion could better inform VHA implementation planning and execution, and vice versa.
1.3 Thesis Outline

The remainder of the thesis is structured as follows. Chapter 2 reviews the literature relevant to enterprise-wide implementations, focusing on three main fields: organizations, implementation and evaluation. Chapter 3 details the Timeline Implementation Framework developed in this thesis. Chapter 4 describes the research methodology and study design of the case study. Chapter 5 provides an overview of VHA and the VHA nation-wide Telehealth expansion. Chapter 6 uses the Timeline Implementation Framework to analyze implementation of a CVT clinic in VISN 1. Chapter 7 provides an enterprise analysis of the VHA Telehealth expansion in order to compare and contrast implementation of a CVT clinic with the national Telehealth initiative, to understand the dynamics between local implementation efforts and enterprise-wide implementation strategies. Lastly, Chapter 8 completes the thesis with final conclusions and future work.
2 Literature Review

The study of enterprise-wide implementations necessarily entails several bodies of knowledge which could potentially be leveraged to guide and validate this research. Figure 2-1 reflects a literature review selection of said knowledge. Three primary sections in this chapter (Section 2.1: Organizations, Section 2.2: Implementation, and Section 2.3: Evaluation) are designed to highlight conceptual themes relevant to enterprise-wide implementations.

![Figure 2-1: Overview of the themes presented in Chapter 2 on enterprise-wide implementations](image)

For example, the seven white boxes within the grey shaded box in Figure 2-1 show there are seven themes relevant to organizations discussed in Section 2.1. Similar figures are included throughout the chapter in order to track progress through the literature; shaded blocks in these figures indicate the current location.
2.1 Organizations

Semantics can influence a reader's conceptual understanding when comparing literature composed by different authors and particularly so in a multi-disciplinary setting. While considering only a few papers, one word may represent multiple meanings, and multiple words may be used to convey one particular concept. Moreover, the element of interpretation when a reader discerns what an author writes, further emphasizes the value in clearly examining what each author means by a given word or phrase prior to comparing or contrasting the literature.

For example, concepts and conclusions from separate studies on organizations or enterprises may overlap, but at first glance the relationship between an organization and an enterprise can be unclear, regardless of varying meanings among authors. The relationship between the use of organizations and enterprises in research will hopefully become clearer throughout this work while both organizational and enterprise theories are considered. Organizational theory had long been established when the term enterprise was introduced to the field; the reader is referred to Lawrence and Lorsch (1967) for an analysis of prior organizational studies and Fradinho (2011) for a thorough review of organizational theory and how it is relevant to the context of enterprise thinking. The term “enterprise” itself is a challenging term to define. In 1999 Black's Law Dictionary defined an enterprise as "one or more persons or organizations that have related activities, unified operation or common control, and a common business purpose". Allen et al. (2004) acknowledged the various contexts to which an “enterprise” can refer, and use examples to illustrate its meaning. For example, an enterprise could consist of multiple organizations, a single organization, or part of an organization (as depicted in Figure 2-2).

![Diagram showing three examples of enterprise definitions](image)

Figure 2-2: Examples of three different relationships between an enterprise and an organization

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13 The following section uses insight from said literature review to discuss the organizational analysis in this section.
14 Solid, red lines illustrate boundaries of an organization. Dashed, black lines illustrate boundaries of an enterprise.
Because an enterprise can often be seen as a larger and/or more complex organization, many concepts and findings from organization theory may also apply to enterprises. When attempting to understand an enterprise-wide implementation, one must also understand the enterprise at hand; the enterprise itself, and the enterprise stakeholders will influence the implementation process. The following subsections provide concepts that facilitate the enterprise analysis that takes place in this work and how they relate to enterprise-wide implementations.

2.1.1 Organizational Uncertainty

Reduced clarity in defining tasks and/or roles within an organization can cause uncertainty to propagate throughout an enterprise via interactions between groups working on shared tasks (Galbraith 1974). As a result, increased uncertainty effectively increases the amount of information that must be communicated to operate at a given level. Responses to this are two-fold: the enterprise can either continue with similar communication levels (i.e., process a smaller fraction of the total required information) or increase the organization's capacity for processing information. The first option allows the enterprise to overcome insufficient communication by utilizing additional resources (e.g., time, money, equipment, staff, etc.) or by decentralizing the enterprise and relying on conditional decision making. The second option indicates a correlation between task uncertainty and organizational communication similar to that of Van de Ven et al. (1976), as discussed further in Section 2.1.2. An organization may increase the amount of information processed by formalizing vertical decision making (i.e., increase the amount of processed information while maintaining a given volume of transferred data) and at the same time coordinating local activities through conditional decision making. On the other hand, an organization may prefer to establish lateral relationships (e.g., task forces, managerial links, matrix organizations, etc.). The complexity of these
approaches would depend on the complexity of the tasks and the collaborating groups; therefore, implementing these changes may require global restructuring. Galbraith offered one alternative: rather than merely responding to increased uncertainty, one could invest resources to reduce initial uncertainty into the system, consequently reducing uncertainty throughout the system.

Organizational scope and information processing may play a role in planning an implementation. Enterprise-wide implementations imply changes at all levels, and implementation plans must first be communicated throughout the enterprise and then processed and executed by individuals. Communication methods and the interpretation of the communicated information will likely influence stakeholder collaboration during implementation planning and execution. Because stakeholder interactions can foster uncertainty propagation, this fact could be incorporated into enterprise implementation planning to help manage uncertainty during execution. Galbraith's final suggestion of reducing uncertainty into the system can inform methods used to communicate information related to the implementation. Moreover, by reducing uncertainty when initiating an implementation (e.g., clear and sufficient communication of implementation decisions and plans), less uncertainty may be experienced throughout the enterprise during implementation.

2.1.2 Communication Methods

Van de Ven et al. (1976) uncovered four classes of communication methods from the literature on organizations: formal vs. informal, vertical vs. horizontal, individual vs. group, and personal vs. impersonal. These classifications provide insight regarding correlations between communication methods and group cooperation in an organizational setting. Cooperation was measured by (1) the uncertainty in the definition or level of difficulty of tasks shared by organizational entities, (2) the interdependence
between tasks carried out by separate organizational entities and (3) the size of the working unit tasked with a given objective. Significant changes were observed in communication methods with varying levels of task uncertainty, task interdependence or unit size. Observations suggested knowledge of an organization's communication methods can help understand organizational activity, and vice versa.

Because an enterprise-wide implementation is a dynamic process, consideration of the interdependencies between communication and enterprise components, as well as the impact of an implementation on internal and external communication methods, may help inform the enterprise and its leadership in leveraging communication to improve the implementation process.

With respect to organizational alignment\(^{15}\) (i.e., unification of organizational components with respect to strategy, objectives, activities, etc.), communication between enterprise groups and individuals has the potential to both create and resolve enterprise conflicts. Insufficient or inappropriate communication methods could introduce or increase misunderstanding between two entities. Conversely, sufficient and appropriate communication could correct/mitigate existing misalignments and maintain alignment. Therefore, ramifications of communication throughout an enterprise can greatly influence enterprise-wide implementations. Innovation and implementation plans should be sufficiently communicated to the necessary groups; otherwise, informed decisions are less likely to occur. With this in mind, an enterprise may want to explicitly incorporate the nature of communication within the enterprise into implementation planning.

2.1.3 Organizational Alignment

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\(^{15}\) The following section (Section 2.1.3) addresses organizational alignment in detail.
Nadler and Tushman (1980) are well known in organizational research for their development of a model looking at organizational behavior. From their perspective, organizations are "dynamic and open social systems" greatly influenced by its leadership, external environment and internal relationships. Their model was designed to identify problems that may arise within an organization or enterprise resulting from a lack of congruency or alignment between the following four organizational components: tasks, individuals, formal organizational arrangements, and the informal organization. Formal organizational arrangements are those explicitly written or established, while the informal organization includes less structured methods by which individuals within the organization communicate.

Lack of congruency or insufficient alignment occurs when two or more entities have conflicting interests. A simple example of such incongruency would be if formal organizational arrangements, such as organizational meetings or process requirements, inhibit the employees from completing tasks in an efficient manner. Therefore, rather than formal organizational arrangements promoting task completion, they conflict with the interest of another organizational components. Although the organization may benefit from such arrangements, all organizational components should align with one another such that they operate in concert to support the overall organizational objectives. Therefore, instances of insufficient alignment between two or more organizational entities provides an opportunity to improve organizational structure, operations and/or activities by establishing alignment.

Although Nadler and Tushman’s model facilitates identification of problems resulting from insufficient organizational alignment, design and incorporation of a solution remains to be addressed. As a result, this model coupled with strategies specific to identifying and implementing solutions, would form a more complete and practical response to insufficient alignment. Thus, concepts from Nadler and Tushman identified incongruencies between organizational components can then inform leadership decisions regarding enterprise-wide implementations. The following section considers the influence of organizational learning when making such enterprise-wide changes.
Organizational learning is a theme within organization theory concerned with how organizations and individuals within organizations gain knowledge applicable to organizational operations. Tsang (1997) reviewed the literature on organizational learning and notice a discrepancy between how different authors approach organizational learning. Edmondson and Moingeon (1998) agreed with this discrepancy and provide a four-part breakdown of organizational learning research based on the research goal (descriptive research vs. intervention research) and the unit of analysis16 (organization vs. individual). The primary goal of descriptive research in organizational learning is to describe how learning takes place, while the primary goal of intervention research in organizational learning is to inform the unit of analysis how to effectively learn. After considering the four perspectives of organizational learning, Edmondson and Moingeon ultimately defined organizational learning as "a process in which an organization’s members actively use data to guide behavior in such a way as to promote the ongoing adaptation of the organization". The authors made the distinction between understanding the needs of organizational management that makes decisions and the needs of individuals within the organization. If management is aware of how an implementation will affect individuals in various stakeholder groups (i.e., if they take a stakeholder approach when deciding whether to adopt), in principle it should be easier to make a decision that promotes enterprise-wide improvement. Furthermore, they recommended utilizing feedback mechanisms as a way to identify needs of both the individuals and the enterprise. Without accurately identifying and addressing the roots of enterprise issues, the enterprise will find itself continually fighting symptoms of the problem, rather than the problem itself. The concept of "guiding behavior" is directly

16 The unit of analysis identifies whether learning is being studied at an enterprise level or at an individual level.
relevant to enterprise-wide implementations as implementation plans are intended to guide implementation execution in order to support innovation use.

As an extension of organizational learning, Senge and Sterman (1992) highlighted the significance of local action based on global thinking. In order to provide overall improvement to an enterprise, members with executive power were encouraged to effectively understand how their decisions at a local or micro level impact areas across the entire enterprise. If such wisdom is incorporated into local decision-making, the enterprise and its members are more likely to benefit in the long run. Senge (2006) further emphasized this point in "The Fifth Discipline" where he claimed systems thinking is the "cornerstone of the learning organization" and is required for an enterprise to overcome their more naive competition.

March (1991) took a descriptive research approach and looked at organizational learning from an enterprise perspective by studying whether organizations should adapt their behaviors based on past experiences or through exploring new opportunity spaces. Various organizational environments and behaviors were simulated in order to quantify how enterprise conditions and decisions impact the success of each learning style on enterprise performance. His conclusions suggested adapting organizational strategies based on exploration can be initially beneficial when facing situations with high uncertainty, but more often leads to lower performance.

During an implementation, both the enterprise as a whole, as well as its individuals, are expected to process additional information in order to accommodate the innovation. While expecting the enterprise and its members to do this, the enterprise may benefit from fostering an environment that encourages its members to partake in the adoption and embrace new challenges that might benefit the enterprise.
Hjern and Porter's (1981) concept of implementation structures is an example of how an implementation can be used to define an enterprise. Their definition of an implementation structure is similar to that of an enterprise in that both are structured around a particular organizational purpose: "An implementation structure is the administrative entity which programme implementors use for accomplishing objectives within programmes." (Hjern and Porter 1981). Just as an enterprise may contain one or more organizations, Hjern and Porter recognized that an implementation structure can be larger and more complicated than an organization. For example, an implementation structure could be composed of internal and external entities of an organization. Echoing the importance of communication discussed with regards to Van de Ven et al. (1976) and Galbraith (1974), Hjern and Porter emphasized capturing cooperation between components of an implementation structure in order to define and understand an implementation structure itself. The complexity in doing so lies within the relationships formed between entities as a result of their common interests. These common interests are certainly related, but can also be unrelated, to activities within the implementation structure. Furthermore, similar to other theories, the critical concept of stakeholder values was included.

To better understand the concept of an implementation structure, consider the following: a program manager is responsible for the development of three products (Products A, B and C). To facilitate design, production and distribution, the manager leads four separate teams: research, engineering, manufacturing and shipping. Currently, each product is at different stages of development, requiring involvement from different teams. Figure 2-3 portrays how an implementation structure associated with a given product is defined. The bold outlines identify the teams currently involved with the development of each product. For each product, the shaded boxes indicate the teams considered an entity within the implementation...
structure associated with that product. Below considers each product separately to determine how the implementation structure associated with that product is defined.

**Figure 2-3: Implementation structures for products at different development stages**

**Product A:** Product A is a nascent project, and the manager is deciding whether to produce it. To inform the decision, the manager has recruited the research and engineering teams to produce potential designs (indicated by the bold outlines under Product A in Figure 2-3). However, this project is discontinued before these teams create a final design. Consequently, the research and engineering teams make up the implementation structure that is defined by the teams that have been involved with Product A (depicted by the two shaded boxes under Product A in Figure 2-3).

**Product B:** Two designs have been selected for prototyping of Product B. Changes are still being made to the design by the engineering team, but the research team is no longer involved with the design process. A final design will be selected shortly, and plans for the manufacturing and shipping of Product B have already been established. While engineering and manufacturing are currently the only active teams developing Product B, the research and shipping teams are also entities within implementation structure for Product B. The shipping team is included because they were involved in scheduling shipping dates. Because entities previously involved with the product are included in the implementation structure, regardless of their current involvement with the ongoing implementation, the research team is considered part of the implementation structure for Product B.

**Product C:** Product C is currently being manufactured and shipped. Because Product C has experienced all stages of the development, all four teams have been involved with its development. Therefore, all four teams are entities within the implementation structure for Product C. Note, for the same reason the research team is part of the implementation structure for Program B, the research and engineering teams are part of the implementation structure for Program C.

17 In Figure 2-3, bold outlines identify which entities are actively involved in current stage of product development, and colored boxes indicate entities included in the implementation structure for each product. As a project advances to a later stage in the development process, the implementation structure grows to include new contributing teams.
The bold outlines in Figure 2-3 help illustrate the impact of implementation structures on the relationship between two entities. Although for Product C the manufacturing team only works with the shipping team, during previous stages the manufacturing team worked with the engineering team in developing Product C. This history will naturally influence the current working relationship between the manufacturing and engineering teams for Product B. Similarly, past collaboration between the research and engineering teams for Product B will influence the collaboration in designing Product A. Past tension between groups could hinder collaboration for current and future products. On the other hand, working relationships in the past can facilitate efficient and effective collaborations. Moreover, there are situations where two teams are asked to collaborate on multiple product lines (e.g., five products are being manufactured and shipped). When extending the analogy to service organizations, a similar analysis can be used, but includes the customer in-the-loop: rather than considering a production cycle, the analysis considers the process of serving a given customer. In addition to including human intervention, service lifecycles introduce additional uncertainties, as customer needs are less predictable and replicable than product development.

Because implementations carried out in an enterprise will result in changes and additions to existing entities within the system, interdependencies between stakeholders, such as previously developed relationships, can either hinder or promote implementation requiring collaboration between stakeholders. Therefore, the enterprise may want to consider existing relationships and interactions (e.g., shared interests, policies or practices) between organizational entities and their potential implications for the implementation and enterprise overall. Furthermore, the enterprise could consider whether to improve and/or leverage existing relationships to support implementation and enterprise activities.
2.1.6 Enterprise Architecture

Enterprise architecture (EA) is a recent field in engineering systems that is seeking to understand how an enterprise can best design their vision, structure and processes. The concept of EA was introduced by Zachman (1987) and has been further developed in the literature: Schekkermann (2004), Nightingale and Rhodes (2004), Ross (2006), Nightingale (2009) and Fradinho (2011). Nightingale and Rhodes of MIT are developing a framework to assist with large-scale enterprise transformation. They described EA as an application of "holistic thinking to design, valuate and select a preferred structure for a future state enterprise to realize its value proposition and desired behaviors" (Nightingale and Rhodes 2012). One of the first steps in their application is to obtain a holistic understanding of an enterprise through a Ten Element Framework used to capture various aspects of an enterprise. Fradinho (2011) compared Nightingale and Rhodes's EA framework (comprised of eight elements at the time) with previous organizational research in order to identify where concepts of the framework overlap with previous literature in organizational theory, as well as how these concepts have progressed over the years and continue to play a role in organizational analysis. Specifically he found that six of the eight enterprise elements in the framework were previously well-supported by organizational theorists.

Table 2-1 lists the most recent definitions of the elements in Nightingale and Rhodes's application. The "ecosystem" refers to the external environment and is composed of entities that influence or are influenced by enterprise activities but are not controlled by the enterprise. The stakeholder element is included to incorporate a stakeholder approach into the analysis. Mitchell et al. (1997) described the difference between stakeholder theory and a stakeholder approach: stakeholder theory "systematically

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18 The product and service views were introduced by Nightingale and Rhodes.
determines the stakeholders of an enterprise", while a stakeholder approach is "intended to broaden management’s vision of its roles and responsibilities beyond the profit maximization function to include interests and claims of non-stockholding groups”. A stakeholder approach\(^9\) allows one to understand whether a fair value exchange exists between the enterprise and each stakeholder, as well as where to address potential gaps (i.e., insufficient alignment) within the system. In practice, this can be analyzed in a variety of ways, but the objective is to relate the needs of each stakeholder with the value they receive from the enterprise, and vice versa. Ideally, this value exchange between the enterprise and its stakeholders would create a balanced, stable system. The remaining eight elements (strategy, process, infrastructure, organization, knowledge, information, product and service) are classified as views, each providing a different perspective of the enterprise.

Table 2-1: The ten elements of enterprise architecture (Nightingale and Rhodes 2012)

<table>
<thead>
<tr>
<th>Element</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecosystem</td>
<td>Environment containing elements “relevant to the enterprise, and is characterized by the external regulatory, political, economic, market, and societal environment in which the enterprise operates and competes/cooperates with other related enterprises”</td>
</tr>
<tr>
<td>Stakeholders</td>
<td>“individuals and groups who contribute to, benefit from, and/or are affected by the enterprise”</td>
</tr>
<tr>
<td>Strategy</td>
<td>“the vision, strategic goals, business model, and enterprise level Metrics”</td>
</tr>
<tr>
<td>Process</td>
<td>“core, leadership, lifecycle and enabling processes by which the enterprise creates value for its stakeholders”</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>“systems and information technology, communications technology, and physical facilities that enable enterprise performance”</td>
</tr>
<tr>
<td>Organization</td>
<td>“the culture, organizational structure, and the underlying social network of the enterprise”</td>
</tr>
<tr>
<td>Knowledge</td>
<td>“the competencies, explicit and tacit knowledge, and intellectual property resident in the enterprise”</td>
</tr>
<tr>
<td>Information</td>
<td>“the available information required by the enterprise to perform its mission and operate effectively”</td>
</tr>
<tr>
<td>Product</td>
<td>“the products that the enterprise acquires, markets, develops, manufactures, and/or distributes to stakeholders”</td>
</tr>
<tr>
<td>Service</td>
<td>“the offerings derived from enterprise knowledge, skills, and competences that deliver value to stakeholders, including support of products”</td>
</tr>
</tbody>
</table>

As previously mentioned, different authors can use the same word to describe different concepts. This in mind, a distinction should be made regarding the use of "organization" in the Ten Element Framework and organizational theory. Table 2-1 describes the organization element as the enterprise "culture" and "social network". These terms refer to the inherent behaviors, beliefs and characteristics of the individuals

\(^9\) The concept of a “stakeholder approach” was introduced by Freeman (1984).
and groups within the enterprise, as well as the interactions between enterprise stakeholders. On the other hand, an organization, as referred to in organization theory, is more closely associated with an enterprise than the EA organizational element. Just as having a good understanding of the enterprise is useful before redesigning an enterprise using EA, examining the enterprise is a useful exercise before undergoing an enterprise-wide implementation.

2.1.7 Organizational Readiness

The concept of organizational readiness for change suggests there are ways an enterprise can prepare for such changes. This section explores some of the literature on organizational readiness to consider how an enterprise may be able to prepare for enterprise-wide implementations.

Weiner (2009) claimed organizational readiness is determined by two main factors: the desire for change and the confidence in executing this change. These should be present both at an enterprise level and at an individual level in order for the entire enterprise to completely welcome the change. This argument was based on the fact that an enterprise-wide implementation requires a collective effort, requiring individual members of the enterprise to participate. In this context, readiness suggests an enterprise is most prepared when the entire enterprise shares the confidence in executing the implementation and believes the outcomes will benefit the enterprise. To generate shared readiness, Weiner recommended "consistent leadership messages and actions, information sharing through social interaction, and shared experience", implying an enterprise should determine its readiness and respond appropriately through such methods to instill the confidence and desire throughout the enterprise as part of the implementation plans. This requires communication to enterprise entities regarding the current attitudes about the implementation and how the implementation is expected to impact the enterprise.
Table 2-2: Process descriptions directly from the literature (Warren and Fuller 2009)

<table>
<thead>
<tr>
<th>Process of Emergence</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimenting</td>
<td>&quot;Diverse exploratory behaviours that might (or might not) become part of the firm over time; new things tried out in often very informal ways, small scale; often developed through exploration of social interactions; shared experiential learning across project teams and stakeholders; 'what works' &quot;</td>
</tr>
<tr>
<td>Reflexivity</td>
<td>&quot;Continuous reflection on the identity of the firm and the self-identity of its owner(s) through the discourses within the business and with stakeholders; vision setting through narratives of self and firm; 'who we are' &quot;</td>
</tr>
<tr>
<td>Organizing</td>
<td>&quot;Organising around a dominant logic (or project); patterns established through negotiated practice; pattern-making and pattern-breaking; 'what needs to be done now' &quot;</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>&quot;Interpretation of shifts in industry landscape; detection of difference; triggers and thresholds for change; 'what we might do' &quot;</td>
</tr>
</tbody>
</table>

Warren and Fuller (2009) also addressed organizational readiness and argue "preparedness is a state of mind", not just tangible resources that support change. They identified four enterprise behaviors (defined in Table 2-2) that promote organizational readiness. Organizing highlights the value in personal connection and routine of individuals involved with a particular program or implementation; moreover, individuals within the group should be united by their opinions and objectives. In a case study, the authors attributed "a spirit of preparedness" to the transfer of knowledge that came from an established "Community of Practice" fostering frequent and open communication within the project team. The emphasis on shared knowledge suggested a correlation between organizational readiness and organizational learning. This relationship is explored further in this thesis and examined in the application of the Timeline Implementation Framework developed in Chapter 3.

Enterprise preparedness can depend on conditions, behaviors and activities of the enterprise leading into a transformation. Before an organization considers implementing a new program or concept, different attitudes likely exist within the enterprise and infrastructures that can influence the implementation process and outcome. For example, consider a company that currently produces online computer games, and it is deciding whether to expand their business model to include the production of video games and consoles. With respect to enterprise infrastructure, many of the conceptual and software capabilities required to create online computer games are transferrable to the video games, simplifying the expansion to video game development. However, the current infrastructure does not support production or development of gaming consoles. Notably, current capabilities, such as existing infrastructure or internal support, can be used to inform the implementation decision. Lacking capability should not eliminate the
possibility of implementation; rather, it conveys changes necessary to support implementation, should a 
decision to implement be made. In order to make an informed decision regarding implementation, the 
enterprise may want to consider how it could address deficiencies (e.g., expand the video game company 
to include production or outsource production), leverage existing capacities (e.g., transferrable skills and 
knowledge), as well as incorporate opinions and beliefs of individuals within the enterprise. The literature 
supports that such an informed decision can help the enterprise prepare for such changes and improve the 
overall outcome.

2.1.8 Summary of Organizational Literature
The seven themes in Section 2.1 gave an overview of how previous research on organizations relate to 
and can inform enterprise-wide implementations. Concepts of organizational uncertainty (Section 2.1.1), 
communication methods (Section 2.1.2), and organizational alignment (Section 2.1.3) emphasized aspects 
of organizations that could both positively and negatively influence implementation. Organizational 
learning (Section 2.1.4) considered the role of learning, at both organizational and individual levels, on 
enterprise-wide implementations. Implementation structures (Section 2.1.5) introduced the complexity of 
organizational implementations and how implementations relate to an enterprise. Enterprise architecture 
(Section 2.1.6) attempted to understand and design the vision and structure of an organization and 
provided an example of how EA can assist an enterprise as-is analysis. Finally, organizational readiness 
(Section 2.1.7) suggested an enterprise can better prepare for enterprise-wide implementations. The 
following section reviews previous research specifically looking at implementation, considering literature 
on implementation (or innovation diffusion) process itself, implementation fidelity, other tools used to 
frame or model implementations, and, finally, implementations of Telehealth.
2.2 Implementation

Reflecting how Rogers initiated research in innovation diffusion, this literature review on implementations begins with an overview of the model he originally developed in 1962. Innovation diffusion\textsuperscript{20} refers to the process of adopting new concepts into practice. Rogers's model focuses on the analysis of innovation diffusion at an individual level, while he later developed a second model to address diffusion in an organizational context. After Section 2.2.1 provides an overview of innovation diffusion, Section 2.2.2 highlights previously developed frameworks that characterize and assist enterprise implementations and ultimately informed the framework developed in Chapter 3. Lastly, Section 2.2.3 considers literature on the implementation of Telehealth.

2.2.1 Innovation Diffusion

In 1962, Rogers published one of the first extensive analyses of innovation diffusion, laying the foundation for research in this field. While his first model (Figure 2-4, page 25) is somewhat general with respect to the decision-making unit, an emphasis is placed on adoption by an individual. Rogers republished his work in 1995 to include a second model (Figure 2-5, page 26) to specifically address innovation diffusion within the context of an organization (Rogers 1995). Researchers frequently use "adoption" to describe the diffusion process of a concept or practice by the individual or group adopting the innovation. However, adoption typically refers to implementations where the source is external to the adopting unit. Conversely, an innovation can be generated within the adopting unit. Although this difference is not always clear when discussing innovation diffusion, a distinction is taken into account in Chapter 3, when in the Timeline Implementation Framework is introduced.

\textsuperscript{20}Kumar et al. (2003) identify three separate uses of the term "innovation": an invention, a new object (Tushman & Newman, 1986), and a process (Daft, 1978).
Although the model in Figure 2-4 was originally designed for innovation adoption by an individual, it contributes to the analysis of enterprise-wide implementations in two key ways. First, individuals are inherently involved with an enterprise-wide implementation, and the model can reflect how individuals within the enterprise are influencing and reacting to the implementation. Individual stakeholders could be exposed to the innovation in a variety of ways, and each may respond differently. Although the model in Figure 2-4 can be used to map individual responses, the actual outcome (i.e., decision process and final decision) will likely vary. Second, concepts present in adoption by an individual are also present in adoption by an enterprise, but the latter must address additional complexities that arise in an enterprise and may be absent when only considering one individual. However, as Hjern and Porter (1891) illustrated with their implementation structures, additional complexities arise when the decision-making unit is an enterprise, lending itself to a separate modeling. For example, in addition to managing direct enterprise-level effects of the implementation, the enterprise must manage various stakeholder groups and indirect effects that ripple throughout the enterprise.

Rogers's original model (Figure 2-4) implies prior conditions exist before an innovation is considered:
1. Previous practice
2. Felt needs/problems
3. Innovativeness
4. Norms of the social system
These conditions, along with characteristics of the decision-making unit, inherently depend on the individual decision-making unit and will directly influence the adoption process. The process begins with the Knowledge stage, when the individual is exposed to the innovation. Additional information about the innovation is then received and processed such that an opinion is naturally formed about the innovation during the Persuasion stage. As illustrated in the model, this information will reflect characteristics of the innovation: relative advantage, compatibility, complexity, trialability, and observability. Rogers
emphasized the influence of communication channels throughout the entire adoption process, and not just during these early stages. In addition to the use of different modes of communicating (e.g., formal/informal, personal/impersonal, vertical/horizontal, and individual/group from Van de Ven et al. (1976)), engagement may vary such that the individual plays a more active or passive role in seeking information. Gathered information should accurately reflect the innovation and how it may address an existing need\footnote{It can be unclear whether the individual is aware of his or her needs prior to innovation exposure or exposure to the innovation triggers awareness of a need. Moreover, there is a distinction between an individual’s “needs” and “wants”. Both concepts are not addressed in this research. Refer to Rogers (1995) for a brief discussion on these.}, such that it equips the individual to appropriately decide whether to adopt.\footnote{Evaluation of the innovation is inherent in the decision whether to adopt; see Section 2.3 for more on how evaluation is addressed by Rogers (1995).}

Eventually, the Decision stage determines whether the innovation is desired\footnote{Rogers (1995) distinguishes between active rejection, where the innovation is considered but adoption is undesired, and passive rejection, where adoption is never seriously considered.}. If the decision to adopt is made, the individual enters the Implementation stage, where behavior modification allows for the incorporation of the innovation into existing practices. The decision and implementation will likely take place amid uncertainty. The individual’s response to uncertainty, as well as additional information encountered during the adoption process, can influence whether the innovation is completely implemented. Lastly, the Confirmation stage determines whether to maintain innovation use. The practicality of the innovation can either encourage continuation or discontinuation (formal rejection) of the innovation.

![Staged model for innovation diffusion in an organization (Rogers 1995)](image-url)
Rogers’s organizational model (Figure 2-5) followed a similar pattern as the individual model, but the five phases incorporated concepts specific to an organizational implementation process. Just as in the original model, prior conditions and characteristics are incorporated into the Agenda Setting stage, where organizational needs are identified. For example, the Agenda Setting stage could reveal that the organization needs to increase production by 20% in order to meet rising consumer demands, the organization has lost approximately one-third of its customers due to increased competition, or the organization is insufficiently meeting the needs of a key stakeholder. Recalling Hjern and Porter’s (1891) perspective of enterprise-wide implementation using implementation structures, hidden relationships between organizational entities can influence implementation processes and outcomes. Therefore, when considering an enterprise-wide implementation, a holistic approach in the Agenda Setting stage can help capture perspectives from enterprise stakeholders. Conditions throughout the enterprise can not only shape what the enterprise should implement, but also how the enterprise should execute an implementation.

Analogous to the Knowledge and Persuasion stages in Rogers’s original model, the enterprise must gather information about the innovation and how it relates to organizational needs. The Matching stage extends the knowledge of organizational needs to identifying potential solutions by considering innovation adoption. How well an innovation addresses enterprise needs, as well as the practicality of innovation implementation can be used to inform whether the organization adopts the innovation. When making this decision, Weiner (2009) reminded the organization that organizational readiness for change is impacted by the desire to change and the assurance that the change will be successful at both the organization and individual levels. Therefore, understanding the innovation adoption process for various stakeholders could positively influence implementation decisions, planning and execution.

The concept of “re-inventing” the innovation is embraced in the two stages following the decision to adopt: the Redefining/Restructuring and Clarifying stages. These stages can be used to manage organizational uncertainty (Galbraith 1974) as well as increase organization-innovation compatibility. For example, by looking at the influence of organizational and innovation characteristics of the implementation process, Meyer and Goes (1988) found that greater interaction between the organization and the innovation (e.g., frequent leadership support for the innovation implementation and use) led to successful adoption. Furthermore, it is unrealistic to expect perfect compatibility between the organization and innovation during or even shortly after implementation. For example, the learning curve associated

24 Rogers credits Charters and Pellegrin (1973) with the introduction of “re-invention” into diffusion research. More on “re-invention” and its relation to implementation fidelity is discussed in Section 2.3.1.
with innovation use or resistance to change can prevent the innovation from effectively improving enterprise operations. Figure 2-6 portrays how an organization may initially experience reduced performance as a result of implementation changes. If the innovation is appropriate in addressing the desired enterprise need and is successfully implemented, overall improvement is expected after a given time (indicated by time “t” in Figure 2-6). Evidence of reduced performance during ERP implementations is documented in the literature (T. Davenport 2000) (Kumar, Maheshwari and Kumar 2003).

Figure 2-6: Overall increase in enterprise performance may not occur until later in the implementation process

The organizational innovation diffusion model concludes with the Routinizing stage, where the innovation is fully incorporated into organizational activities. Although Rogers stated that the innovation “loses its identify” when adoptions reaches the final stage, an innovation can maintain its identify while still being completely implemented into organizational activities, so long as innovation processes are distinct from, and not fully integrated into, other organizational processes. For example, an organization would fully integrate a new mail server into organizational communication, while the production line of a new product would remain separate from the development stage or other production lines.

In summary, Rogers’s models of innovation diffusion provide a rich understanding of important concepts surrounding adoption at both individual and organizational levels, as well as elements that influence implementation processes and innovation performance. Now that a broad look of innovation diffusion has been described, the following section considers existing implementation models and frameworks that were influential in the development of the Timeline Implementation Framework presented in Chapter 3.
2.2.2 Implementation Frameworks

After conducting a vast and systematic literature review, Greenhalgh et al. (2004) presented a conceptual model for innovation diffusion in service organizations, complete with descriptions of each component. The model illustrates the interactions between the innovation and organizational components, as well as their role in implementation. Together, the scope and structure of the model highlight concepts at play during an organization-wide implementation, while revealing direct and indirect relationships between components. Many elements in Greenhalgh et al.'s model were incorporated into the Consolidated Framework for Implementation Research (CFIR) model by Damschroder et al. (2009). These components are augmented with additional concepts and categorized into five constructs to help determine how they influence or are influenced by enterprise-wide implementations: intervention characteristics (i.e., innovation characteristics), the outer setting, the inner setting, individuals and the implementation process. These constructs are meant to assist the analysis of diffusion by focusing on the interactions between constructs.

Other influential models include Rycroft-Malone et al.'s Promoting Action on Research Implementation in the Health Services (PARIHS) model and Simpson's (2002) four-stage model for transferring research into practice.

2.2.3 Telehealth Implementation

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25 Damschroder et al. (2009) use "intervention" when referring to, what is referred to here as, an "innovation".
26 See work by Rycroft, Kitson and colleagues: (Rycroft-Malone, et al. 2002) and (Kitson, et al. 2008)
27 Simpson’s (2002) four stages of implementation include: exposure, adoption, implementation and practice.
Over the years, researchers have studied Telehealth implementations and its effect on health care systems. Emery (1998) investigated the correlation between hospital type and the likelihood of adopting Telehealth. Influenced by Rogers's (1995) theory of innovation diffusion, Emery applied his model to analyze Telehealth implementation. Similar to the concepts of Meyer and Goes (1988), Emery argued that during each stage characteristics of the potential adopter, characteristics of the innovation, and characteristics of the communication of information about the innovation influence the success of adoption. Economic, sociological and management approaches helped identify three categories of implementation barriers: financial, behavioral and administrative. Prominent barriers included cost of technology (financial), insurance coverage and medical liability (financial), physician and patient acceptance (behavioral), industry standards (administrative), and medical license issues (administrative).

Later studies investigated behavioral and some administrative barriers to Telehealth implementation, while literature on financial barriers is limited. In a study on organizational readiness for Telehealth adoption, indicators for implementation readiness included appreciation of the innovation, the need for improvement, and strong leadership (Jennett, Gagnon and Brandstadt 2005). Their findings supported Weiner's (2009) claim that readiness depends on the desire for change and the enterprise's confidence that the implementation will be successful. A second study looking at conditions for implementation success in rural regions recommended strengthening leadership in order to foster the confidence required to carry out the implementation (Gagnon, et al. 2006). Additionally, the need for sufficient access to educational material, reliable resources, and collaboration among clinics were identified as specific barriers limiting support of Telehealth implementation into rural medical centers and clinics.

Obstfelder et al. (2007) laid out six characteristics of successful Telemedicine applications. Similar to the previously mentioned behavioral barriers, the primary complications of executing an implementation stemmed from the relationships between technical and social factors that impact stakeholders involved with the implementation. To reduce the risk of harm on the patient-provider relationship, the authors recommended understanding the nature of the interactions being inserted into the communication and compare them with the interactions in traditional care.

In line with Galbraith's (1974) recommendation about reducing uncertainty into an organization, May et al. (2011) considered the requirements to successfully integrate Telehealth into chronic disease management care by reducing organizational uncertainty during the implementation process. The two primary barriers that they identified included an unclear understanding Telehealth’s role in health care.
delivery processes and the lack of Telehealth adaptation to the medical environment. They claimed these barriers could be reduced if uncertainty associated with Telehealth is properly managed by providing accurate and sufficient evidence describing Telehealth to secure readiness. This could be done with the help of local champions and incorporation of formal change management, with the goal of creating a shared vision across the enterprise by involving various stakeholders during the planning and execution phases of implementation.

2.3 Evaluation
This section gives an overview of evaluation as it relates to enterprise-wide implementation. Section 2.3.1 summarizes the five dimensions of implementation fidelity that resulted from separate extensive literature reviews conducted by Dane et al. (1998) and Dusenbury et al. (2003). The complete review of the literature on evaluation and its relation to Telehealth by Scott et al. (2007) guides the discussion on outcome indicators in Section 2.3.2. Future work should include a more complete review of the literature on evaluation to better inform and further validate the Timeline Implementation Framework.

As noted in the discussion on innovation diffusion (Section 2.2.1), evaluation is inherently part of the implementation process, as evaluation of the innovation directly influences the decision whether to implement. Rogers explicitly denoted this in his innovation diffusion model (Figure 2-4) where the perceived characteristics of the innovation (relative advantage, compatibility, complexity, trialability and observability) inform the decision-making stage (1995). The actual evaluation of the innovation is a crucial point in the implementation process and is incorporated into the analysis in this work. However, the specific methods used to evaluate the innovation are outside the scope of the Timeline Implementation Framework; rather the framework is used to determine whether innovation evaluation is included in the enterprise’s implementation decision.

2.3.1 Implementation Fidelity
Innovations change over time, and deviation from implementation plans naturally occurs. In fact, Van de Ven and Poole (1990) developed a method to study innovation adaptation, showing how observations of ideas, people, transactions, context, outcomes and processes disagree with implicit assumptions in the literature. For example, although an organization is implementing one particular innovation (i.e., an “idea”), deviations and inconsistencies during innovation implementation and continued use can result in a variety of innovation outcomes across the enterprise. As described in a previous study out of the Minnesota Innovation Research Program:
"Innovation ideas were found to proliferate into many ideas. There is not only invention, but there is re-invention as well, with some ideas being discarded as others are reborn. There are many persons involved in innovation, but most of these are only partially included in the innovation effort, as they are distracted by very busy schedules as they perform many other roles unrelated to the innovation. The network of stakeholders involved in transactions is constantly being revised." (Van de Ven and Angle 1989)

These observations (the incorporation of new ideas, participation of diverse individuals, and balance of the implementation with existing responsibilities) are realities that demonstrated why enterprise-wide implementation fidelity is difficult, both to execute and measure.

Around the turn of the century, researchers began to explore implementation in the context of enterprise resource planning (ERP) systems. (See Kumar et al. (2003) for a literature review on ERP systems and implementations.) While, ERP systems comprise of software packages aimed to assist management in manufacturing organizations, Kumar et al. emphasized the complexity of ERP implementations due to their "organizational and process re-engineering [...], enterprise-wide implications, high resource commitment, high potential business benefits and risks". Moreover, the "organizational approach to adopting ERP systems is important for achieving integration benefits" (Kumar, Maheshwari and Kumar 2003).28 Previous discussions on organizations and implementations in this review, in addition to the realities observed by Van de Ven and colleagues (Van de Ven and Angle 1989) (Van de Ven and Poole 1990), appear to be relevant not just to ERP implementations, but to other enterprise-wide implementations as well. Evidence displayed instances where ERP implementations result in a sub-optimal program or discontinued ERP implementations and/or use (Davenport (1998) and (2000), Kumar (2003), Marcus and Tanis (2000)), suggesting an enterprise could consider ramifications of poorly executed implementations, as well as methods to ensure quality implementation planning and execution. Organizations and implementation scientists looked to past and developing research on implementation fidelity to address these questions.

Dane and Schneider (1998), Dusenbury et al. (2003) and O'Donnell (2008) provide literature reviews that deduced five dimensions of implementation fidelity: adherence, dose, quality of delivery, participant responsiveness and program differentiation. Exact definitions for these terms according to Dusenbury et al. (2003) are provided in Table 2-3. "Adherence" is measured by comparing implementation plans or expectations with what is actually implemented. "Dose" refers to the amount of content received by

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28 This quote is taken from Kumar et al. (2003), and is supported by their exploratory study and the following publications: Bingi et al. (1999), Markus and Tanis (2000), and Koch et al. (1999).
Table 2-3: Dimensions of implementation fidelity (Dusenbury, et al. 2003)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adherence</td>
<td>the extent to which implementation of particular activities and methods is consistent with the way the program is written</td>
</tr>
<tr>
<td>Dose</td>
<td>the amount of program content received by participants</td>
</tr>
<tr>
<td>Quality of Delivery</td>
<td>the extent to which a provider approaches a theoretical ideal in terms of delivering program content</td>
</tr>
<tr>
<td>Participant Responsiveness</td>
<td>the extent to which participants are engaged by and involved in the activities and content of the program</td>
</tr>
<tr>
<td>Program Differentiation</td>
<td>unique features of different components or programs so that these components or programs can be reliably differentiated from one another</td>
</tr>
</tbody>
</table>

"Quality of Delivery" is determined by the difference between "innovation facts" and "understanding of the innovation"

"Quality of delivery" is determined by the effectiveness of educational material and delivery methods, such that the desired elements of the innovation are captured in educational materials and ultimately transferred to those participating in the innovation implementation and use. Figure 2-7 illustrates how "quality of delivery" measures disparities between factual knowledge of the innovation and the understanding of the innovation by receiving audiences after transferring innovation knowledge during implementation. "Participant responsiveness" reflects how engaged participants are with the educational material, and "program differentiation" determines whether program concepts and purposes are communicated to participants in a way that clearly distinguishes the primary components.
The five dimensions of implementation fidelity assist evaluation of implementation planning, efforts and outcomes. If implementation plans accurately forecast implementation execution, adhering to plans are expected to benefit the implementation process and outcome. Alternatively, in cases where aspects of implementation were not anticipated, modification the original plans may be desirable.

2.3.2 Outcome Indicators
Scott et al. (2007) reviewed over 1,200 studies to identify metrics to evaluate Telehealth programs. Metrics fell into the following four categories:

- quality (e.g., quality of care, quality of life, safety and efficacy),
- access (e.g., the effort required to receive/provide care),
- acceptability (e.g., the satisfaction and preferences of various stakeholders), and
- cost (e.g., the financial impact of the implementation on various costs, such as direct/indirect, fixed/variable, marginal and general).

Acceptability, commonly referred to as satisfaction, considers various stakeholder preferences with respect to Telehealth. Acceptability is broken down by aspects of Telehealth such as technological components, confidentiality concerns, education of the technology, and patient-provider interactions. Although acceptability is often subjective, Banker et al. provided evidence of acceptability predicting future events, supporting the inclusion of stakeholder perspectives in evaluation (Banker, Potter and Srinivasan 2000). Incorporating how Telehealth impacts varying stakeholders (e.g., internal/external, providing/supporting/receiving, etc.) into the evaluation process inherently generates a more holistic understanding of the overall impact of Telehealth. Scott et al. suggested including measures from patient, provider and society's perspectives, echoing Bashshur's recommendation that Telehealth evaluation should be considered from multiple perspectives (Bashshur, On the Definition and Evaluation of Telemedicine 1995). Many of the barriers for adoption experienced by establishing Telehealth clinics are related to the examples of acceptability described in Scott et al. (Emery 1998) (Simpson 2002) (May, et al. 2011) (Zanaboni and Wootton 2012).

Grigsby et al. (1995) developed two models to evaluate Telemedicine performance. In 2005, Grigsby et al. (2005) took a health services research\textsuperscript{29} approach to Telehealth evaluation and discovered Telemedicine evaluation literature lacks sufficient effectiveness evaluation to generalize results to a wide range of Telehealth applications. They suggested correlation between dimensions of evaluation introduces

\textsuperscript{29} Health services research focuses on how patients can access affordable health care by considering how social, financial, organizational and behavioral factors affect access.

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additional complexity in accurately measuring dimensions separately (e.g., quality, access and cost). For example, increasing the access to Telehealth will indirectly impact the cost and quality of Telehealth through changed levels of utilization. During evaluation, one may want to be aware of the correlations between the evaluation dimensions in order to more confidently identify the causes of the final performance, henceforth facilitating action in addressing primary causes, rather than merely symptoms of the root cause.

2.4 Summary

Review of previous research in fields relevant to enterprise-wide implementations is necessary to leverage existing knowledge and identify unfilled gaps in the literature. For this reason, Chapter 2 reviewed well-cited literature in three primary research fields (organizations, implementation and evaluation) in order to address Research Question 1 and launch the study of enterprise-wide implementations.

Q1) How have enterprise-wide implementations and innovation been characterized in the literature?

Section 2.1 discussed a variety of concepts in organizational theory introduced by well-known researchers in the field, as well as their pertinence to this research. Understanding organizational operations alone is a complicated topic but is a necessary component of investigating enterprise-wide implementations. Implementation was specifically addressed in Section 2.2 in order to understand the process of incorporating a new practice into existing practices. Similar to the role of learning within both individual and organizational contexts during enterprise-wide changes, innovation diffusion at individual and organizational levels can influence the process and outcome of enterprise-wide implementations. For that reason, implementation fidelity and innovation evaluation were discussed in Section 2.3.

Numerous concepts pertinent to enterprise-wide implementation emerged from the literature. These concepts form the basis of the Timeline Implementation Framework, such that they guide analysis of enterprise-wide implementations. Chapter 3 first relates the literature themes highlighted in this chapter to the structure of the Timeline Implementation Framework and then walks through the framework in detail.
3 Timeline Implementation Framework

Enterprise-wide implementations require collaboration of a variety of stakeholders and can have vast impacts across an enterprise. Transformation likely requires people, processes, support structures and stakeholders to adapt such that the enterprise is more compatible with the innovation being implemented. Inherent realities and challenges of complex socio-technical systems can further complicate enterprise-wide implementations, directly influencing the success or failure of the final outcome. Foresight of how the innovation may influence the enterprise can be used to outline an implementation approach such that innovation adoption is successful without negatively disrupting the current system. With this in mind, frameworks are designed to guide implementations by highlighting concepts that an implementer should consider before, during and after an implementation. To that effect, this thesis develops the Timeline Implementation Framework to facilitate enterprise-wide implementations by recognizing four distinct phases of an implementation and identifying aspects of the enterprise and the innovation that might influence implementation progress within each phase. This chapter walks through each phase of the Timeline Implementation Framework to discuss concepts significant to enterprise-wide implementations.

3.1 Framework Description

Figure 3-1 defines the four phases of the Timeline Implementation Framework. Framework development began by identifying concepts influential to enterprise systems and implementations that emerged from the literature review discussed in Chapter 2. Figure 3-2 illustrates how the sections in Chapter 2 align with the phases of the Timeline Implementation Framework. Those authors, along with other well-cited references pertaining to enterprise-wide implementations, generated concepts used to populate the Timeline Implementation Framework in Figure 3-3. Each phase is comprised of four or five dimensions (bolded, underlined text) to distinguish between high level themes that exist within a given phase. For example, there are four dimensions within Phase II: The Innovation, Communication about the Innovation, Stakeholder Involvement and Implementation Strategy. Distinct concepts within each dimension provide details on ideas, activities or topics that could occur that might influence an enterprise-wide implementation. The five concepts specifically relevant to “The Innovation” dimension are the following: Innovation Components, Enterprise Components (that will be impacted by the innovation), Innovation Source, Innovation Advantages and Innovation Disadvantages. Considering the relationship between these five concepts and the rest of the enterprise can potentially influence how the enterprise goes about implementing the innovation, as well as how the enterprise, in general, responds to innovation implementation. Definitions for all phases, dimensions and concepts in the Timeline Implementation Framework are given in Appendix A.
Prior to implementation, the enterprise and its stakeholders are introduced to the innovation, whether it be from an external or internal source. The enterprise will formally decide whether to adopt the innovation and begin planning the implementation.

Phase II considers the implementation of the innovation into existing enterprise operations. Dimensions in this phase aim to characterize the process by which the innovation is incorporated into the enterprise by the primary dimensions in the literature on implementation fidelity.

Reflection and evaluation of (a) innovation outcomes and (b) the impact of the innovation on enterprise operations. The purpose of the evaluation phase is not to evaluate the innovation or its impact on the enterprise, rather it is to identify whether the enterprise is considering these concepts when evaluating the innovation and implementation.

Feedback to future implementations

Figure 3-1: Definitions of the four phases in the Timeline Implementation Framework

Figure 3-2: Relationship between the Timeline Implementation Framework and the literature review themes presented in Chapter 2
Figure 3-3: Dimensions and concepts for each phase of the Timeline Implementation Framework
3.1.1 **Phase I: Enterprise Analysis**

Before undergoing an enterprise-wide implementation, the enterprise may benefit from reflecting upon aspects of the enterprise that can promote or hinder implementation efforts. For example, a culture that fosters enterprise and individual learning has the potential to improve implementation efforts. Phase I is meant to facilitate such an analysis by highlighting concepts corresponding to enterprise innovation. Figure 3-4 outlines the dimensions and concepts in Phase I.

![Figure 3-4: Overview of Phase I Dimensions and Concepts](image)

### 3.1.1.1 Culture for Change

*History of Innovation* and *Value of Innovation* are indicators that an enterprise openly adopts new ideas. An enterprise’s willingness to innovate alone is insufficient to determine effective innovation, evidence revealing the appreciation of innovation suggests the enterprise and its individuals are more likely to embrace the change necessary for enterprise-wide implementations.

Recall at the end of Section 2.2.1 how systems often experience a reduction in performance immediately after implementation efforts begin due to policy resistance and the need to manage new and changing processes (Figure 2-6). *Stakeholder Commitment* during enterprise-wide implementations can help mitigate and overcome this performance reduction. In particular, the enterprise will encounter less policy resistance and will more likely successfully bear through the challenges that come with vast changes because stakeholders are committed (to the enterprise and to innovation) during the early stages of implementation.
Support for Individuals from their colleagues and leaders can serve as a means of encouragement. Not only does such support show investment in the individual’s work, it can increase stakeholder commitment and encourage individual initiative when his/her feels support from their peers and superiors.

Lastly, Enterprise Documentation provides a way for individuals within the enterprise to learn from previous (successful and unsuccessful) innovation efforts. Merely documenting these efforts is insufficient; this knowledge must be accessible to individuals within the enterprise.

3.1.1.2 Organizational Learning

This dimension aims to assess whether the enterprise is a “learning organization”. Edmondson and Moingeon’s (1998) definition of organizational learning: "a process in which an organization’s members actively use data to guide behavior in such a way as to promote the ongoing adaptation of the organization" implies that a learning organization inherently learns at both the enterprise and individual levels. In many ways, organizational learning and a culture for change complement one another. For example, a culture rooted in historical innovation and filled with individuals who value innovation likely supports learning and applications of new knowledge by individuals and the enterprise as a whole.

Local Action, Global Thinking is considered a key component of enterprise learning (Senge and Sterman 1992). In practice, this means decisions at a local level are made after considering the system-wide consequences of the various options. While such thinking is often involved in decisions made at higher levels within an organization, the overall system can benefit when individuals at all levels incorporate systems thinking into their local decisions.

The Timeline Implementation Framework specifically highlights Individual Learning as a way to identify whether individuals are active in learning and applying new knowledge within their given role and whether the enterprise encourages individual learning. Lastly, Enterprise Reflection evaluates whether the enterprise as a whole incorporates lessons learned from past experiences into later practices. While the literature argues learning from past experiences alone can hinder an enterprise’s ability to reach its true potential, enterprise reflection augmented with exploration of new ideas (i.e., innovation) provide multiple avenues for enterprise development (March 1991).
3.1.1.3 *External Influence*

Based on the nature of the relationship between the enterprise and external entities\(^{31}\) (e.g., partners, competitors, regulators, etc.), the *Influence if External Entities* on enterprise activities (and likewise the enterprise’s *Influence on External Entities*) can vary. Policy regulation, pollution and equipment suppliers are a few examples of external influence.

3.1.1.4 *Internal Communication*

As discussed in Section 2.1.2, enterprise communication can influence enterprise-wide implementations in various ways:

- Communication promotes common understanding of implementation tasks.
- Enterprise-wide implementations require collaboration and information sharing reduces uncertainty and miscommunication.
- Implementation is a dynamic process and continued communication can prevent individuals from acting on outdated information.
- While communication can improve enterprise-wide implementations, inadequate communication has the potential to harm an implementation.

For these reasons, the following concepts of internal communication are considered in the Timeline Implementation Framework: *Formal Communication, Informal Communication, Continuous Communication* and *Stakeholder Collaboration*.

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\(^{31}\)An enterprise’s external environment includes entities that influence or are influenced by enterprise operations but are not under enterprise purview.
3.1.2 Phase II: Implementation Planning

Phase II focuses on the innovation and the enterprise’s response to the innovation. While preparing for potential implementation, the enterprise will consider whether the innovation and enterprise components would be compatible. The enterprise assesses the potential benefits offered by the innovation, as well as the financial and non-financial costs associated with innovation adoption. Ultimately, the enterprise decides whether to adopt the innovation. Figure 3-5 outlines the dimensions and concepts in Phase II.

![Figure 3-5: Overview of Phase II Dimensions and Concepts](image)

3.1.2.1 The Innovation

A key step in identifying compatibility is to explicitly identify Innovation Components and the Enterprise Components that will influence or be influenced by the innovation. Recognizing the potential interactions between the innovation and enterprise can reveal the potential impact on existing enterprise components, processes and capabilities, as well as the costs of innovation implementation and continued use. A more complete understanding of the innovation, the enterprise, and their potential interactions allows the enterprise to better assess Innovation Advantages and Innovation Disadvantages, henceforth informing the enterprise decision to implement.
3.1.2.2 **Stakeholder Involvement**

The literature greatly emphasized the value of stakeholder involvement in implementation efforts. Leadership Engagement, active Champions, other Stakeholder Engagement, and Stakeholder Acceptance and Support are key ways stakeholder can get involved. Although individual advocates can influence the perception of the innovation, as well as implementation progress, general acceptance and engagement of stakeholders throughout the enterprise can influence implementation success, given system-wide interdependencies that are inherent to an enterprise. Furthermore, engaging stakeholders during the implementation process can allow the enterprise to better predict the impact of the innovation on the roles and responsibilities of various stakeholder groups.

*Formally Appointed Internal Agents* and *Formally Appointed External Agents* are individuals hired to support innovation adoption. Formal appointment is meant to ensure dedication to innovation adoption and prevent divided interests between other initiatives competing for the individual’s commitment.

3.1.2.3 **Implementation Strategy**

Before deciding to adopt a specific innovation, the enterprise may want to consider *Alternative Solutions* to a given enterprise need or set of needs. Failing to compare multiple solutions can reduce the likelihood of implementing the most appropriate innovation.

Beyond identifying enterprise components as discussed earlier in Phase II, identifying how the existing *Enterprise Infrastructure* is expected to support or accommodate the innovation during and after implementation may influence implementation execution. For example, the enterprise will likely consider acquiring sufficient IT resources before fully launching an innovation that requires significant IT support, or securing the staff and physical space necessary to install the innovation before purchasing equipment.

Furthermore, *Barriers and Facilitators to Implementation* speak to aspects of the innovation or the enterprise that may hinder (barriers) or enable (facilitators) implementation of the innovation. Scott et al. (2007) explain that barriers and facilitators can be economical, geographical, temporal, social, etc. These barriers and facilitators should then be considered during *Innovation Evaluation*, where decision makers

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should formally weigh the pros and cons of implementing the innovation. Following the evaluation, an *Adoption Decision* is made indicating whether the enterprise will formally adopt the innovation. If the decision to adopt is made, the decision makers or designated implementation team can develop an *Implementation Plan* that establishes and documents implementation methods, responsibilities, objectives and deadlines that can guide implementation execution.

3.1.2.4 *Communication about Innovation*

While decision makers should be informed of the innovation and the impact it could have on the enterprise, stakeholders who would be impacted by the innovation should receive *Supporting Evidence* for implementing the innovation. Various communication methods can be used to share evidence with stakeholders (e.g., documentation, trainings, informal or formal info sessions, trial programs), as long as stakeholders receive information that accurately reflects how the innovation would impact the overall enterprise, as well as their individual roles. Along with type of information communicated to stakeholders, the source of this information and the source of the innovation itself (*Innovation Source*) can influence how this information is received.

As the enterprise approaches implementation, the enterprise should have a *Clear Definition of the Roles* involved with the innovation (implementation and sustained use). Clearly defined roles convey to stakeholders what is expected of them and what they can expect from others. They also serve as a communication tool as people can contact the appropriate person when they have a particular question or concern about the innovation. Similarly, an *Understanding of Adoption Plans* (specifically the plans, objectives and thought processes behind adoption) can facilitate stakeholder involvement. While knowledge of implementation plans and objectives describe what the implementation will entail, reasons for adoption helps justify the implementation, adding credence to stakeholder involvement in the implementation.
3.1.3 Phase III: Implementation Execution

After the enterprise decides to implement the innovation, implementation execution begins. Efforts across the enterprise more or less reflect the guidelines set in the implementation plan. Phase III assesses implementation execution with the five dimensions of implementation fidelity\(^{33}\): program differentiation, adherence, dose, participant responsiveness and quality of delivery. Figure 3-6 outlines the dimensions and concepts in Phase III.

Figure 3-6: Overview of Phase III Dimensions and Concepts

3.1.3.1 Program Differentiation

Program differentiation refers to the Implementation of Distinct Components and the Understanding of Distinct Components of the innovation. This means the different components of the innovation remain distinguishable from one another and from components of the enterprise. Vague distinctions between components can introduce additional challenges with implementation or tracking performance metrics. Therefore, clear distinction between aspects of the innovation and the enterprise is recommended to facilitate stakeholder understanding of the innovation and the implementation.

3.1.3.2 Adherence

Implementation progress or success if often measured by adherence to prescribed Implementation Objectives and Deadlines. While lack of adherence often indicates the implementation is progressing

\(^{33}\) Five dimensions of implementation fidelity are credited to Dane and Schneider (1998) and Dusenbury et al. (2003).
slower than expected, frequent failure to meet objectives or deadlines may suggest the expectations for
the implementation are unrealistic and the implementation plan should be revisited. If unexpected barriers
are encountered and cause implementation delays, new deadlines may be created to account for these
changes. Furthermore, the enterprise is encountering new territory during the implementation, and this
experience may reveal alternative techniques for innovation implementation or use unidentified prior to
implementation. Application of New Knowledge may then be desired as a way to improve implementation
methods or the innovation itself.

3.1.3.3 Dose

Intensity, Volume, Frequency and Pace are concepts that help understand the amount of information or
material received by participants during implementation. These measures can reflect the dose experienced
throughout the overall implementation or during smaller segments of the implementation.

Staged Implementation is another element of dose that gauges how the innovation spreads through.
Implementation stages can be incorporated in a number of ways. Firstly, the innovation could be fully
implemented on a small scale before expanding the innovation to sites across the entire enterprise. In
doing so, knowledge gained from earlier stages can be applied to later implementations. For example, a
network of five hospitals utilizes different scheduling systems at different facilities and would like to
replace them with one system that communicates with a shared database allowing facilities to access and
update information at other facilities. Rather than implementing the new scheduling system at all
hospitals at once, one or two facilities could be chosen for a “pilot” implementation where their systems
are replaced and lessons learned from this pilot is used to inform implementation at the remaining sites.
Alternatively, the enterprise may implement part of the innovation at all sites before incorporating all
aspects of the innovation. Using the previous example, the scheduling systems could be replaced at all
facilities, but each facility maintains their own schedules as before. After each hospital is comfortable
with the new system, they can expand system capabilities to allow hospitals to share calendars and
appointment information. This method could be effective when the innovation has multiple major distinct
components. Lastly, a combination of staged implementation strategies can be taken. Those responsible
for setting the implementation objectives should consider the different options and choose what they feel
is most appropriate given the enterprise needs.
3.1.3.4 Participant Responsiveness

Similar to stakeholder engagement during implementation planning, Participant Engagement during the implementation also influences innovation adoption. Here, participants refer to individuals who are directly involved with the innovation. Enterprise Engagement, on the other hand, refers to stakeholder groups throughout the enterprise who support the innovation. Establishing formal and informal mechanisms for all stakeholders to provide Feedback on the implementation and the innovation provide additional avenues for individuals to participate in the improving current and future implementations.

3.1.3.5 Quality of Delivery

Enterprise-wide implementations require communication and collaboration between stakeholder groups across the enterprise. One concept influencing the quality of delivery in an implementation is Stakeholder Communication. There are a variety of topics related to stakeholder communication to consider: continuous communication, stakeholder collaboration, communication challenges, etc.

Program Material (e.g., training material, documentation, process outlines) should accurately reflect information about the innovation and should be sufficient, such that individuals who obtain this information are capable of correctly using the innovation. Program material can be communicated through a variety of Delivery Methods. Methods should be suitable given innovation requirements and the stakeholders receiving the information.

Facilitators to Implementation can effectively improve implementation efforts. Slack resources, incentive structures and excellent communication between key stakeholders are examples that could facilitate or promote implementation. Conversely, Barriers to Implementation encountered during the implementation can hinder or prevent implementation success. A dearth of implementation facilitators itself could be an implementation barriers (e.g., insufficient resources, lack of incentive structures and poor communication). In both cases, barriers or facilitators could be innovation specific (e.g., incomplete understanding of the innovation by key stakeholders) or general to all implementations (e.g., internal competition between stakeholders).
3.1.4 Phase IV: Innovation Evaluation

Finally, Phase IV assesses whether the enterprise actively measures the innovation after implementation, as well as the innovation’s impact on enterprise operations. Evaluation literature identified four primary dimensions of evaluation: cost, quality, access and satisfaction. Each dimension, along with their relation to innovation implementation is discussed below. Innovation evaluation should be considered from the perspective of all stakeholders impacting and/or impacted by the innovation (Bashshur, On the Definition and Evaluation of Telemedicine 1995). Figure 3-7 outlines the dimensions and concepts in Phase IV.

![Figure 3-7: Overview of Phase IV Dimensions and Concepts](image)

3.1.4.1 Cost

The enterprise can incur a variety of costs: direct, indirect, fixed, variable, marginal, and general costs (Scott, et al. 2007). All types should be considered when examining one-time costs associated with implementation (Implementation Costs) such as initial equipment and software purchases/installation, as well as ongoing costs required for supporting and maintaining the innovation (Innovation Costs) such as equipment maintenance or staffing of new positions. The innovation’s Impact on Existing Enterprise Finances can be experienced in numerous (direct and indirect) ways. Consider the following example: the enterprise is adopting an innovation that replaces Process A, but to do so increases utilization of Process B. While costs associated with Process A will eventually be eliminated once implementation is complete, additional resources are necessary to support increased utilization of Process B. The overall impact of innovation adoption on existing enterprise processes will depend on the savings incurred by eliminating Process A compared to the additional costs associated with Process B. It is possible indirect effects of the innovation go unnoticed during implementation planning and execution. Therefore, continually tracking
enterprise expenses before, during and after implementation may be necessary to identify how the innovation alters enterprise costs.

3.1.4.2 Quality

It can be useful for the enterprise to directly measure quality of the innovation. While exact metrics or methods can vary with the innovation and enterprise, selected metrics could track Innovation Performance, Innovation Reliability, and Innovation Safety and Risk. Multiple scenarios should be considered when considering quality, such as when the innovation operates properly versus when it malfunctions.

Furthermore, similar to how the innovation indirectly impacts existing enterprise expenses, the enterprise should also consider the innovation’s Impact on the Quality of Existing Operations. For example, perhaps the innovation requires significant amount of shared resources (e.g., IT support or space used for other enterprise operations), such that they are provided at the expense of existing operations. If sufficient slack resources are available, the impact on the quality of existing operations will be less than if these resources are used for other purposes.

3.1.4.3 Access

Innovation Utilization and Innovation Task Efficiency refer to enterprise use of the innovation and the efficiency of innovation related tasks, respectively. Together, these concepts can help identify how much the innovation impacts the enterprise. Likewise, Stakeholder Workload Distribution measures the time and effort that different stakeholder groups spend on innovation tasks, revealing how much each groups dedicates to the innovation relative to their other tasks and what is expected of their role description.

The evaluation in Phase IV can help capture Barriers and Facilitators to Innovation Use. Insufficient resources or inadequate understanding of the innovation are examples of barriers preventing the enterprise from accessing or utilizing the innovation as it should. On the other hand, incentives structures, leadership support and program assistance are facilitators that simplify innovation use. Lastly, Innovation Documentation is a specific facilitator increasing enterprise access to the innovation. Formal documentation processes, instructions, etc. that describe the innovation and making them available to stakeholders using the innovation can improve innovation efficiency and use.
3.1.4.4 *Satisfaction*

Satisfaction refers to the perception of the innovation by those impacted or impacting the innovation. While satisfaction can be highly subjective, stakeholder perception of the innovation can greatly influence its success. Thus assessment of *Stakeholder Satisfaction* from multiple perspectives helps capture how the innovation is perceived. *Feedback Mechanisms* is proven\(^3^4\) to be an effective method to obtain stakeholder satisfaction.

From a holistic perspective, *Innovation Sustainability* helps determine whether the enterprise can maintain supporting the innovation. More than just financial sustainability, the enterprise should weigh the overall value added with what is necessary to continually support the innovation (e.g., finances, equipment, support staff, etc.).

Active reflection with the purpose of applying lessons learned to future endeavors is a key component of being a learning organization. To that effect, *Implementation Reflection* can identify lessons learned from the current implementation with the purpose of improving methods for future implementations.

3.2 **Enterprise Architecture and the Timeline Implementation Framework**

While enterprise architecture\(^3^5\) (EA) is concerned with setting the vision for an enterprise-wide implementation, it is worth comparing the EA Ten Element Framework and the Timeline Implementation Framework. The EA Framework is comprised of the enterprise ecosystem (i.e., external landscape), key stakeholder groups and eight “views”\(^3^6\) that emphasize somewhat distinct enterprise elements: *strategy, process, infrastructure, organization, knowledge, information, product* and *service*. Table 3-1 compares the EA Ten Element Framework with the Timeline Implementation Framework. An “X” indicates a relationship between an EA element (row) and a dimension of the Timeline Implementation Framework (column). While some elements have greater prominence than others, all ten EA elements are reflected in the Timeline Implementation Framework. Moreover, each dimension of the Timeline Implementation Framework incorporates more than one EA element, signifying the complexity that can result from the interaction of multiple enterprise components during such a dynamic implementation process. With respect to EA, these findings could reveal unseen relationships between EA elements. For example, a

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\(^3^4\) The following authors are a sampling of those who support feedback as a means of gathering stakeholder satisfaction: Rogers (1995), Rycroft-Malone et al. (2002), Greenhalgh (2004), Grimshaw (2004), Pizziferri (2005), Damschroder (2009) and Scott et al. (2007).

\(^3^5\) Refer to Section 2.1.6 for a description of enterprise architecture and its Ten Element Framework.

\(^3^6\) These eight views, combined with the ecosystem and stakeholders make up the Ten Element Framework.
process enabling enterprise performance could also be considered part of the enterprise infrastructure. A more comprehensive analysis comparing EA elements with the detailed concepts of the Timeline Implementation Framework (rather than only considering the higher level dimensions) could provide additional insight on potential links between EA elements as expressed during an enterprise-wide implementation.

Table 3-1: Comparing the EA Framework and the Timeline Implementation Framework

<table>
<thead>
<tr>
<th>Phase I</th>
<th>Phase II</th>
<th>Phase III</th>
<th>Phase IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culture for Change</td>
<td>Organizational Learning</td>
<td>External Influence</td>
<td>Internal Communication</td>
</tr>
<tr>
<td>Ecosystem</td>
<td>(6)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>(10)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Strategy</td>
<td>(6)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Organization</td>
<td>(3)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>(8)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Process</td>
<td>(10)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Knowledge</td>
<td>(3)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Information</td>
<td>(7)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Product/Service</td>
<td>(6)</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

3.3 Summary

The Timeline Implementation Framework was created in response to the second research question:

Q2) How can enterprise-wide implementations be characterized over time, from implementation conceptualization to evaluation and sustainment, in a way that informs current and future implementation efforts?

By highlighting concepts in the literature relevant to enterprise wide implementations, the framework identifies four implementation phases: (I) Enterprise Analysis, (II) Implementation Planning, (III) Implementation Execution and (IV) Innovation Evaluation. Phase I highlights enterprise features that could enable or hinder innovation dissemination, Phase II considers the planning that would precede an enterprise-wide implementation, Phase III examines the fidelity of implementation execution, and Phase
IV evaluates the outcome of innovation implementation. After providing a brief overview of the framework, this chapter walked through the framework, explaining concepts within each phase, to illustrate the enterprise-wide implementation process. Lastly, dimensions in the Timeline Implementation Framework were compared with the Ten Element Framework of EA to identify where dimensions and EA elements align.

The following chapters use the Timeline Implementation Framework to help characterize and assess the Veterans Health Administration (VHA) Telehealth expansion. Findings from the analysis aim to answer the remaining three research questions in order to provide insightful recommendations intended to improve VHA implementation efforts.
4 Methodology

4.1 Preliminary Research and Study Overview

Figure 4-1 outlines the research methods of this work, including preliminary work that led to the current study and research questions. Eight steps are summarized below.

![Figure 4-1: Conceptual overview of the research methods](image)

1. **Class Project:** The author’s interest in implementation began in the fall of 2011 with a course project investigating the Veterans Health Administration (VHA) Telehealth Expansion. Informal interviews with 19 Telehealth stakeholders throughout the country were compared and contrasted to produce a general understanding of the national Telehealth program. Conclusions revealed potential areas of improvement specific to the Telehealth expansion, as well as topics for further research intended to inform enterprise-wide implementations. The author was curious and decided to continue exploring this field after presenting conclusions of the preliminary study to a Department of Veterans Affairs (VA) National Program Director.

2. **Literature Review:** Formation of the final research topic began by reviewing the literature on organizational and implementation theories. Exposure to previous research in these fields provided a firm foundation of enterprise-wide implementation knowledge, and allowed both convergences and gaps in the literature to surface. Many frameworks that examine enterprise-wide implementations exist, but no frameworks were found that framed the implementation process with time-dependent

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37 Nine of the 21 Veterans Integrated Service Networks (VISNs) were represented in the findings.
phases while incorporating detailed concepts, as done so in the Timeline Implementation Framework presented in Chapter 3. Results of the literature review in Step 2 answer the first research question:

Q1) How have enterprise-wide implementations and innovation been characterized in the literature?

3. **Framework Development:** The first draft of the Timeline Implementation Framework was created after identifying concepts related to enterprise-wide implementations in the literature. The framework structure divides the implementation into four time-dependent phases, and concepts within each phase are further categorized into related themes. Development of the Timeline Implementation Framework answers the second research question:

Q2) How can enterprise-wide implementations be characterized over time, from implementation conceptualization to evaluation and sustainment, in a way that informs current and future implementation efforts?

4. **Exploratory Research:** Exploratory research of Telehealth implementation efforts throughout New England was conducted prior to the full study in order to shape valuable and practical study research questions and study methods. As part of an iterative process, findings from this preliminary work suggested additional topics to review in the literature and conducted preliminary assessments of the framework during its development.

Steps 2-4 were repeated for the following reasons:

- Exploratory research findings offered practical knowledge that was used to inform more detailed literature reviews and framework drafts.
- More focused literature reviews during later iterations helped identify concepts, theories, studies, etc. that were previously unseen. Moreover, concepts that surfaced during exploratory research studies could be directly searched in the literature.
- Framework drafts were reviewed and edited as additional information from the literature and exploratory findings was revealed.
- With each iteration, the researcher matured and could then return to previous steps with more conceptual and practical knowledge.

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38 Recall, the Timeline Implementation Framework aims to understand the implementation process over time within a complex socio-technical system, from implementation conceptualization to evaluation and sustainment.

39 Evidence from the exploratory study in Step 4 and the analysis in Step 7 discovered concepts that were not previously identified in the literature. These concepts were later appended to the Timeline Implementation Framework as applicable.

40 According to VHA terminology, Veterans Integrated Service Network 1 (VISN 1) is comprised of the six New England states.
5. **Study Design**: Results of this iterative process led to the formation of the study design that is outlined in Section 4.2. Exploratory findings identified potential interview respondents, and the framework structured interview protocols and the data analysis. Implementation of a Clinical Video Telehealth (CVT) clinic in New England was selected as a case study, and individuals at varying levels of the VHA were included to provide an enterprise perspective of Telehealth implementation in the VHA.

6. **Data Collection**: Data collection included 15 interviews, observation, internal documents and archival data. Separate interview protocols were developed for various stakeholder groups to account for their differing roles in Telehealth. Each protocol was designed to reflect concepts in the Timeline Implementation Framework, such that concepts were equally likely to occur, regardless of the respondent’s role in Telehealth. For example, questions may vary between providers and Telehealth technicians, but the same concepts addressed similarly in each protocol. As described in more detail in Section 4.2, a lower participation rate than expected resulted in a slight study redesign during the data collection.

7. **Analysis**: MAXQDA11, a specialized coding software, facilitated quantitative and qualitative analysis of the gathered evidence. Observations and internal documents were used to validate interview responses, and archival data was explored in order to characterize the VHA system. See Section 4.3 for details on the analysis process. Results from the data collection and analysis aim to address the third research questions:

   Q3) What is the current state of the VHA Telehealth expansion?

8. **Results, Conclusions and Recommendations**: Results, conclusions and recommendations provide suggestions for improvement of the VHA Telehealth expansion, as well as the development and execution of implementation strategies for further VHA endeavors (the final two research questions).

   Q4) Given the current state and objectives of the VHA Telehealth expansion, how can Telehealth implementation be improved?

   Q5) How can the characterization and evaluation of Telehealth implementation efforts inform the development and execution of implementation strategies for current and future VHA initiatives?

The author has received input from individuals within VHA in the following ways: consistent input to study design, execution and conclusions for a VHA perspective; feedback by VA researchers regarding
the framework and its potential benefits for VHA; and two presentation to a VA National Program Director, one for the of the class project in Step 1 which provided insight to this research design and another near the analysis of these research findings for input and confirmation on key preliminary findings that led to the final conclusions.

4.2 Study Redesign and Final Study Design

The original study design had two parts.

I. Two separate Telehealth implementations (one Store-and-Forward and one CVT) at different implementation phases were desired in order to better understand Telehealth implementation in the VHA. Variations in Telehealth clinics and Telehealth types would contribute to a more comprehensive representation of Telehealth implementation.

II. Influential roles throughout the VHA system, in Telehealth program development and implementation, were identified as potential study participants in order to attain an enterprise perspective of VHA Telehealth implementations. Responses from these individuals were to be compared and contrasted with responses from individuals directly involved with a specific Telehealth clinic in order to understand how the clinics fit into the context of the nationwide Telehealth expansion.

However, low response rates of potential study participants resulted in insufficient numbers to complete the originally desired study. Consequences were twofold: first, unfilled responses by crucial roles in the Store-and-Forward implementation led to insufficient stakeholder perspectives to conduct a complete analysis. Second, because only one of nine potential study respondents at the national and regional levels participated in the study, the “enterprise perspective” was reduced to a more localized context, namely VISN 1. Figure 4-2 compares the original study design (left image) and final study design (right image), and Table 4-1 calculates response rates for each level of the organization. Black dots in Figure 4-2 indicate study participants, and the gray dots in the left image indicate individuals contacted who did not participate. While the original study design included two Telehealth programs (as indicated by the green and blue dashed outlines in the left image), the final study analyzed only the CVT implementation (green

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41 IRB restrictions prevented contact with leadership prior to study execution. Given these conditions, resistance to participation at higher levels suggests garnering leadership support may have increased response rate at higher organizational levels.

42 Refer to Chapter 5 for a more complete understanding of the various levels of the VHA organization.
dashed outline in the right image). However, this CVT implementation allowed for an enterprise-wide implementation study at VISN 1 in that it is part of both VISN and national implementation efforts. National and regional offices are key stakeholders in the VISN 1 Telehealth enterprise: regardless of being external to the enterprise, national offices provide funds, resources, directives, guidelines, etc. that are directly influential in Telehealth expansion in VISN 1.

![Original Study Design](image1)

![Final Study Design](image2)

Figure 4-2: Original study design (left image) and final study design (right image)

<table>
<thead>
<tr>
<th>Level</th>
<th>N Participated</th>
<th>N Invited</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>1</td>
<td>8</td>
<td>12.5%</td>
</tr>
<tr>
<td>Regional</td>
<td>0</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>VISN</td>
<td>1</td>
<td>2</td>
<td>50%</td>
</tr>
<tr>
<td>Facility 1</td>
<td>10</td>
<td>15</td>
<td>66.7%</td>
</tr>
<tr>
<td>Facility 2</td>
<td>3</td>
<td>3</td>
<td>100%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>15</strong></td>
<td><strong>29</strong></td>
<td><strong>52%</strong></td>
</tr>
</tbody>
</table>

4.3 Qualitative and Quantitative Textual Analyses

MAXQDA11, a specialized coding software, facilitated analysis of interview responses. Similar to a grounded-theory approach (Charmaz 2006), emerging concepts from interview responses were directly related to concepts in the Timeline Implementation Framework. A “code” was created for each

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43 Colored circles symbolize medical centers or outpatient clinics included in the study; black dots indicate study participants; and gray dots indicate individuals who were contacted but did not participate. Black dots within the dashed lines indicate those necessary to conduct a complete case study.
framework element in order to gather related comments referencing specific concepts. These comments, or quotations, are considered “coding instances” of at least one concept. Depending on the context of the quotation, coding instances could be linked to multiple codes or concepts. Coding instances associated with multiple codes could identify links between concepts in the framework.

 Participant responses from separate interviews were compared and contrasted to obtain internal and external validity, as well as various perspectives throughout the enterprise.

- **Number of instances (internal validity)** - The number of responses about concepts within a particular dimension (or concept) compared with the number of responses about another dimension (or concept) could help identify which concepts were particularly relevant throughout the different implementation phases. Similarly, the number of coding instances, or responses, by different study participants was compared to determine the presence of a particular concept throughout the entire enterprise. Consider the following hypothetical responses about the pace of an implementation: one respondent separately mentioned four times that the implementation execution was too fast, three respondents describe the pace as manageable or just right, and one respondent never referenced the pace of the implementation. When comparing the number of coding instances, the context of the instances need not agree. In the above example of implementation pace, this comparison would tell us that four of the five respondents acknowledge pace when discussing the implementation. Additionally, more references to pace by the first individual indicate that he or she thinks about pace more frequently when reflecting on the implementation.

- **Content (internal validity)** – Consistencies or irregularities in responses by different individuals could have a number of implications. For example, different individuals have different roles and responsibilities, so implementation experiences were likely to differ by individual, as in the previous example. However, inconsistent or conflicting responses could uncover misunderstandings between collaborating stakeholders, suggesting potential barriers to communication and ultimately implementation.

- **Content (external validity)** – Additionally, interviews were compared and contrasted with observations and internal documents in order to question and/or affirm participant responses. For example, while all respondents may testify that implementation was being executed at a specific pace (establishing internal validity), external validity could be achieved if internal documents tracking clinic progress and met deadlines indicated implementation efforts were being executed at a much slower pace.
As illustrated above, analysis at various levels of abstraction provided a richer understanding of the implementation. Guided by the Timeline Implementation Framework, the analytical methods described in this chapter were used to study a specific CVT implementation in VISN 1.
5 Background: VHA Telehealth Expansion and Implementation of a CVT Clinic

Veterans Health Administration (VHA) is currently expanding three Telehealth modalities: Home Telehealth (HT), Store-and-Forward (SF) and Clinical Video Telehealth (CVT). VHA Telehealth began in 2003, when Home Telehealth was introduced as a way to improve care to chronically ill Veterans and reduce their need for long-term inpatient stays (Darkins, et al. 2008). For the past decade, the Home Telehealth program has grown to serve more than 200,000 Veterans in their homes. Darkins and his colleagues explain how VHA, “attributes the rapidity and robustness of its [Home Telehealth] implementation to the ‘systems approach’ taken to integrate the elements of the program” (Darkins, et al. 2008). Now that Home Telehealth is more established, VHA is currently expanding the clinic-based Telehealth modalities, CVT and SF, nationally.

This chapter aims to address Research Question 3\(^{44}\) by describing the current state of the VHA Telehealth expansion, beginning with a national perspective and ending with a Veterans Integrated Service Network (VISN) perspective of Telehealth expansion and utilization. After a brief overview of the VHA mission and structure in Section 5.1, Section 5.2 introduces the VHA Telehealth expansion by focusing on the three Telehealth modalities and how they related to two other aspects of health care delivery. Section 5.3 describes key stakeholder groups involved with Telehealth implementation at local, regional and national levels of VHA. Finally, the make-up of SF and CVT (referred to as the “Clinic-Based Telehealth” modalities) at the VISN level is portrayed in Section 5.4.

5.1 Veterans Health Administration

As one of three administrative branches of the Department of Veterans Affairs (VA)\(^{45}\), VHA is committed to “[honoring] America’s Veterans by providing exceptional health care that improves their health and well-being” (Department of Veterans Affairs 2011). To support this mission, VHA manages 152 medical centers and nearly 1400 Community Based Outpatient Clinics (CBOCs) across the country. Figure 5-1 maps the twenty-one\(^{46}\) regional networks, VISNs, created during VHA’s organizational

\(^{44}\) Research Question 3 is as follows: What is the current state of the VHA Telehealth expansion?

\(^{45}\) The two other VA administrations are National Cemetery Administration and Veterans Benefits Administration.

\(^{46}\) Although VISNs are numbered up to VISN 23, VISNs 13 and 14 merged to form VISN 23.
redesign in the mid-1990s (Kizer, Demakis and Fuessner 2000). By decentralizing the organization into separate regional healthcare systems, each VISN manages the health care provided at medical centers and CBOCs within its defined periphery. This thesis is primarily concerned with the 11 medical centers and 43 CBOCs in the New England Healthcare System, also known as VISN 1 (Figure 5-2). With an expenditure of approximately 2.1 billion dollars in Fiscal Year (FY) 2012, VISN 1 served over 250,000 unique Veterans.

Figure 5-1: Map of the 21 Veterans Integrated Service Networks (Department of Veterans Affairs 2009) (Department of Veterans Affairs 2009)

Figure 5-2: The 11 medical centers and 43 CBOCs in the New England Healthcare System (VISN 1)

A recent study compared VHA health care delivery in 1994 and 2004 to find that the decentralization into regional healthcare systems improved efficiency of care, without impacting efficacy (Ozcar and Luke 2011).

Patient count came from an internal VA database, and the budget information came from an internal VA report.
While medical centers offer a full range of medical and surgical services, CBOCs are distributed around medical centers throughout the surrounding community primarily for geographic access and convenience. Medical centers and CBOCs form partnerships to establish, what is defined in this thesis as a “facility”. Figure 5-3 illustrates what might constitute a facility. For example, “Facility 1” illustrates a partnership between one medical center and four CBOCs. However, a facility can encompass multiple medical centers, like “Facility 2” in the figure.

![Facility Diagram](image)

**Figure 5-3**: A "facility" is defined by the partnerships between one or more medical centers and the surrounding outpatient clinics

### 5.2 VHA Telehealth

In 2012 VHA tasked all of its regional entities with the objective of creating a "3-year plan to ensure that 50% of [unique patients] are receiving services through virtual care on or before October 2014" (VHA Office of Healthcare Transformation 2011) in order to promote its mission of providing patient-centered care. Although “virtual care” is not limited to Telehealth, but refers to various electronic health care methods, such as secure messaging, Telehealth includes three of the six virtual care modalities and refers to the use of technology to enable the delivery of health care services to patients located at a separate medical center or outpatient clinic than the provider:

1. **Home Telehealth (HT)**
   - A patient, typically one diagnosed with a chronic condition, keeps a monitoring device in their home and frequently tracks his/her medical condition over time. The patient routinely communicates this information to his/her assigned Care Coordinator located at a nearby medical center or CBOC. The

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49 The six virtual care modalities include: the three Telehealth modalities (CVT, SF, and HT); opting in for secure messaging (SM) through MyHealtheVet, a secure, online patient portal; e-consults, where providers asynchronously consult another provider regarding a particular patient case; and SCAN-ECHO (Specialty Care Access Network-Extension for Community Healthcare Outcomes) where primary care providers connect with specialist as a way to provide specialty care treatment to their patients (performed through a video-conferencing system similar to CVT).
Care Coordinator, contacting the patient’s provider when appropriate, will use recent health trends to determine whether the medical intervention is required.

2. **Store-and-Forward (SF)**

Medical information of a patient’s health condition is captured and stored in the patient’s electronic medical record by a Store-and-Forward Telehealth Imager (SFT Imager). At a later time, a certified reader examines the image(s) and determines the appropriate course of action to be taken (e.g., receive a particular treatment, take a specific medication, schedule an in-person or Telehealth follow-up appointment, or take no action).

3. **Clinical Video Telehealth (CVT)**

Patients meet with a provider located at a separate medical center or CBOC via a secure, real-time video-conferencing link. A telepresenter facilitates the CVT encounter with the patient at the receiving site (i.e., the medical center or CBOC where the patient is located during the CVT appointment), while the provider offers medical expertise from the providing site (i.e., the medical center or CBOC where the provider is located during the CVT appointment).

Similar to the way Bashshur et al. (2011) illustrated three dimensions of Telehealth using technology (e.g., synchronicity, network connectivity), functionality (e.g., diagnosis, consultation, monitoring, mentoring) and application (e.g., treatment, specialty, disease, site), Figure 5-4 identifies three key dimensions of VHA Telehealth programs: Telehealth modality, service, and patient rurality.

- **Telehealth modality** is broken down into the three Telehealth modalities in VHA: HT, SF and CVT. Each modality serves a particular purpose in the health care delivery system.

- **Service** defines the various medical specialties utilizing Telehealth. How Telehealth augments or replaces medical care will depend on the specialty and the provider’s vision of Telehealth for his/her particular clinic.

- **Location/Rurality** determines whether the patient lives in an urban or rural region of the country. The benefits of Telehealth could vary with patient rurality. For instance, while urban patients living close to a medical center do not have a long-distance travel burden as more rural patients face, Telehealth can reduce the time spent in congested urban traffic, as well as wait times between scheduling an appointment and receiving care.\(^{51}\)

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\(^{50}\) The VHA categorizes each patient by rurality. Rurality categories are as follows: “urban” areas are those that are considered urban by United States Census; “highly rural” areas are counties were the average population is less than 7.0 citizens per square mile; and “rural” areas make up the remaining geographies. “Unknown” is used to categorize a patient location when his/her address is unknown (source: internal VHA document).

\(^{51}\) In addition to varying patient needs with rurality, it is worth reiterating the realization that the operating budget of supporting an urban facility is greater than that of a rural facility (as depicted in Figure 1-2).
5.3 Telehealth Stakeholders

Telehealth is an enterprise-wide implementation aimed to eventually integrate with nearly all VHA health care delivery methods. In order to incorporate Telehealth into VHA administrative, business and medical processes such that health care processes are enhanced, and not hindered, the Telehealth expansion inherently required collaboration of stakeholder groups throughout the entire system. At a clinical level, Telehealth Clinical Technicians (TCTs) and administrators communicate with patients, and with one another, before an encounter\(^2\) to coordinate appointment scheduling. During a Telehealth appointment, providers and TCTs will use Telehealth technologies to directly provide health care to patients. At a facility level, a Facility Telehealth Coordinator (FTC) is responsible for supporting all Telehealth clinics in his/her assigned facility (i.e., medical center(s) and CBOCs), from implementation to sustained use. Furthermore, participation of facility leadership and stakeholder groups is necessary to assist Telehealth adoption and use in their facility. Outside of the facility, the VISN, regional and national offices provide a variety of direct and indirect support. Each of the major stakeholders involved with Telehealth are described below\(^3\). These descriptions were informed by interviews, observation and internal documents.

**Patients**

The patient experience differs depending on the Telehealth modality. For HT, patients, most often suffering from chronic conditions, monitor their own personal medical conditions with a device they keep in the home. As a form of case management, they regularly communicate their health status to their assigned Care Coordinator (see below) who will determine whether any medical intervention, such as

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\(^2\) An encounter is defined by the patient interaction with a single health care provider. For example, it is possible that a multiple patient encounters take place during a single appointment (e.g., one encounter with a nurse who takes the patient’s blood pressure, and another encounter with a specialties).

\(^3\) Individuals from all stakeholder groups were invited to participate in the case study presented in Chapters 6 and 7. Due to either a decline in participation or a lack of response, the following stakeholder groups were not included in the final study: Telehealth Services, regional OIT&T and the three national training centers. Chapter 5 provides details on the participant response rates.
changes to medication, behavioral medication, sending a visiting nurse to the home, scheduling an appointment with a provider, etc. is required.

For SF, the patient will schedule an appointment with a TCT or a clinical administrator. During the appointment, an image will be taken of a particular medical condition by a certified SFT Imager. The image is then stored in the patient’s electronic medical record to be read at a later date by a certified provider. After the image is read and a decision as to whether follow-up action is required (e.g., in person appointment, medication, treatment, etc.), the patient is contacted and informed of the appointment outcomes.

For CVT, the patient will schedule an appointment with the TCT or clinical administrator who manages the provider’s schedule. The patient side of the CVT appointment will be facilitated by a certified Telepresenter, often filled by a TCT. Through a secure, synchronous video-conferencing connection, the patient will receive medical services by the remote provider. The Telepresenter and the provider will communicate to the patient any necessary follow-up instructions.

**Providers**

Clinicians play a couple of key roles in Telehealth. Firstly, providers can use Telehealth technologies as a way to deliver health care services to patients. Depending on the needs of the patients and the nature of the medical care, Telehealth can augment and/or replace certain health care delivery methods. In HT, providers communicate with the Care Coordinator(s) assigned to his/her patient(s) to determine what preventative measures to take. In SF, providers can become certified Readers, allowing them to screen images of a patient’s medical condition. Specialists, such as optometrists or dermatologists, use SF as a way to increase efficiency of screening and treating patients. In CVT, providers remotely render medical services to patients over a secure, synchronous connection.

However, before utilizing Telehealth technologies to treat patients, providers serve as the clinical champion in integrating Telehealth into their existing practices. Therefore, in addition to the use of Telehealth technologies, providers continue with their traditional modes of providing care (e.g., seeing patients face-to-face). Providers collaborate with TCTs, FTCs and other individuals who will participate in the Telehealth clinic.

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54 The term “provider” is a general term that encompasses medical doctors (MDs), nurse practitioners (NPs), physician’s assistants (PAs), registered nurses (RNs), etc.
Clinical Administrators
Clinical administrators often become involved to help manage scheduling of Telehealth appointments. Particularly with CVT, two separate schedules (one managed by each clinic) must be coordinated to ensure the patient, the provider, and all necessary equipment/space is scheduled for the appropriate time and location.

Care Coordinators (HT only)
As a preventative measure, Care Coordinators regularly communicate with HT patients to help manage chronic conditions. Specifically, this means helping track patient health measures and determining whether medical intervention is necessary to treat the patient’s condition. When appropriate, the Care Coordinator will communicate with a patient’s provider for consultation or to provide updates of the patient’s condition.

SFT Imagers/Readers (SF only)
Certified SFT Imagers, often a TCT, work directly with the patients during a SF appointment. In addition to capturing the patient’s medical condition and uploading the image to the patient’s electronic medical record, the SFT Imager must sufficiently document the patient’s condition in the electronic notes. This includes any information communicated by the patient during the patient encounter, as well as any health indicators perceived during the appointment. For this reason, the SFT Imager must be acutely perceptive during the appointment, ask the patient appropriate questions about his/her condition, and accurately document all the information that may help the Reader. Furthermore, the Imager is also responsible for educating the patient about certain medical options and preventative care.

Certified providers can serve as SFT Readers, who use the captured image and documented notes from the SFT Imager to determine whether medical intervention is required to treat the patient. Rather than having the patient in the same room during the appointment, the flexibility of SF allows the reader to study the image, and consult other medical experts when necessary, in order to make the most appropriate decision.

Telepresenter (CVT only)
Telepresenter is the term used to describe the individual who facilitates the patient side of a CVT appointment. It is part of the TCT responsibilities to serve as the Telepresenter at his/her medical center or CBOC. However, if a more specialized medical scope is required for a particular CVT clinic, it is
possible that a provider with a greater scope of practice may serve as the Telepresenter, as long as the provider completes the training necessary to facilitate the CVT appointment.

Telehealth Clinical Technicians (TCTs)

TCTs are designed to facilitate clinic-based Telehealth encounters on the patient end, whether that is the Telepresenter in CVT or the Imager in SF. As one TCT explained, during these appointments,

"[TCTs] are designed to be the hands on. [...] I'm that other provider's eyes, ears, hands... we'll be realistic. nose. I mean, I'm the one who gets the physical aspect, the interaction, and then create that comfort with that patient."

As vital as TCTs are during patient Telehealth encounters, TCTs are equally important for Telehealth implementation and sustainment throughout the facility. Other TCT responsibilities include the following:

- Educating patients about Telehealth and recruiting them to participate in Telehealth
- Educating providers about Telehealth and recruiting them to be clinical champions who adopt Telehealth into their practice
- Working with Information Technology (IT) and Clinical Engineering in setting up and deploying Telehealth equipment
- Assisting the FTC in supporting implementation of Telehealth clinics
- Assisting the FTC in supporting existing Telehealth clinics
- Other responsibilities pertaining to Telehealth implementation and use across a facility

Facility Telehealth Technicians (FTCs)

Facility Telehealth Coordinators are responsible for all Telehealth programs within their assigned medical center(s) and CBOC(s). To that effect, FTCs interact with nearly every stakeholder group in this list, along with nearly every stakeholder group within their assigned facility. In addition to managing relationships with these groups, FTCs are responsible for Telehealth-related training and for supervising all the TCTs within a facility (two per medical center, one per CBOC), are directly involved with the implementation of each Telehealth program in their facility, evaluate and provide continued support to all Telehealth program throughout the facility, and more.

Information Technology (IT)

IT provides technical support to the entire facility. In order to provide a wide range of technical support, IT is divided into multiple subgroups, each specializing in a particular area. Due to the complex technical
infrastructure required for CVT, participation from all IT groups is necessary to support implementation and sustained use. The kind of support required to support Telehealth by each group is described below:

- **IT Networking** programs the data switch on the CVT cart locally (i.e., wherever the cart is located). All devices on the CVT cart (e.g., video system, computer, stethoscope, etc.) are plugged into this data switch to simplify how the CVT cart connects to the data jack on the wall. A CVT cart is shown in Figure 5-5.

- **IT Desktop** is responsible for imaging each computer on the CVT carts (along with all other computers in the facility).

- **IT Server** sets up the server necessary to program stethoscopes.

- **IT Telecom** (Telecommunications) remotely sets up the video systems on each cart and checks to see if there is enough bandwidth to support CVT encounters.

- **IT WAN** (Wide Area Networks) manages the data links between VA medical centers(s) and CBOC(s) and helps prioritize which tasks on the network receive the available bandwidth.

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Figure 5-5: CVT cart (Department of Veterans Affairs 2011)

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55 Clinical Engineering is required for the stethoscope machines, which allow providers at one site to listen over the network to a patient’s heart, located at another site.

56 Sufficient bandwidth is not a problem at the larger medical centers, but there have been issues of insufficient bandwidth at CBOCs. When there is not enough bandwidth to support all the work trying to be done on the network, the entire network slows and the quality of the CVT video is compromised.
On top of their Telehealth responsibilities, IT is also responsible for setting up and maintaining technical equipment throughout the facility, providing technical support to VHA employees, ensuring all communication networks are functioning (e.g., patient electronic medical records are appropriately managed), and more. Facility IT is part of a larger IT network throughout the country. In fact, the national Office of Information Technology (OI&T) is currently in the process of establishing regional IT offices.

**Clinical (or Biomedical) Engineering**

Clinical Engineering is responsible for managing all medical devices and ensuring they are safe and functional. For Telehealth, this means Clinical Engineering is responsible for SF equipment, and each medical device that is attachment to a CVT cart (e.g., stethoscope). Because of the technical and complex nature of Telehealth equipment, CVT equipment in particular, collaboration between IT, Clinical Engineers, TCTs and the FTC is necessary to set up, install, deploy and maintain Telehealth equipment.

**VISN Telehealth Lead**

Each VISN has a VISN Telehealth Lead responsible for managing Telehealth at the VISN level and supporting Telehealth implementation at facilities throughout the VISN. VISN Telehealth Leads serve as the “middle man” between the national entities who provide implementation strategy and funding and the facilities implementing Telehealth programs.

**Facility Leadership**

Considering the impact of Telehealth on existing stakeholder groups throughout the facility, for example IT and Clinical Engineering, Telehealth can become an integral part of facility operations. Documented approval of facility leadership, usually a Chief of Staff who oversees all medical and surgical services delivered, is required for each Telehealth clinic established.

**VHA Telehealth Services**

VHA Telehealth Services is the national force behind the VHA Telehealth expansion. While start-up funding for Telehealth has been provided through the Office of Healthcare Transformation’s “VHA’s T21 Network Implementation” initiative for the first three years (VHA Office of Healthcare Transformation 2012), VHA Telehealth Services provides VISNs and facilities with implementation strategies, guidelines, documents, standards, targets, etc., driving the national expansion.

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57 Between the VISN and national levels of the organization, VHA is divided into four regional networks. VISNs 1 through 5 are part of with Region 4 Office of Information Technology (OI&T).
Office of Specialty Care Services (OSCS)
The Office of Specialty Care Services is a national office responsible for maintaining and expanding the medical and surgical specialties offered by VHA. OSCS works alongside the VHA Telehealth Services in order to expand Telehealth into specialty and sub-specialty services. OSCS is also responsible for the Specialty Care Transformation, an effort to create a more patient-centric healthcare system through the use of innovative delivery methods, such as Telehealth, secure messaging and e-consultations.

Office of Rural Health (ORH)
The mission of VHA’s Office of Rural Health is “to improve access and quality of care for enrolled rural and highly rural Veterans by developing evidence-based policies and innovative practices to support the unique needs of enrolled Veterans residing in geographically remote areas.” (VHA Office of Rural Health 2013). As a vehicle to increase access to care, Telehealth has the ability to directly support the ORH mission. In fact, simultaneous with the VHA Telehealth Services implementation efforts, ORH was separately expanding Telehealth as a means to serve rural Veterans.

National Training Centers
Each Telehealth modality has its own national training center: Home Telehealth National Training Center in Florida, Store-and-Forward Telehealth National Training Center in Boston, and Clinical Video Telehealth national Training Center in Denver (VHA Office of Telehealth Services 2012). Each center is responsible for developing the national training standards and training programs, as well as the education of Telehealth programs, operations, and processes throughout VHA.

5.4 VISN Level Clinic-Based Telehealth
The make-up of Clinic-Based Telehealth (i.e., CVT and SF) at the VISN level provides a more regional perspective of Telehealth utilization. Patient counts (i.e., the number of unique patients receiving a particular service) are used in this chapter to measure and illustrate the size and growth of the separate clinic-based Telehealth modalities over time. Table 5-1 shows the unique patient count for the five VISNs with the highest utilization of CVT and SF in FY 2012 and compares these counts with national and VISN 1 measures. CVT is primarily used for the following services (in no particular order): primary care, mental health, TeleMOVE! 58, and clinical pharmacy 59. The VA TeleMOVE! Initiative was developed in...
VISN 12 to help veterans manage obesity and has resulted in reports showing increased Veteran satisfaction compared to face-to-face encounters because of increased access and convenience (Klobucar, Wittrock and Hughes 2011). SF is predominantly used for Diabetic Retinal Screening. In fact, nearly every SF patient in VISNs 16, 7, 6 and 20 received SF services only through a Diabetic Retinal Screening. Of the VISNs with the highest SF utilization, VISN 8 was the only network with significant use of other SF services, which included EKG, dental and laboratory encounters.

Table 5-1 is evidence that SF Telehealth is more mature than CVT in VISN 1. The more advanced SF program is likely due to the fact that the Store-and-Forward Telehealth National Training Center is located in Boston. CVT, on the other hand, is ranked second to last with respect to the number of unique patients served using CVT technologies. Table 5-2 (left) does show a significant increase in VISN 1 patients utilizing Telehealth in the last two years, but great strides in CVT implementation must be achieved for CVT to produce a noteworthy contribution to meeting the VISN 1 target set of 50% unique patients utilizing virtual care by October 2014, a metric target that was uniformly established across all 21 VISNs.

Table 5-1: Five VISNs with the highest CVT and SF patient counts compared with national and VISN 1 measures (FY 2012)

<table>
<thead>
<tr>
<th>Rank (of 21)</th>
<th>VISN</th>
<th>CVT Patient Count</th>
<th>Rank (of 21)</th>
<th>VISN</th>
<th>SF Patient Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>Nationally</td>
<td>148,710</td>
<td>-</td>
<td>Nationally</td>
<td>242,015</td>
</tr>
<tr>
<td>1</td>
<td>V23</td>
<td>18,219</td>
<td>1</td>
<td>V16</td>
<td>32,917</td>
</tr>
<tr>
<td>2</td>
<td>V19</td>
<td>13,872</td>
<td>2</td>
<td>V07</td>
<td>23,357</td>
</tr>
<tr>
<td>3</td>
<td>V08</td>
<td>12,565</td>
<td>3</td>
<td>V08</td>
<td>20,618</td>
</tr>
<tr>
<td>4</td>
<td>V12</td>
<td>10,610</td>
<td>4</td>
<td>V06</td>
<td>19,557</td>
</tr>
<tr>
<td>5</td>
<td>V18</td>
<td>8,751</td>
<td>5</td>
<td>V20</td>
<td>18,164</td>
</tr>
<tr>
<td>20</td>
<td>V01</td>
<td>2,748</td>
<td>9</td>
<td>V01</td>
<td>12,944</td>
</tr>
</tbody>
</table>

The growth of CVT and SF (nationally and in VISN 1) in the last two years, as illustrated in Figure 5-6 and stated in Table 5-2, reflects VHA’s increased efforts to expand the clinic-based Telehealth modalities. National programs experienced more moderate growth rates relative to VISN 1. More than 50% of VISN 1 unique CVT patients use CVT for mental health treatment. Other frequent uses of CVT in VISN 1 include TeleMOVE!, prosthetics and physical therapy. SF services in VISN 1 are predominantly used for EKGs, Teledermatology and Diabetic Retinal Screening.
Table 5-2: Annual increase patient count (%) for clinic-based Telehealth (VISN 1 and nationally)

<table>
<thead>
<tr>
<th></th>
<th>VISN 1 CVT</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>VISN 1 SF</td>
<td>43%</td>
<td></td>
<td>112%</td>
</tr>
<tr>
<td>National CVT</td>
<td>25%</td>
<td>35%</td>
<td></td>
</tr>
<tr>
<td>National SF</td>
<td>12%</td>
<td>25%</td>
<td></td>
</tr>
</tbody>
</table>

5.5 Summary

The purpose of Chapter 5 was to address the third research question:

Q3) What is the current state of the VHA Telehealth expansion?

To do so, four key aspects of the national VHA Telehealth program were discussed, beginning with a national perspective and ending with a VISN level perspective:

i. Section 5.1 gave an overview of the VHA mission and structure

ii. Section 5.2 began the discussion by describing the three Telehealth modalities

iii. Section 5.3 introduced the reader to key Telehealth stakeholder groups at various levels throughout the organization

iv. Section 5.4 portrayed the use of Clinic-Based Telehealth modalities at a VISN level and compared it to the national make-up

In order to capture Telehealth implementation at a clinic-level, Chapter 6 analyzes implementation of a CVT clinic in VISN 1.
6 Case Study: Implementation of CVT Clinic

Using a secure, virtual connection, Clinical Video Telehealth (CVT) can make health care more accessible for patients by allowing them to receive real-time medical advice from multiple providers located at separate locations. The Veterans Health Administration (VHA) is currently undergoing a nationwide integration of Telehealth into existing health care practices. The current chapter considers implementation of the CVT clinic, one of three VHA Telehealth modalities, into an existing surgical partnership between two separate Department of Veterans Affairs (VA) facilities located in Veterans Integrated Service Network 1 (VISN 1).

Figure 6-1 illustrates how surgeons at one surgical clinic (the providing site clinic) routinely serve patients who are traditionally seen by providers at another (the receiving site clinic) located in two (of six) separate facilities in VISN 1. In the mid 1990’s, when the receiving site no longer had a specialty surgeon on staff, the two clinics formed a partnership so patients at the receiving site clinic could access surgical expertise in this particular specialty. Today, patients from the receiving site continue to travel the over 200 miles each way for face-to-face appointments with surgeons at the providing site clinic. Many of these surgery patients are required to attend annual post-operative follow-up appointments with a surgeon to assess their current conditions. Due to the nature of these appointments, CVT has the potential to either replace or postpone a portion of the face-to-face appointments.

Figure 6-1: Overview of the 2012 VHA environment surrounding the case study CVT clinic

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60 The three modalities of Telehealth include Clinical Video Telehealth, Store-and-Forward and Home Telehealth.
61 Facility Trauma Level determined by criteria set by American College of Surgeons Verification Review Consultations (American College of Surgeons. New Verification Site Visit Outcomes 2012)
62 Medical and Surgical (Med/Surg)
When first encountering CVT, a surgeon from the providing site and a nurse practitioner (NP) from the receiving site saw Telehealth as a way to improve the health care experience for the receiving site patients. Prior to the fall of 2011, these providers had no knowledge of Telehealth and the potential benefit it might have for their patients. These two providers first discovered Telehealth when the surgeon and NP were conducting routine clinical rounds at the receiving site. The surgeon passed a CVT cart while on rounds and was curious about its purpose. Given the potential impact of CVT on the receiving site patients frequently traveling to the providing site, the surgeon was motivated to implement CVT into their clinic. Five to ten patients per week who are seen by the NP at the receiving site travel an average of 225 miles each way to the providing site for face-to-face appointments with a surgeon annually. Because the appointments frequently do not require the surgeon to see the patient in person, a CVT clinic linking the receiving and providing sites would allow patients to speak with the surgeon at the providing site without traveling there. Shortly after discovering CVT, the surgeon initiated its adoption; details of this implementation are discussed in Section 6.4.

The discussion in Chapter 6 is as follows: Section 6.1 walks through a use case of a CVT appointment, and Section 6.2 discusses the potential impact of a CVT clinic on the existing surgical partnership, as well as the VHA enterprise. Section 6.3 describes the four interview respondents raised who are included in the analysis that is presented in Section 6.4. Finally, Section 6.5 summarizes the research findings by highlighting emergent themes and providing preliminary recommendations aimed to improve Telehealth implementation efforts. These preliminary recommendations will be revisited in Chapter 7, when an enterprise perspective of Telehealth expansion is considered.

6.1 A CVT Appointment

The use case in Figure 6-2 outlines the general process of scheduling and conducting a CVT appointment. The process begins with a patient request to see a provider, who is utilizing Telehealth and finishes after any necessary follow-up care (e.g., treatment, medication, in-person visit, or another CVT appointment) is arranged.

63 These four interview respondents were selected for their direct involvement with this CVT clinic implementation.
64 This analysis is facilitated by the Timeline Implementation Framework developed in Chapter 3.
65 The patient request could either be a direct request to see a primary care physician or the result of a referral to see a specialist.
To request an appointment with the provider, the patient can either contact the providing site (the facility where the provider is located) or the receiving site (the facility where the patient usually receives care). For the purpose of the use case, the site contacted by the patient is labeled “Site 1”, and the site not contacted by the patient is “Site 2”. Before scheduling a CVT appointment, the clinic must first determine whether CVT is viable for this type of visit and whether the patient would like to use CVT. If CVT is not viable or the patient prefers an in-person visit, CVT will not be utilized, and the patient will schedule an in-person appointment with the provider. On the other hand, if CVT is viable and the patient opts to use CVT, the scheduler at Site 1 will coordinate scheduling with Site 2. Each clinic is responsible

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66 Site 1 could be the receiving site (in which case Site 2 would be the providing site), or Site 1 could be the providing site (in which case Site 2 would be the receiving site.)

67 If the patient contacts the providing site, the providing site is “Site 1”, and the receiving site is “Site 2”. Alternatively, if the patient contacts the receiving site, the receiving site is “Site 1”, and the providing site is “Site 2”
for establishing a scheduling protocol that is compatible with their existing scheduling processes for non-
Telehealth appointments. If any preparatory work is required before the CVT appointment, such as a
medical test so the results can be reviewed at the appointment, the patient should complete this work
before the scheduled CVT appointment.

After the necessary preparatory work is completed, if any, the patient is ready to see the provider. The
patient will arrive at the receiving site, and the telepresenter\textsuperscript{68}, the individual who will administer the
appointment at the patient end, will set up the equipment and perform any necessary preliminary tasks
before connecting via CVT with the provider at the providing site, at which point the synchronous CVT
connection begins. The telepresenter and the patient then communicate the patient’s health condition to
the provider. The patient’s condition can be shared through any combination of verbal descriptions, test
results, still images, as well as real-time moving images. The telepresenter performs any medical tasks
(within his/her medical scope of practice) requested by the provider and relays findings back to the
provider. Ultimately, the telepresenter facilitates the entire appointment on the patient end, while the
provider gives medical advice (i.e., renders medical services). After the appointment is complete, the sites
disconnect, ending the synchronous connection. Both the provider and the telepresenter must
appropriately document the appointment, such that the records accurately reflect the appointment and are
compatible with one another. Following the CVT appointment, the patient, with the help of the
telepresenter, should seek the recommended follow-up care (e.g., treatment, medication, in-person visit,
or another CVT appointment).

6.2 Potential Impact of the CVT Clinic

An attractive feature of Telehealth is its potential to increase access to care by reducing geographical
barriers. For appointments that do not require face-to-face patient-provider interactions, CVT specifically
aims to reduce the travel burden by allowing Veterans to receive Telehealth care from a local medical
center or CBOC, rather than traveling to see the provider in-person at a farther location. Unlike the other
Telehealth modalities, CVT also offers real-time communication between the Veteran and provider,
facilitated by a telepresenter at the receiving site.

Using data from FY 2012, Table 6-1 quantifies the potential impact of CVT on providing site patients of
this particular CVT clinic. The 120 unique patients usually served at the receiving site accounted for

\textsuperscript{68} The telepresenter is usually a TCT.
nearly a quarter of unique patients seen by surgeons at the providing site. Although these patients make up only 15% of the total outpatient visits, they travel disproportionately more of the total miles (37%) traveled by all patients to the clinic in FY 2012. Moreover, receiving site outpatients traveled, on average, fifty more miles than all other outpatients. Because these patients carry a greater travel burden than the other patients served at the providing site clinic, a CVT clinic at the providing site would likely have a greater impact on reducing patient travel when partnered with the receiving site clinic. Table 6-1 also indicates that outpatients from other sites could benefit from CVT. Expansion of CVT services to partnering facilities throughout VISN 1 is anticipated once CVT is established between the providing and receiving sites.

Table 6-1: Approximate distances (in miles)\(^{69}\) to the providing site for outpatients in FY 2012\(^{70}\)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Mode</th>
<th>Max</th>
<th>Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outpatients from Receiving Site (N=120)</td>
<td>225</td>
<td>195</td>
<td>235 (N=24)</td>
<td>415</td>
<td>90</td>
</tr>
<tr>
<td>Outpatients not from Receiving Site (N=381)</td>
<td>177</td>
<td>90</td>
<td>10 (N=68)</td>
<td>4500</td>
<td>5</td>
</tr>
</tbody>
</table>

Generally speaking, enterprise-wide implementations can have tremendous financial impact on an organization in a number of ways. Innovation implementation and sustained use could relieve the organization of high financial burdens, generate new financial burdens, or introduce a combination of burdens and reliefs. New capabilities, processes, resources and personnel that are necessary to support innovation implementation and sustained use will require upfront financial investments by the organization. For example, one CVT cart, with all necessary technical equipment and additional medical attachments, costs between 17 and 66 thousand dollars\(^7\), depending on number and types of medical devices attached to the cart. VHA funds dedicated to the nation-wide Telehealth expansion were divided among the VISNs to use at their discretion for Telehealth expansion in their medical centers and outpatient clinics. While initial funds were provided at the national level to VHA facilities across the country for FY 20012-2014, in FY 2015 VISNs will be required to support Telehealth programs independent of these supplemental national funds. Therefore, the overall impact of Telehealth on existing finances is pertinent to the sustainment of Telehealth. Specifically, the enterprise should consider the

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\(^{69}\) Driving distances between patient location (center of patient's 3-digit zip code) and provider location were determined using driving directions calculated by Google Maps.

\(^{70}\) Table 6-1 does not account for multiple trips made by a single patient. Outpatients referred from the receiving site each made one visit to the providing site. Other outpatients averaged 2.75 visits. These numbers could suggest that outpatients from the receiving site require fewer outpatient visits, that distance does introduce a barrier to care for receiving site outpatients, or that alternative strategies are taken to reduce the number of outpatient visits required by receiving site outpatients.

\(^{71}\) Source: Internal VA document
operational costs of Telehealth, as well as how Telehealth impacts current operational costs. Examples of Telehealth costs incurred by VA include infrastructure expansion (e.g., bandwidth, IT support, maintenance, upgrades, etc.), the initial investment of over 6 million dollars \(^2\) for Telehealth equipment in VISN 1 at the beginning of the expansion timeframe, and personnel necessary for program implementation and sustainment, such as FTCs, TCTs and clinicians throughout the VISN.

In addition to the initial and recurring costs of Telehealth, Telehealth does have the potential to reduce some existing costs of health care delivery. Reducing Veteran travel would result in reduced travel costs on the Veteran, the VHA, or both. VHA reimburses Veterans for each mile they travel to VHA medical appointments. Using the VHA travel reimbursement rate of 56.5 cents per mile (U.S. General Services Administration 2013) and the average mileage traveled by receiving site patients to the providing site clinic, the average effective travel costs is approximately $254.25 per appointment. Assuming all 120 patients coming from the receiving site drove and were reimbursed\(^2\), that would amount to $30,510 of VHA dollars on top of the 6+ hours of travel time per Veteran. Alternatively, each day VHA offers free shuttle services between medical centers for Veteran convenience. These shuttle services can incur similar expenses on VHA: with an average gas price in New England of $3.62 per gallon\(^4\) in FY 2012, the estimated cost of gas alone (excluding vehicle purchasing costs, maintenance costs, and driver employment) is over $18,800. Notably, although Telehealth has the potential to reduce patient travel, it would be unrealistic to expect Telehealth to completely eliminate patient commute via personal travel or shuttle to the providing site. Specifically, patient medical needs or patient preferences may still require in person visits with providers at the providing site.

Furthermore, VHA anticipates Telehealth to improve health care delivery with respect to patient satisfaction, safety, quality and cost. Travel reduction alone is expected to improve patient satisfaction; providers at both the providing and receiving sites mention frequent complaints from Veterans concerning travel to the providing site (e.g., distance, time, shuttle services, parking and personal travel). Increasing patient satisfaction of care and reducing patient travel, especially in poor weather conditions, could also have a significant impact on Veteran safety, considering the age and health condition of these patients. Additionally, patient satisfaction surveys and conversations with providers utilizing CVT indicate that patients are highly satisfied with their VHA Telehealth experiences. Although VHA has confirmed that patients appear to be satisfied with Telehealth, there is less of a consensus surrounding how to ensure high

\(^2\) Three separate interview respondents serve as the data source for this figure.
\(^3\) Veterans must meet certain eligibility criteria to be reimbursed for travel (U.S. Department of Veterans Affairs 2012).
\(^4\) Calculation based on archived weekly statistics from the U.S. Energy Information Administration (EIA 2013)
quality care. A natural concern that emerges is the limitation that providers cannot assess patients with their hands. However, the literature has limited research establishing or determining the quality of Telehealth care. On one hand, these conditions can lead to concerns regarding the reliability and effectiveness of Telehealth. On the other hand, some providers and other VA staff express little concern about questioning the quality of Telehealth care, and in some cases argue that Telehealth may improve the quality of care: SF facilitates treatment in that providers are free to consult with other experts and revisit images while determining the best course of action.

With the ability to replace or postpone face-to-face appointments through remote treatment, CVT can expedite health care delivery. This, in turn could increase the convenience and consistency of care from the patient perspective, as well as promote appropriate delivery of care from a VHA perspective. For instance, addressing patient needs in an effective and efficient manner can prevent conditions from progressing to a more dangerous or costly state. While in some cases remote care can increase visits (e.g., Telehealth appointments reveals the need for an in person visit), it also can help balance supply and demand of care at the providing site, in a way that considers both Telehealth and local in person demands. 75

6.3 Interview Respondents

Four study participants were identified as they were the individuals directly involved with implementation of this CVT clinic. Interview responses from these individuals serve as the primary source of information, but findings are compared and contrasted with internal documents, archival records and observations when appropriate. Figure 6-3 provides an overview of the four respondents and their roles in the clinic.

**Respondent 1: Providing Site Surgeon**

This respondent is one of three surgeons in the providing site clinic and serves as the champion for the CVT clinic in this study. During a CVT encounter between the receiving and providing sites, the surgeon will provide medical service to the patient, who will physically be located at the receiving site clinic and accompanied by Respondent 3 (see below).

75 It is worth noting that VHA operates on a capitated system where they are responsible for all present and future care to the Veteran. For this reason, it is in VHA's financial and moral interest to prevent disease and promote overall Veteran health.
Respondent 2: Providing Site Facility Telehealth Coordinator (PS-FTC)
This respondent serves as the Facility Telehealth Coordinator (FTC) at the facility employing the surgeon (Respondent 1). The PS-FTC is responsible for developing, implementing and maintaining all Telehealth clinics within his/her facility. During FY 2012, this FTC helped establish over twenty new Telehealth partnerships in this facility, including the CVT clinic in this study.

Respondent 3: Receiving Site Nurse Practitioner (NP)
This respondent is one of two NPs in the receiving site clinic, which is located in a separate facility from the one employing the surgeon and PS-FTC (Respondents 1 and 2, respectively). During a CVT encounter between the receiving and providing sites, the NP will facilitate the encounter at the receiving site, where the patient will physically be located. In this role, he/she will perform the necessary medical tasks on the patient and communicate this information to the surgeon.

Respondent 4: Receiving Site Facility Telehealth Coordinator (RS-FTC)
This respondent serves as the FTC at the facility employing the NP (Respondent 3). The RS-FTC is responsible for developing, implementing and maintaining all Telehealth clinics within his/her facility. The RS-FTC currently supports approximately twenty Telehealth partnerships (including the CVT clinic in this study), half of which were established in FY 2012.
6.4 Results and Analysis

Interviews were conducted with respondents to capture implementation details of the CVT clinic. Interview protocols were guided and informed by the Timeline Implementation Framework created in this thesis (see Chapter 3 for framework details). Interview responses, augmented with internal documents and observation, were reviewed to support the qualitative and quantitative analyses below. The analysis is divided into four major segments, based on the four phases of the Timeline Implementation Framework:

- Phase I: Enterprise Analysis
- Phase II: Implementation Planning
- Phase III: Implementation Execution
- Phase IV: Innovation Evaluation

Each phase is divided into four or five dimensions, each comprised of concepts related to that dimension.

While using reference frequency as a proxy, Figure 6-4 depicts the response frequency of each dimension during the four interviews. Notably, higher frequency does not necessarily denote higher importance, but it may nonetheless convey the importance from respondents’ perspectives. Phases II (29.9%) and III (42.5%) were referenced more frequently than Phases I (11.8%) and IV (15.8%). These frequencies could suggest that concepts in Phases II and III require more attention by these individuals during the implementation process. One could also look at each phase separately, to determine which dimensions are referenced more frequently compared to other dimensions in that phase. The following lists the most referenced dimensions in each phase:

- Phase I: *Culture for Change* (5.1%)
- Phase II: *The Innovation* (13.1%)
- Phase III: *Quality of Delivery* (21.1%)
- Phase IV: *Access* (5.9%)

CVT implementation was partially complete at the time of the interviews, and it is possible that the progress of the implementation would influence interview responses. Additional studies at various stages of implementation are necessary to determine whether progress might influence how participants respond.

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76 The percentage for each dimension is calculated by dividing the total number of coding instances associated with a given dimension divided with the total number of coding instances.

77 There are a variety of plausible reasons some dimensions could be referenced more frequently than others. For example, highly referenced dimensions could be more relevant to:
   a. The tasks completed by FTCs and clinicians
   b. The implementations currently being executed
   c. The overall implementation process
   d. Any combination of a-c
   e. None of the above
The CVT implementation could have encountered unusual barriers, such as a specific technical implementation issue, that could skew response rates around a concept that may be less common in general implementations. Further analysis of research findings is now discussed to further investigate the scoring behind each dimension. For instance, textual analysis may denote the importance of a why a concept was mentioned or whether concept relevance is consistent across interview respondents.

<table>
<thead>
<tr>
<th>Phase I</th>
<th>Phase II</th>
<th>Phase III</th>
<th>Phase IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise Analysis (11.8%)</td>
<td>Implementation Planning (29.9%)</td>
<td>Implementation Execution (42.5%)</td>
<td>Innovation Evaluation (15.8%)</td>
</tr>
<tr>
<td>Culture for Change (5.1%)</td>
<td>The Innovation (13.1%)</td>
<td>Program Differentiation (0.8%)</td>
<td>Cost (2.4%)</td>
</tr>
<tr>
<td>Climate for Learning (3.2%)</td>
<td>Stakeholder Involvement (2.4%)</td>
<td>Adherence (6.7%)</td>
<td>Quality (4.5%)</td>
</tr>
<tr>
<td>External Relationships (1.1%)</td>
<td>Implementation Strategy (7.2%)</td>
<td>Dose (8.0%)</td>
<td>Access (5.9%)</td>
</tr>
<tr>
<td>Internal Communication (2.4%)</td>
<td>Communication About Innovation (7.2%)</td>
<td>Participant Responsiveness (5.9%)</td>
<td>Satisfaction (2.9%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quality of Delivery (21.1%)</td>
<td></td>
</tr>
</tbody>
</table>

Figure 6-4: Response frequencies by phase and dimension for the four respondents involved with the CVT implementation

6.4.1 Phase I: Enterprise Analysis

Phase I helps an enterprise understand how its existing environment may foster or inhibit enterprise-wide implementations. Organizational communication (Van de Ven, Delbecq and Koenig Jr 1976) and

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78 Darker shaded dimensions indicate concepts in that dimensions were more frequently discussed during the interview. Box sizes are proportional to the number of concepts within each dimension.
organizational alignment (Nadler and Tushman 1980) are naturally included in Phase I, as enterprise-wide implementations require participation of multiple stakeholder groups and will influence existing enterprise components. Therefore, the enterprise analysis in Phase I can help identify organizational alignment that may promote enterprise-wide implementations or insufficient organizational alignment that may hinder enterprise-wide implementations.

Table 6-2 is cited throughout the Phase I analysis to compare the number of references to a given dimension by provider and FTC respondents. Large differences in responses between different roles could indicate that certain concepts may be related to tasks specific to a job description or more prominent under certain situations. Numbers in Table 6-2 prompt and facilitate further qualitative analysis on the responses themselves. Similar tables are included in the analysis of the remaining three implementation phases.

Table 6-2: Number of references to Phase I dimensions by provider and FTC respondents

<table>
<thead>
<tr>
<th>Phase I Dimension</th>
<th>2 Providers</th>
<th>2 FTCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culture for Change</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Organizational Learning</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>External Influence</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Internal Communication</td>
<td>1</td>
<td>8</td>
</tr>
</tbody>
</table>

6.4.1.1 Culture for Change

History of Innovation and Value of Innovation

Tremendous improvements with regards to the quality of VHA-wide care during the last two decades were directly mentioned by two of the four respondents. While one respondent attributes these improvements to VHA’s increased focus on patient-centered care, the other is uncertain as to what led to these system-wide improvements. Specific innovative VHA programs that focus on health care integration, such as Patient Aligned Care Teams (PACT) and Secure Messaging (SM), were also mentioned during the interviews. One provider who frequently uses SM expressed how providers and patients alike value SM as a way to simplify provider-patient communication.

79 Recall from Section 2.1.3 that Nadler and Tushman define “organizational alignment” as the compatibility of the following organizational components: tasks, individuals, formal organizational arrangements, and the informal organization.

80 PACTs are managed by primary care practitioners and leverage a wide-variety of health care providers in order to provide “accessible, coordinated, comprehensive, patient-centered care” (Department of Veterans Affairs 2011).

81 SM facilitates patient-provider communication through secure electronic messaging.
In the mid 1990's, VHA underwent organizational restructuring (Kizer, Demakis and Fuessner 2000). These efforts transformed the organization from one with a decreasing reputation to a leading institution in quality care across the country (Asch, et al. 2004). Although the transformation in the 1990s was not explicitly mentioned in the interviews, the "tremendous improvements" described by the two respondents refer to outcomes that likely resulted from this system-wide transformation. So although not explicitly stated, the VHA's history of transformation was stated.

Committed Stakeholders and Support for Individuals

One provider was under the impression that self-motivated individuals are largely responsible for major improvements, in spite of poor external support. The FTCs expressed somewhat different levels of support from their leadership: one was highly vocal about leadership support, while the other spoke less about communication with leadership, emphasizing that reaching out to leadership was a last resort after exhausting all other options.

In general, all respondents express the importance of stakeholder commitment in implementing change. Implementations are completed when individuals, regardless of their position, are fully committed to their success. This concept was not only directly mentioned in the interviews, but also evident in how these individuals revealed their own commitment to Telehealth.

General Enterprise Documentation

The PS-FTC felt documentation of facility personnel and operations would, in theory, expedite transition into the FTC role. Because FTCs interact with a large number of stakeholders, who encompass a variety of roles in Telehealth implementation throughout VHA, managing communication with these stakeholders can become quite complicated. Within a given facility, an FTC interacts with providers from all Telehealth programs, employs all TCTs (2 per medical center and 1 per CBOC), communicates with facility leadership to help manage Telehealth-related operations, and constantly reaches out to stakeholder groups for Telehealth support. The PS-FTC argued that frequent changes in personnel and role responsibilities would make updating documentation of facility personnel and operations both arduous and impractical.

Documentation, in the form of research publications, was suggested by the surgeon as a means to improve health care delivery to Veterans. Published research by VHA providers in peer-reviewed journals would affirm VHA's reputation of providing high quality preventative care to the professional health care
community and could increase credibility of VHA care. In turn, general respect and appreciation for VHA providers was expected to increase, which in turn would further motivating providers to uphold the VHA image. This concept of using documentation as an incentive for improving health care was mentioned only by the surgeon but offers a unique function of innovation as a means of indirectly improving the quality of care.

6.4.1.2 Organizational Learning

Local Action, Global Thinking

Senge and Sterman (1992) explicitly introduce the “acting locally and thinking globally” mentality and discuss how systems-thinking, coupled with organizational learning, better equips managers to promote overall system improvements. The PS-FTC interview was dense with the concept of “Local Action, Global Thinking”. Seven times the respondent discussed how local decisions impact other groups throughout the VHA, and vice versa. For example, the PS-FTC explained how Telehealth is a vehicle for care that is integrated into other services and a local Telehealth clinic naturally has system-wide impacts. Therefore, the PS-FTC argued that a Telehealth clinic’s success is determined by how it helps other services meet their own performance metrics.

Most coding instances of Local Action, Global Thinking were self-emerging (indicating that the concept transpired without being probed by the interviewer), and most frequently occurred in the PS-FTC’s response to the following question: “If you were the VA king/queen for a day, what would you like to see done to improve health care to Veterans?” Rather than merely responding with recommendations for improvement from an FTC perspective, the respondent first considered any challenges or restrictions the king or queen might face. Specifically, the respondent said:

“You have to look at the challenges that you’re going to have as the king. If you’re looking down on the nation of all these different programs, knowing that what you say is going to be held in the highest regard, and people know that at the way things work at a facility level are very specific, and things at the national level are more guidance. But even then that guidance goes a long way, and people take that very seriously. So knowing this guidance that I give out is going to be given to a lot of different people and circumstances, a lot of them are going to be in various areas in terms of the status of where their programs are and along that timeline of implementation.”

By acknowledging both the liberties and constraints of the “crown”, one may have a more realistic understanding of what VHA leadership could do to improve health care to Veterans.
Consideration of the macro level environment during the PS-FTC’s response may possibly be influenced by personal interactions between the PS-FTC and higher level leadership. Closer communication with the levels above the FTC positions might have increased awareness of existing macro level challenges of managing enterprise-wide Telehealth expansion.

Finally, the PS-FTC concluded the interview by, not only mentioning the concept and challenge of Local Action, Global Thinking, but emphasizing the how such a mindset is required during Telehealth implementation:

“You can’t just have your own perspective, you have to have shared perspective of everybody else, and that’s what makes it complex.”

Individual Learning
Appreciation for individual learning and personal growth from a VHA enterprise perspective was not referenced during the interviews. However, all respondents gave examples of individuals seeking personal growth and professional development in their VHA careers. Although respondents did not explicitly mention that VHA encourages employee learning, these examples conveyed ways in which the VHA satisfied an individual’s desire to advance in knowledge and profession.

Enterprise Reflection
While lessons learned from previous implementations are likely to have naturally been incorporated into CVT implementations at the providing and receiving sites, these four interviews gave no evidence in which past experiences influenced the development of the CVT clinic implementation. The PS-FTC did mention reflection of a single implementation that results in immediate application of new knowledge to the current implementation. This concept will be discussed in greater detail in Phase III.

When discussing implementation roll-outs at a local level, one respondent said the following:

“It’s entirely based on individual people championing it. There’s no fertile ground that it automatically propagates forward. There’s no sense of folks keeping an eye out for efficiencies or spotting new ideas and then providing the necessary support.”

Focused on local improvement efforts, the respondent went on to provide examples suggesting that a lack of organizational awareness or reflection limits organizational support for innovation and therefore depends on individual commitment at an individual level in order to make local improvements.
6.4.1.3 **External Influence**

**Influence of External Entities and Influence on External Entities**

Interviews revealed no evidence of clinic influence on VHA entities outside the clinic. In contrast, three of the four respondents spoke of the strong influence of external entities on VHA operations and the ultimate influence on health care delivery. Comments specifically identified positive and negative influences that result from VHA being a government organization, such as the benefits and constraints that come with government funding, structure, priorities and directives.

While Chapter 7 reveals further insights that delve deeper into the governmental influence on VHA, one concern that emerged in the current analysis was how this may stifle innovation. Specifically, when an organization becomes "institutionalized," the formalized structure has the potential to limit the emergence of new ideas.

In theory, a systematic structure creates a more efficient system by standardizing operations. However, if the system becomes too rigid, the given structure may conflict with innovation, which can then be overlooked, regardless of its potential benefits. One interview suggested that this idea can be true of government institutions and expressed concern that such a rigid structure may prevent innovations that improve VHA health care, primarily at a local level.

### 6.4.1.4 **Internal Communication**

All respondents commented that e-mail is a regular method of communication, but e-mail seemed more prominent with FTCs than providers. In fact, providers primarily use face-to-face interactions with patients, other providers, support staff, service leadership, etc. The surgeon described the challenge that Telehealth presents with regard to provider-patient communication:

"I’ll have to learn a new medium to interact with patients. So much of what we do is by putting a hand on the guy’s shoulder. So much for Veterans is how you shake their hand, and how you look at them, and how you treat them when you walk in the room. [...] And if I can’t impress upon them the way I do in a personal encounter, I’m going to have to learn new skills in how to do it in Telehealth. And that’s just a new skill. It’s challenging."
On the other hand, FTCs communicate through a variety of media: teleconferences and in-person meetings, as well as countless conversations throughout the day which could be in person or over the phone, as well as via Telehealth, e-mail and instant messaging services. The frequency of FTC interactions with stakeholder groups was said to vary, but FTC communication in aggregate takes up a significant amount of FTC time and energy.

Both FTCs spoke to the value of continuous and open communication. Their examples illustrated how Telehealth implementations benefited from quality communication and how implementation was hindered by insufficient communication. In line with conclusions made by Van de Ven et al. (1976) on organizational communication, evidence and analysis reveal how communication may impact implementation and is revisited in detail in the discussion on the Quality of Delivery in implementation execution (page 106).

6.4.1.5 Phase I Summary

Table 6-3 summarizes key findings that emerged from Phase I evidence. Overall, it is understood that VHA is working to improve quality of care, and recent changes show how innovation is used to improve health care delivery. Aspects of VHA are expected to enhance enterprise-wide implementations: enterprise history and value of innovation, high stakeholder commitment, as well as areas of strong leadership support and quality communication. However, evidence also identifies areas where VHA could improve to better support enterprise-wide implementations: incidences of low support for individuals at a micro level, poor communication between key stakeholders during implementation, and enterprise dependence on individuals for innovation and improvement at a micro level. This evidence is specific to the providing and receiving sites in this study; Chapter 7 will relate these findings with responses from individuals outside of this clinic to understand how these findings may or may not be representative implementation throughout VHA.
Table 6-3: Summary of key findings emerging from Phase I evidence

<table>
<thead>
<tr>
<th>Section</th>
<th>Dimension</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4.1.1</td>
<td>Culture for</td>
<td>The general impression is that innovation can, and should, be used to improve VHA operations. Individuals receive varying levels of support from leadership, but believe stakeholder commitment directly influences whether improvements are ultimately made and/or maintained.</td>
</tr>
<tr>
<td></td>
<td>Change</td>
<td></td>
</tr>
<tr>
<td>6.4.1.2</td>
<td>Organizational</td>
<td>Telehealth inherently introduces interdependencies between local and global activities/decisions. Lack of enterprise reflection at a local level observed by one respondent.</td>
</tr>
<tr>
<td></td>
<td>Learning</td>
<td></td>
</tr>
<tr>
<td>6.4.1.3</td>
<td>External Influence</td>
<td>The influence of being a government organization on VHA operations perceived as positive and negative.</td>
</tr>
<tr>
<td>6.4.1.4</td>
<td>Internal</td>
<td>Frequent and open communication was valued by all respondents. Consistent with the literature, evidence reveals examples of (good) communication promoting implementation and (poor) communication hindering implementation.</td>
</tr>
<tr>
<td></td>
<td>Communication</td>
<td></td>
</tr>
</tbody>
</table>

6.4.2 Phase II: Implementation Planning

Table 6-4 reveals that most coding instances of dimensions in Phase II occur in FTC interviews. Notably, an interview with one FTC lasted significantly longer, allowing for greater opportunity to discuss any of these concepts at length. While this disparity appeared to have little impact on concepts related to Phase I, there are dimensions in Phases II, III and IV where this respondent expressed significantly more than other participants. Specifically, this respondent spoke a great deal on concepts in The Innovation and Implementation Strategy dimensions.

Table 6-4: Number of references to Phase II dimensions by provider and FTC respondents

<table>
<thead>
<tr>
<th>Phase II Dimension</th>
<th>2 Providers</th>
<th>2 FTCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Innovation</td>
<td>13</td>
<td>36</td>
</tr>
<tr>
<td>Stakeholder Involvement</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Implementation Strategy</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>Communication About Innovation</td>
<td>12</td>
<td>15</td>
</tr>
</tbody>
</table>

6.4.2.1 The Innovation

Innovation Components

Innovation Components was the highest referenced concept within The Innovation dimension. Interviews highlighted the following Telehealth components:
- Administrative and management processes
- Technology and technical equipment
- Provider recruitment
- Patient recruitment
- Scheduling
- The encounter
- Patient follow-up
- Documentation and billing

Regarding implementation of a Telehealth clinic, the administrative and management processes include, but are not limited to: deployment and installation of equipment, completion of the needs assessment (to determine whether Telehealth is needed and feasible for a particular clinic), completion of Telehealth Service Agreement (TSA), and creation of the Telehealth clinic profiles. A Telehealth clinic includes a clinic profile created within the VHA electronic medical record system required for billing and documentation. The providing and receiving sites have separate Telehealth clinic profiles to reflect the activity associated with their local clinic. Although separate clinic profiles are created for each site, certain fields in the clinic profiles must match so that the system can recognize when a patient at the receiving site is being treated by a provider at the providing site. This is necessary for workload credit and billing purposes. Moreover, only the provider rendering services (i.e., the provider at the providing site) will receive payment.

One of the major differences between CVT and traditional care is the necessary collaboration between the provider at the providing site and the telepresenter facilitating the patient side of the encounter. The surgeon describes the collaboration from the provider’s perspective:

“[I will have to] share that space with another provider who is, in their eyes, an independent entity. I can’t work in such a way that I take away the [NP’s] role from that entire region. [...] I can’t supplant it, somehow I have to... we have to co-share this place. In that room, we have to co-share it. And that’s going to be very interesting.”

As patient utilization of Telehealth increases, scheduling is considered one of the more complicated components. This is particularly true for CVT, where the providing and receiving sites must schedule synchronous appointments, while managing separate calendars. A variety of scheduling tools are available, but VHA has not standardized scheduling methods for Telehealth. The RS-FTC expressed plans to consolidate and have one TCT responsible for scheduling all CVT appointments at main medical
center, while the PS-FTC has each clinic establish their own protocols compatible with their existing scheduling system. Regardless of the varying methods, FTCs argue the need for frequent and accurate communication between the providing and receiving sites in order to maintain compatible schedules.

**Enterprise Components**

The following enterprise components were highlighted in the interviews:

- Communication pathways (e.g., face-to-face, phone, Microsoft® Outlook, Secure Messaging, etc.)
- Medical and Surgical Services
- Microsoft® SharePoint Server
- Computerized Patient Record System (CPRS)
- VistA Imaging
- Billing

VHA documents all patient medical records electronically using CPRS, a graphical user interface for VHA’s electronic medical record. VistA Imaging enhances CPRS by allowing providers to attach medical images (such as X-rays, scans, or other medical images) and non-medical images (such as charts, scanned documents or images) to patient records. Providers can add text to the uploaded image in order to document additional medical information, notes and/or context (Department of Veterans Affairs 2011). Notably, internal VHA documents identify CPRS as an enterprise component that facilitates Telehealth use. This is likely due to the ease of securely sharing medical information between sites via the electronic medical record system.

Consistent with May et al.’s (2011) claim that confusion surrounding the role of Telehealth may serve as a barrier to Telehealth use, the main concern of the providing site FTC is the integration of Telehealth follow-up into routine patient care. If patient follow-up is not smoothly incorporated into patient care, Telehealth no longer enhances the overall patient experience and has the potential to reduce the quality of care. As the PS-FTC warned:

"If you don’t integrate it right, you have the potential of doing great things, but you also have the potential of making the existing processes more complex. If you get too involved or you don’t do that with that in mind, that you can cause problems with the existing processes / existing departments, then I think the chances of you making that mistake or having an oversight are greater.

[…]

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And you’re creating more of a workaround for that veteran to get the care that they need. You’re making things more complex and worse off, if you’re not integrating Telehealth successfully. I think it does truly have that ability to go either way. And I think that’s the biggest challenge in Telehealth implementation. is: How do you integrate patient recruitment, patient selection, patient eligibility, the appropriateness of Telehealth? And once you see that patient, how do you integrate this new service that didn’t exist before? And then the follow-up recommendations and everything that came out of that Telehealth service, how do you direct that patient back into the system? Cause it’s not going to be the same as ophthalmology or optometry, especially because we’re not our own service line.”

Advantages and Disadvantages
Telehealth advantages and disadvantages are summarized in Table 6-5. All four respondents regarded Telehealth as valuable and an asset to the patient experience. Relative to respondents at the providing site, respondents at the receiving site more frequently mentioned Telehealth advantages, and less frequently mentioned disadvantages. Moreover, receiving site respondents could not identify a way in which Telehealth may hinder the VHA mission of providing quality health care to Veterans. Rather than direct, negative consequences, the disadvantages mentioned by respondents were potential disadvantages in the event that Telehealth is misused or poorly implemented.
<table>
<thead>
<tr>
<th>Dis/Advantage</th>
<th>Description</th>
<th>Source</th>
<th>Example / Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advantage: Clinical efficiency</strong></td>
<td>Improvements in clinical efficiency at provider site</td>
<td>Providers</td>
<td>The rural provider believes the CVT clinic will “clean up” the urban clinic, by reducing the number of patients physically in their clinic.</td>
</tr>
<tr>
<td><strong>Advantage: Reduced barriers to health care</strong></td>
<td>Reduced geographical barriers with SF and CVT, and reduced scheduling / time-constraint barriers with SF.</td>
<td>All respondents</td>
<td>The rural provider uses CVT to see patients who otherwise would not receive care. CVT consultations allow the provider to see these patients remotely during seasons of inclement weather, delaying patient travel until improved weather conditions. Increased convenience and safety for patients justify the additional, quick consultation. Moreover, it makes it easier for family members to attend the appointment, a limiting factor due to limited seats on the shuttles.</td>
</tr>
<tr>
<td><strong>Advantage: Improved patient-provider relationship</strong></td>
<td>Telehealth can foster a stronger patient-provider relationship by reducing barriers such that it increases patient-provider interactions.</td>
<td>Receiving site respondent</td>
<td>In the previous example, patients would interact with their provider twice, rather than once. Increasing the number and frequency of patient-provider interactions (on top of reduced barriers) may increase patient likelihood of seeking care.</td>
</tr>
<tr>
<td><strong>Disadvantage: Provider observations of patient is limited</strong></td>
<td>Provider rendering care is limited in what they can observe of the patient (e.g., see all of patient, touch, etc.)</td>
<td>Three of four respondents</td>
<td>First, CVT reduces what the provider sees of the patient; for example, the patient is billed for one condition, but the provider notices another. Second, the provider has been trained to use their hands when examining a patient. These realities require the provider to rely more on patient history and the telepresenter on the other end.</td>
</tr>
<tr>
<td><strong>Disadvantage: Risk of poor implementation</strong></td>
<td>Implementation into an existing system can potentially improve or damage the overall system</td>
<td>Providing site respondent</td>
<td>Follow-up requirements after a Telehealth encounter are insufficiently incorporated into existing process, such that necessary follow-up actions may not be taken and the patient does not receive proper care.</td>
</tr>
<tr>
<td><strong>Disadvantage: Telehealth becomes default delivery method</strong></td>
<td>By default, a patient is seen via Telehealth when an in person consultation is more appropriate.</td>
<td>Providing site respondent</td>
<td>The general assumption that Telehealth is more convenient for rural patients than a face-to-face encounter will make Telehealth the default mode of health care delivery for rural patients without considering their needs or desires.</td>
</tr>
</tbody>
</table>
6.4.2.2 Stakeholder Involvement

Leadership Engagement

Service chiefs are responsible for encouraging and supporting providers to incorporate Telehealth into their clinic. In this case, service leadership at both sites expressed support for the CVT clinic in conversation and in signing the TSA, but otherwise it was not actively involved with the implementation process.

The only role of facility business leadership in the implementation of a Telehealth clinic is to formally sign off on the clinic through the TSA. In general FTCs require more frequent interactions with facility leadership during the overall process of incorporating Telehealth into facility operations. The two FTCs expressed different relationships with their facility leadership. The PS-FTC would limit interacting with facility leadership to avoid distracting them from the numerous responsibilities that come with managing the facility.

On the other hand, the RS-FTC did not described the relationship with the facility leadership in detail, but did mention that one of the four senior leaders of the facility was a strong advocate for Telehealth and occasionally attended their monthly Telehealth meeting organized by the RS-FTC. The RS-FTC also noted that their medical center Director stressed the importance of local clinic managers in promoting Telehealth programs at their respective medical centers and CBOCs. The RS-FTC was struggling to engage CBOC nurses and staff in Telehealth programs at their clinic.

Champions

As discussed under Stakeholder Commitment in Phase I where one respondent felt improvement only took place when individuals take initiative based on self-interest. These comments suggest commitment at the individual level is influential in actively promoting Telehealth at both a facility and clinic level. FTCs serve as Telehealth champions throughout their facility, and the two providers serve as the clinical Telehealth champions for their respective clinics. By design, establishment of Telehealth clinics depend upon providers who initiate Telehealth adoption into their clinics. They are then responsible for its implementation.

One FTC discusses the correlation between implementation success and the devotion of the champion clinician, as well as the TCT. This FTC instructs TCTs to take ownership of their essential role in Telehealth, which includes (but is not limited to) patient scheduling, facilitation of patient Telehealth
encounters, equipment assembly and equipment maintenance. In some cases, the FTC will rely on one or more TCTs for general administrative support.

Respondents also identified the need for champions in actively and successfully promoting Telehealth throughout the system. Not only do champions individually take the initiative to make change happen, but when they express their enthusiasm when communicating with others, their zeal is often contagious, further advocating Telehealth.

**Stakeholder Acceptance and Support and Stakeholder Engagement**

Of those who would be involved with the Telehealth clinic once it was fully established, the two providers were the individuals primary engaged in and supportive of clinic development. Although patients were not directly involved with the clinic development\(^{82}\), a patient perspective was considered by these providers, who interact with patients on a daily basis. Built upon their experience and conversations with patients about their frustrations in traveling to Boston, the providers anticipate enthusiastic support from the patients impacted by the clinic.

**Formally Appointed Internal and External Agents**

While coordinators (FTCs) and technicians (TCTs) are formally appointed internal agents for Telehealth implementation, no formally appointed external agents (e.g., external consultants) existed for the implementation of this CVT clinic.

**6.4.2.3 Implementation Strategy**

**Alternative Solutions**

Before implementing CVT, the providing and receiving sites were utilizing Store-and-Forward (SF) technologies to exchange patient medical information and images\(^ {83}\). One provider also mentioned using secure messaging (SM) as a valuable way to directly communicate with patients via a technological medium. Rather than being seen as alternatives, SM and SF could be used in conjunction with CVT to enhance how providers medically treat patients.

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\(^{82}\) Notably, attempts to include patient opinions through formal interviews were made by the surgeon. Time constraints, confusion and challenges related to research requirements (such as whether approval by the Institute Review Board (IRB) was required), prevented the direct inclusion of patient perspectives.

\(^{83}\) Although these comments briefly came up in the interviews, the use of Secure Messaging and Store-and-Forward by this clinic was discussed further in conversations outside the recorded interviews.
Innovation Evaluation and Decision

Notably, while cost may provide a convincing argument for Telehealth adoption from an enterprise perspective (see Section 6.2), cost did not motivate the implementation of this clinic. The decision whether to adopt CVT was based primarily on the perceived benefit Telehealth offered to patients. The surgeon explains their primary motivation for adopting CVT:

"It started with [us providers] talking about patients not needing to come here and the fact that Telehealth existed."

While benefits to patients may be sufficient in making the decision whether to adopt, a holistic perspective, as Bashshur (1995) suggests, would more appropriately describe the clinic’s overall impact by considering multiple perspectives (e.g., the facility, existing clinic, providers, etc.). For example, consider the following three perspectives: the providing site clinic, the receiving site clinic and a patient. Table 6-6 highlights how a CVT clinic might impact these three entities. Such an analysis can identify enterprise (existing or required) components that may facilitate or hinder CVT implementation and use. Ultimately, a holistic perspective would account for the total effect of CVT on multiple aspects of the enterprise. Deciding to implement a CVT clinic based primarily on the patient perspective aligns with VHA’s mission of patient-centered care. However, failing to consider how implementation may impact the enterprise from a global/holistic view may cause the enterprise to neglect how the implementation might indirectly prevent VHA from achieving a patient-centric system.

Alternatively, the PS-FTC argued that the benefits of Telehealth will vary by patient. In other words, one patient may benefit more than another, based on their medical needs, access to medical facilities, or interests. With this in mind, multiple patient demographics should be considered to accurately represent multiple patient perspectives of Telehealth.

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84 Additional entities are directly and indirectly influenced by the clinic and should also be considered to obtain a true holistic perspective of the clinic’s impact on the enterprise. Stakeholder perspectives that might be considered in obtaining a holistic perspective could include the following: providing site facility, the receiving site facility, other clinics that partner with the providing site clinic, the Telehealth staff at each facility, technical support staff at each facility, etc.
Table 6-6: Varying perspectives of the CVT clinic, as depicted in the interviews

<table>
<thead>
<tr>
<th>Providing Site Clinic</th>
<th>Patient Perspective</th>
<th>Receiving Site Clinic</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Up-front implementation</td>
<td>• Receives similar care</td>
<td>• Up-front implementation</td>
</tr>
<tr>
<td>• Provides similar care</td>
<td>• Travels significantly less</td>
<td>• Accommodates patient visit</td>
</tr>
<tr>
<td>• Learns new medium of care</td>
<td>• May require a 2nd in person visit at the providing site (if Telehealth insufficient).</td>
<td>• Receives no payment</td>
</tr>
<tr>
<td>• May require a 2nd in person visit (if the Telehealth appointment is insufficient)</td>
<td></td>
<td>• More complex scheduling</td>
</tr>
<tr>
<td>• Receives payment for care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• More complex scheduling</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Implementation Plan
During the interviews the providers never spoke of an implementation plan. They explained a vague outline of the implementation, but did not fully grasp detailed requirements for clinic setup. The later discussion on Communication of Adoption Plans (page 98) offers further insight as to why this unclear understanding may exist and how it could be mitigated.

Recalling the response frequencies in Table 6-4, the Implementation Plan is highly referenced. Comments described the overall impact of the VHA Telehealth expansion on the facility more than the impact of a single CVT clinic. Responses are associated with three main themes: insufficient planning, quick-paced implementation, and the wide scale replication of programs without considering local needs. These concepts are more relevant to the enterprise perspective of CVT, and therefore are discussed in Chapter 7.

6.4.2.4 Communication about Innovation

Supporting Evidence
The two providers suggested word of mouth from other Telehealth practicing providers effectively shares evidence and beliefs that support Telehealth adoption. Both providers saw evidence from Telehealth practicing providers to different degrees. For example, one provider sought the opportunity to sit in a CVT encounter and observed a full appointment. Alternatively, the other provider received positive verbal evidence from a champion provider of a SF clinic but had not experienced a CVT encounter firsthand.
Trainings provided a comprehensive list of supporting evidence to employees who will directly use Telehealth. One of the provider respondents agreed information in this training was very informative in describing both the history and supporting evidence of Telehealth.

**Innovation Source**
Respondents were first introduced to Telehealth from a variety of sources. Typically, providers are introduced to Telehealth by their local FTC or TCT. However, as described in the case introduction, the two providers were introduced to Telehealth when they passed a CVT cart when they were conducting clinical rounds. After beginning implementation of this CVT clinic, the providing site surgeon and colleagues were encouraged by service leadership to integrate Telehealth into their clinical practices.

One FTC had previous, extensive Telehealth experience in another VISN and was highly influential in the development of their Telehealth program. The other FTC was first introduced to Telehealth in a graduate course and saw Telehealth as the “future” of health care delivery.

**Clear Definition of Roles**
When implementation of a clinic first begins, participants at the providing and receiving sites establish a TSA (Telehealth Service Agreement) to establish the roles and responsibilities of key individuals associated with clinic operations. This document initiates the formal partnership between the two sites and defines roles and responsibilities for those who will be involved with the Telehealth clinic. Individuals identified in the TSA are the business and service leadership at each facility, FTCs, Telehealth credentialed providers, eligible telepresenters and schedulers. For the clinic considered in this case study, a TSA was created at the onset of the CVT clinic, but it has not been updated to accurately represent changes in the clinic.

**Communication of Adoption Plans**
While the TSA defines roles and responsibilities for individuals once the clinic is complete, it does not specifically define roles and responsibilities of individuals during the implementation. After completing the initial paperwork, implementation requirements were less clear, especially for the providers, and led to delays in clinic completion. Evidence suggests providers had some confusion about the following:

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85 There is not a one-to-one correlation between individual and innovation source, because some individuals were introduced to Telehealth in more than one way.
The overall implementation process (i.e., activities required to fully establish the clinic)
The clinic profiles (e.g., how it relates to any existing clinic, how to use it, how it is set up, etc.)
Telehealth billing (i.e., how to document the appointment, payment allocation)

After a few months of inactivity and confused as to why they were not seeing patients via Telehealth, the providers grew less interested in pushing implementation. This evidence suggests adoption plans for the CVT clinic, as well as the implementation responsibilities, could have been more clearly communicated to all participants before implementation had begun. Moreover, an outline of the required tasks that is accessible to those responsible for implementation could help guide and expedite the implementation by informing participants of what tasks should be completed, and by when they should be completed, to successfully complete implementation.

In contrast, about ten months after the implementation began these interviews discovered that all four respondents misunderstood the implementation progress and were unaware of any incomplete tasks that would be required for the clinic to function. Most individuals were confident about the progress of implementation at their site but were unclear of the progress at the other site. For instance, the PS-FTC believed the clinic at the providing site was ready and is waiting on “confirmation” from the receiving site to verify their readiness. On the other hand, the RS-FTC believed everything was complete at the receiving site. In reality, both clinics were set up, but they were not compatible with one another, and the providers did not have access to them nor knew how to document a Telehealth encounter.

By knowing which tasks make up the implementation process, the providers could have a better idea of what is complete or incomplete and, therefore, narrow down what is causing the delay. Providers could then be more direct and effective when inquiring about the clinic, rather than having a general sense of confusion.

6.4.2.5 Phase II Summary

Many components of Telehealth and the VHA enterprise were discussed in great length during the interviews. Table 6-7 highlights key findings that emerged from Phase II evidence. Respondents provided many examples of Telehealth advantages and disadvantages (Table 6-5). Respondents at the receiving site mentioned Telehealth advantages more frequently and disadvantages less frequently than respondents at the providing site. Consistent with the evidence in the literature (May, et al. 2011), an unclear
understanding of how Telehealth is integrated into traditional care processes is seen as a potential barrier and/or risk of reducing the quality of care.

The decision to adopt CVT into this clinic was based primarily on perceived benefits to patients. While this appears patient-centered, a more holistic perspective that a Telehealth clinic’s impact on the entire facility is recommended, as well as supported in the literature (Bashshur 1995), to (1) better understand how existing operations will be impacted by Telehealth adoption and (2) how these changes may indirectly hinder VHA’s ability to provide patient-centered care elsewhere.

Finally, providers had a limited understanding of the tasks necessary to fully implement a CVT clinic, and the roles of responsibilities of all individuals participating in the implementation. This, along with a lack of communication (discussed in Phase III) ultimately delayed implementation completion.

Table 6-7: Summary of key findings emerging from Phase II evidence

<table>
<thead>
<tr>
<th>Section</th>
<th>Dimension</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4.2.1</td>
<td>The Innovation</td>
<td>Telehealth naturally requires consistent communication between different sites and stakeholder groups. Potential advantages and disadvantages of Telehealth, as well as advantages and disadvantages of implementation, were mentioned by those directly involved with the implementation. Consistent with the literature (May, et al. 2011), unclear understanding of Telehealth integration into traditional care processes is seen as a potential barrier and/or risk of reducing the quality of care.</td>
</tr>
<tr>
<td>6.4.2.2</td>
<td>Stakeholder Involvement</td>
<td>By design, clinical champions play an active role in Telehealth implementation at a clinic level. Moreover, engagement and commitment of formally appointed internal agents (FTCs and TCTs) are crucial for Telehealth implementation at a facility level.</td>
</tr>
<tr>
<td>6.4.2.3</td>
<td>Implementation Strategy</td>
<td>The decision to implement this CVT clinic was based on the perceived benefits of Telehealth to patients. Implementation plans were not well understood by providers.</td>
</tr>
<tr>
<td>6.4.2.4</td>
<td>Communication about Innovation</td>
<td>Supporting evidence from providers utilizing Telehealth is effective in promoting Telehealth to other providers. Roles and responsibilities during the implementation were less clear than the roles and responsibilities of individuals once the clinic is complete, hindering implementation progress.</td>
</tr>
</tbody>
</table>
6.4.3 Phase III: Implementation Execution

Quality of Delivery was discussed far more than any other dimension, both by providers and FTCs (Table 6-8). More frequent FTC responses are likely explained by the FTCs role in managing all Telehealth clinics in their assigned Healthcare system, as well as the fact that the interview with one FTC lasted approximately an hour longer than any of the other interviews.

<table>
<thead>
<tr>
<th>Phase III Dimension</th>
<th>2 Providers</th>
<th>2 FTCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Differentiation</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Adherence</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>Dose</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>Participant Responsiveness</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Quality of Delivery</td>
<td>20</td>
<td>59</td>
</tr>
</tbody>
</table>

6.4.3.1 Program Differentiation

Implementation of Distinct Components

The RS-FTC provided a clear, general outline of the implementation process:

- Completion of a needs assessment to determine whether Telehealth is suitable for the clinic,
- Creation of a Telehealth Service Agreement between the two facilities identifying the role of all individuals involved with the clinic
- Completion of all necessary Telehealth training (by all participating individual)
- Acquire the necessary equipment and ensure it is functional
- Coordinate the scheduling process between the two sites
- Create the Telehealth clinic profile and appropriate billing structure in the system so the patient and provider sites can communicate
- Begin seeing patients

Based on the distinct components revealed through interviews, observation and internal documents, the use case in Figure 6-5 was developed to highlight the key components of a CVT clinic implementation.
Figure 6-5: Use case for the implementation of a CVT Clinic

Understanding of Distinct Components
As discussed on page 98 under Communication of Adoption Plans, implementation plans or objectives were not clearly understood by all participants before execution. Furthermore, Section 3.1.2.4 (Communication about Innovation) revealed that participants had inconsistent perspectives of implementation progress. Such evidence suggests individual could have a greater understanding of the innovation components, and how they are reflected in the implementation.
6.4.3.2 Adherence

Implementation Objectives and Deadlines
No deadline was set to define when the CVT clinic was expected to be complete. The overall implementation was not broken down into short-term tasks or milestones that could be used to track progress. Rather than following a concrete checklist with tasks and target completion dates, the implementation took a more casual approach, determining next steps as needed. Perhaps if all individuals responsible for the implementation had a more complete understanding of the process, or communicated more frequently, the opportunity to create a list of progressive deadlines would have transpired.

Application of New Knowledge
The PS-FTC described the benefits of taking time during the first few months of clinic operation to identify details that were not considered prior to launching the clinic:

“As the clinic evolves, we have to make sure we have enough time that once you draw that line in the sand and you start seeing patients, those first few months that you’re going to continually make adjustments and have that awareness. It calls for more of your consciousness and time.”

Although prior planning is necessary to outline processes, providers can identify ways to improve the predefined processes, and adjustments can be made during this time that could enhance the overall Telehealth experience.

In addition to the application of new knowledge at the clinic level, the PS-FTC reflected about Telehealth implementation within their facility over the last year to express how recent lessons learned should improve future implementation efforts in subsequent years.

6.4.3.3 Dose

Provider comments related to Dose primarily focused on frustration with the lack of progress in implementing the CVT clinic. Providers were initially pleased with the quickness in creating the TSA and deploying Telehealth equipment. However, during the months before these interviews took place, the delay frustrated the providers.

86 After interviews were complete, communication increased and the final components of the Telehealth clinic were completed within one month.
Coding instances revealed numerous responsibilities placed on FTCs. Being responsible for dozens of Telehealth clinics in their facility, FTCs naturally carry a greater load relative to VHA’s rate of Telehealth expansion. Interestingly, only the PS-FTC and the NP mentioned the busyness of FTCs. While the PS-FTC mentioned how the FTC role could be overwhelming, the NP recognized the tremendous amount of time and effort put in by the RS-FTC. While the RS-FTC mentioned many involved and challenging tasks under the FTC purview, the FTC did not mention that the role was unmanageable.

Staged Implementation
Within the context of a single CVT clinic, implementation staging is not particularly relevant. An unstructured mock encounter was performed to ensure equipment was functioning and the providers were comfortable performing a CVT encounter. However, a step-by-step walk through of an entire encounter was not completed with both providers present. In this case, an additional mock encounter before seeing a real patient is advised.

6.4.3.4 Participant Responsiveness

Participant Engagement
Telehealth implementation execution requires engagement on behalf of participants directly involved with the clinic. In fact, Telehealth implementation in the VHA only takes place when a provider initiates Telehealth adoption into their own practice. When the surgeon and the NP foresaw Telehealth benefiting their patients, they were initially engaged and contacted their local FTCs to begin implementation. However, their interest diminished when they repeatedly could not identify why they were unable to see patients via Telehealth.

In general, both FTCs were extremely engaged in their roles at their respective facilities. Fully engaging in all tasks requiring their attention can become challenging when the number of tasks grows to an unwieldy amount. During the implementation of this clinic, FTCs had a lot on their plate between maintaining other Telehealth programs, implementing new programs, and preparing for their upcoming “accreditation” review conducted by VHA national staff. Because their attention is divided between numerous responsibilities, FTCs too seemed to lack understanding of the current clinic status and what was required to complete the implementation.

One FTC was more likely to reach out to others (e.g., leadership, other FTCs, training centers, etc.) for information and support, while the other would often avoid asking others unless necessary, to prevent
from interrupting with their other tasks. The following excerpt describes the concern of interrupting facility leadership:

"You're constantly interfacing with your facility leadership. And I think you have to be careful with that, because they have a whole facility to support, and they don't want to hear that you are complaining or are asking for things that you haven't explored all your other options and resources well-enough that you could have handled this on your own."

However, there are times when asking questions could not only expedite the FTC's task, but directly and/or indirectly benefit other tasks throughout the facility. Although asking a question may inconvenience or delay another individual, because many individuals greatly depend upon the FTC (e.g., all Telehealth clinics and TCTs within a facility), quickly receiving the needed information could increase FTC efficiency, indirectly improving multiple programs throughout the facility.

**Enterprise Responsiveness**

Responses relevant to *Enterprise Responsiveness* were primarily directed towards implementation at a facility level. After conducting the interviews, observation revealed how a local TCT at the provider site became more involved with the implementation. The TCT personally engaged with the surgeon, the FTC, IT at the providing site, and even with the NP and TCT at the receiving site to ensure the equipment was updated and functioning, as well as to provide valuable information that directly benefited the clinic. For example, the TCT was present during the mock encounter between sites and was able to explain in detail what goes into a CVT encounter and answer specific questions of providers.

Details of the TCT role are discussed in Chapter 7, but it is worth noting that TCTs often play an active role in provider recruitment and clinic implementation than was experienced during this implementation. This was likely the case because of two reasons: (1) the providers were not recruited to use Telehealth by a TCT and (2) many of the TCTs were hired after this implementation began. In fact, the surgeon had not met a TCT at the providing site until one month before implementation was complete. Nevertheless, high TCT engagement greatly improved implementation progress.

**Feedback**

None of the responses about feedback described feedback that pertained to the implementation of this CVT clinic. Ongoing feedback mechanisms and enterprise-wide feedback are discussed in Chapter 7.
6.4.3.5 *Quality of Delivery*

**Communication among Stakeholders**

Communication among stakeholders was the single most referenced concept of the entire framework. Multiple relevant themes within the concept emerged: continuous communication, lack of communication, collaboration and the challenges of communication.

*Continuous Communication*

The RS-FTC frequently mentioned the value of continuous communication. To promote continuous communication, the RS-FTC organizes a monthly Telehealth meeting. These meetings provide a forum for Telehealth stakeholders throughout the facility to ask questions, share updates and provide feedback, such that the RS-FTC and other Telehealth stakeholders have the necessary information to support and maintain Telehealth clinics throughout the facility. Bringing everyone together once a month not only ensures more consistent communication and common knowledge, but also promotes the spread of information and lessons learned between clinics.

Moreover, the RS-FTC emphasized continuous communication to build relationships with others in a way that facilitates Telehealth implementation.

"Whenever I go to a site [...] I make sure that anybody who’s involved with Telehealth, I see – just to maintain the relationships. It sounds kind of weird, but those relationships are really whether or not you’re going to have success. You have to have those good relationships. People have to have buy-in, and if they can learn to trust you, you’re going to have much better buy in."

In some sense, building these relationships creates intangible incentives that can maintain buy-in from stakeholders. In some sense, communication is used to foster personal relationships with the purpose of facilitating future implementation efforts. When there are insufficient incentives to encourage others to participate, the RS-FTC finds that these relationships to effectively improve buy-in.

*Lack of Communication*

Van de Ven et al. (1976) emphasized how shared tasks (i.e., collaboration) can lead to the propagation of existing uncertainty, that communication (i.e., additional processed information,) can be used to correct this growing uncertainty. Interviewees gave numerous Telehealth and non-Telehealth examples of how insufficient communication hinders implementation, as was discussed in *Understanding of Adoption*.
The next example addresses a lack of communication during implementation that ultimately impacted the quality of implementation execution.

Figure 6-6 provides perspectives of the four implementation participants. All respondents believed implementation tasks were complete, yet the clinic was not deemed “ready” to see patients, leading to confusion and frustration for providers. In reality, the missing component was that (1) although the Telehealth clinic profiles at the providing and receiving sites had been created, they had not been programmed to be compatible with one another and (2) providers did not have access to the clinics, nor did they understand how to document Telehealth encounters using the clinic. Different perspectives suggest insufficient shared, accurate knowledge of clinic status that could be mitigated with communication. In fact, the PS-FTC clearly indicates that the clinic is not ready “because we don’t have confirmation” that the two sites were compatible and ready. Because CVT requires coordination of the providing and receiving site clinics, both sites require confirmation that the other clinic is ready to begin offering CVT services.

Figure 6-6: Different perspectives of the clinic status for each respondent

Figure 6-7(a) illustrates the relative levels of communication that occurred during implementation. The dark, vertical line labeled “site barrier” signifies the added challenge of communicating between sites. Dashed lines linking two participants indicate a communication link between these two individuals. The

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87 The entity responsible for setting up the clinic profiles can depend on the local site. For example, the FTC creates the clinic profile at the providing site, while the separate clinics are responsible for setting up their own clinic profile at the receiving sites based on documented guidelines. However, the RS-FTC often facilitates this process.
amount of shading gives a general sense of the varying communication levels between pairs. These variations reveal a number of realities of the four respondents. First, communication is greatest between the two providers. This is likely due to the existing provider-provider relationship from the medical collaboration between clinics. Figure 6-7(a) shows communication levels with each participant is less for FTCs. On the other hand, Figure 6-7(b) recommends more consistent communication within each communication link, as illustrated by the darker shaded communication links between each pair. The goal is for each participant to be more accurately informed of implementation status so appropriate action can be taken in a timely manner when implementation progress slows.

![Figure 6-7: Actual and recommended communication between respondents](image)

Notably, there are realistic limitations to consider that prevent FTCs from communicating more with providers and other FTCs. Recall, previous evidence that revealed FTCs maintain a high volume of communication with numerous stakeholders. With this in mind, the reduced communication in Figure 6-7(a) might suggest that FTCs must communicate with such a high number of individuals and groups, in addition to completing a high volume of tasks, that the amount of communication that can be maintained with each Telehealth clinic under his/her purview is constrained by the amount of work one individual is capable of performing.

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88 Shading illustrates relative levels of communication between individuals.
This could be mitigated using at least two different methods: FTC tasks could be completed more efficiently (without compromising efficacy), or FTC responsibilities could be shared by more than one individual. In fact, the PS-FTC actually recommends hiring an assistant for FTCs. Evidence from this case study supports the creation of such a role to relieve FTCs from the packed, demanding tasks for which they are responsible. In absence of such an assistant, evidence at both the providing and receiving sites reveal how TCTs often assist FTCs by taking on administrative responsibilities outside of their traditional responsibilities. This may be manageable at the early stages of Telehealth in a facility, but as existing programs expand and more programs are established, these administrative responsibilities could compete with the TCT’s ability to perform their primary role: providing Telehealth care to Veterans by facilitating SF encounters and serving as a telepresenter during CVT appointments.

**Collaboration and the Challenges of Communication**

Both FTCs strongly expressed the value of collaboration in implementation, but they also emphasized the challenge of maintaining effective communication. These challenges can stem from the high volume of communication that Telehealth requires, the number of different stakeholders that need to communicate with one another (FTCs in particular), and the level of importance of many tasks and individuals involved with Telehealth implementation.

Galbraith (1974) warns collaborators about the danger of uncertainty when sharing organizational responsibilities, and argues the solution is to increase information sharing to make up for a lack of clarity. With this in mind, the ambiguity of implementation status could be mitigated by sharing information about the uncertain process. Moreover, May et al. (2011) indentified uncertainty of how Telehealth fits into the overall process of health care delivery as a barrier to implementation. This might suggest that increased awareness of the overall implementation process, in addition to the impact of Telehealth on the existing clinic, may have instead facilitated implementation.

**Program Material and Delivery Methods**

Overall, respondents spoke favorably of their Telehealth training. Providers must complete both online and hands-on training. While there were mixed feelings regarding the online training system, the program material was found informative and useful. The online training included a variety of methods such as videos, demos, presentations and documents. While the clinical aspect of Telehealth was covered in detail, one provider would appreciate if billing was more explicit.
FTCs also complete online and in person training that is specific to their role. Although one FTC had no experience with Telehealth before taking the FTC role, after completing the prescribed training, this individual said the training provided the necessary material, but given the volume of information and FTC responsibilities, more time and first-hand experience was needed in order to retain this information. Having the reference material from training on hand was found to enhance real-time learning while becoming more familiar with the role.

**Facilitators to Implementation**

Interviews proposed a variety of facilitators that promote implementation:

- When a program is seen to directly benefit patients, VHA leadership will likely support the initiative to promote the VA mission of providing patient-centered care.
- Near the end of the implementation process, the surgeon was in communication with another surgeon at a CVT clinic in another VISN, who informed this clinic of the challenges they encountered in their CVT clinic and how they overcame them. These lessons learned helped the surgeon anticipate potential barriers they may face.

**Barriers to Implementation**

All four respondents discussed how competing initiatives produced barriers to Telehealth implementation. Specifically, competition was identified between facilities in the same VISN (for funding), between stakeholders at a single facility (for resources – namely time), and within individuals (with respect to task prioritization). As these insights are more relevant to the enterprise-wide scope of the VHA Telehealth expansion efforts, and additional insight is provided by responses from other study participants, Section 7.3.4 discusses the theme of internal competition in detail.

Another challenge impacting Telehealth implementation and sustainment is staff turnover, particularly in the TCT position. TCTs are invaluable for Telehealth operations; not only are they the ones who work directly with the patient, but their clinical, technical and administrative knowledge of Telehealth is necessary for implementation success and program sustainment. Losing critical personnel, such as TCTs who are deeply involved with the program, can immobilize implementation progress throughout the facility. The knowledge of Telehealth leaves with the individual, and the FTC must then invest in a new TCT, which requires involved hiring and training processes. One FTC expressed the difficulty of filling open TCT positions because of a facility hiring freeze. Even though Telehealth staff are not covered by

99 The two surgeons discovered they both were implementing CVT clinics in the same surgical specialty when the VISN 1 surgeon attended a conference, and the other surgeon was giving a presentation on their CVT clinic.
the facility but funded with national dollars, it required a long process for the facility to approve Telehealth support staff.

Both FTCs describe the great challenge faced by many VHA facilities. One ardent FTC believes the staffing problem could assuage TCT turnover by increasing their pay grade:

"If you really want to keep these operations going, and you want to keep master preceptors, and you want to keep these people who are taking on all these extra duties, and their job is enough to warrant a higher grad than it is, it’s like how much can we stuff into one position before people say: ‘Telehealth is cool but I got kids, a family, a life. I gotta grow, I can’t live and put this much energy into a [position with this level of pay]’ I think that’s going to be a challenge at every single facility in the nation."

Since Telehealth depends on TCT expertise for both Telehealth implementation and sustainment, losing a TCT is particularly costly to facility-wide implementation efforts.

### 6.4.3.6 Phase III Summary

Table 6-9 summarizes the key findings that emerged from Phase III evidence. **Quality of Delivery** is by far the highest referenced dimension of the Timeline Implementation Framework. Within this dimensions, **Communication among Stakeholders** presented numerous themes that directly influenced the quality of implementation execution. These themes (continuous communication, lack of communication, collaboration and the challenges of communication) are linked to dimensions throughout the Timeline Implementation Framework:

- **Phase I:** Internal Communication
- **Phase II:** The Innovation, Communication about Innovation
- **Phase III:** Program Differentiation, Dose, Participant Responsiveness

More consistent communication is recommended between all individuals who are directly involved in the implementation to ensure appropriate action is taken to maintain implementation progress. Moreover, to relieve FTCs from the weight of their numerous demanding responsibilities in order to allow for more quality communication with other Telehealth stakeholders at the facility, personal assistance or support for FTCs may be required.
Table 6-9: Summary of key findings emerging from Phase III evidence

<table>
<thead>
<tr>
<th>Section</th>
<th>Dimension</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4.3.1</td>
<td>Program Differentiation</td>
<td>The implementation process seems to be clearly outlined, but how these tasks were carried out in practice was not clear to participants.</td>
</tr>
<tr>
<td>6.4.3.2</td>
<td>Adherence</td>
<td>Specific objectives and deadlines outlining the implementation process were not established for this implementation. Application of new knowledge is perceived as a valuable way to improve implementation by immediately incorporate lessons learned.</td>
</tr>
<tr>
<td>6.4.3.3</td>
<td>Dose</td>
<td>FTCs manage a large volume of demanding tasks, which could potentially impact the quality of implementation delivery.</td>
</tr>
<tr>
<td>6.4.3.4</td>
<td>Participant Responsiveness</td>
<td>Implementation requires engagement of participants in order to ensure important tasks are not neglected. High engagement of a TCT greatly expedited implementation.</td>
</tr>
<tr>
<td>6.4.3.5</td>
<td>Quality of Delivery</td>
<td>Communication Among Stakeholders provided many relevant and important themes: continuous communication, lack of communication, collaboration and the challenges of communication. More consistent communication is recommended between all individuals involved in the implementation to ensure appropriate action is taken to maintain implementation progress. To allow for greater FTC communication, personal assistance or support for FTCs may be required in order to relieve FTCs from their numerous demanding responsibilities.</td>
</tr>
</tbody>
</table>

6.4.4 Phase IV: Innovation Evaluation

Phase IV urges the enterprise to address two questions regarding innovation evaluation:

1. Is the enterprise evaluating the innovation?
2. Is the enterprise tracking how the innovation impacts other enterprise operations?

While FTCs are responsible for implementing and maintaining all Telehealth programs in their assigned facility, evaluation of these programs is inherently part of their job description. It is possible this fact contributed to the higher response rates by FTCs on innovation evaluation (Table 6-10).
Table 6-10: Number of references to Phase IV dimensions by provider and FTC respondents

<table>
<thead>
<tr>
<th>Phase IV Dimension</th>
<th>2 Providers</th>
<th>2 FTCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Quality</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Access</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>

6.4.4.1 Cost

Implementation Costs

Costs of implementation were mentioned with respect to facility level implementation but not with respect to implementation of a single clinic. The fact that all implementation costs are covered by national VA funding until 2015 likely contributed to the little consideration of cost. However, the financial burden of Telehealth will become a reality for all VHA facilities in FY 2015 when they are required to cover all direct and indirect costs of Telehealth.

The significant time required by technical support staff and clinicians during Telehealth implementation is an indirect cost to VHA, and it also was not discussed in the interviews. To support Telehealth development, these individuals may often compromise their time, leaving less for other responsibilities. Specifically, clinician time could otherwise be spent promoting alternative aspects of the VHA mission, such as providing services to Veterans for which VHA would receive payment or conducting research.

Innovation Costs

Staffing cost were the only innovation costs that emerged during the interviews. This concept came up when one FTC explained that inadequate pay grades for TCTs may contribute to the high TCT turnover VHA is experiencing. See Barriers to Implementation in Phase II for more details.

Impact on Enterprise Finances

When asked about the benefits of Telehealth, the surgeon’s immediate response argued that Telehealth minimized the cost of Veteran health care when one considers the total combined amount spent by Veterans and VHA. By reducing costs of Veteran travel to care (e.g., fuel costs, time taken off work to attend the face-to-face appointment), resources are freed and could be spent in other ways that promote Veteran health. For example, rather than take off work to drive four hours to a medical appointment and being reimbursed by VHA for the travel, the Veteran could schedule an appointment at a local clinic.
where the Veteran does not need to take off as much time at work and can use this money for other medical treatments, a gym membership, etc.

One FTC felt Telehealth has the potential to reduce overall cost of care, but also has the potential to increase costs:

"If you build it correctly, and you build it where there is a margin of cost savings, then you’re going to have cost savings. If you put together a service that isn’t cognoscente or aware of cost, where you’re just not saving money where you could be, so you’re arguably a loss. Or your just putting efforts into FTE, you’re paying all these people and your techs aren’t doing anything all day, now you’ve got more money the MC as a whole is paying for, that not only are you not doing a whole bunch of services, you’re doing nothing. And you just bought however many millions of dollars of equipment across the network. Not only is that not being used, but all these people are being paid to use that equipment. I think cost is really a concern, because in the beginning, you can’t just have all these programs running."

6.4.4.2 Quality

Innovation Reliability, Safety and Use

The surgeon expressed an interest in measuring the quality of the CVT consultation in order to determine whether the use of Telehealth is impacting care received by patients. One way to assess the impact of Telehealth on the quality of care would be to compare an in person evaluation with an evaluation performed via CVT. For example, the NP could see a patient in person and note particular methods, decisions, conclusions and medical advice made regarding the patient’s condition. Immediately after, the surgeon would then treat the patient via CVT. The outcomes of the NP’s in person encounter would be compared with the surgeon’s CVT encounter and all discrepancies noted. Differences could suggest that Telehealth altered how the patient’s condition was perceived, which in turn changed medical outcomes and recommendations. Further evaluation would then be required to determine how Telehealth may impact the quality of care. Alternatively, if there are not differences between the NP and surgeon’s conclusions, this method detected no way in which Telehealth impacted the care provided to the patient.

Impact on Enterprise Quality

Respondents spoke of multiple ways in which Telehealth improves the quality of patient care:
• By increasing access and reducing patient access to care, Telehealth can increase communication and therefore build a stronger patient-provider relationship, which could improve the provider’s ability to treat the patient. This is consistent with findings by Obsfelder et al. (2007), who argue that Telehealth success depends on how it impacts the patient-provider relationship/experience.

• Like SF, the telepresenter can capture and send digital images to the provider, allowing the provider to review still images of the patient. Unlike SF, CVT allows real-time communication between the providing and receiving sites so the provider can request additional images or tests. This ability to digitally capture visual patient conditions and communicate real-time between sites is considered an improvement to the quality of care compared to traditional methods.

• The quality of care could improve with CVT, given that patients have two individuals (the provider and the telepresenter) addressing the patient. This benefit would then depend on the medical scope and experience of the individual serving as the telepresenter.  

Alternatively, concerns of Telehealth hindering the quality of care did arise:

• If TCT competencies are not maintained, it is more likely that communication with the provider is compromised, reducing the quality of care. Moreover, because the provider’s perception of the patient is limited, the TCT is responsible for identifying any potential concerns and communicating these to the provider.

• As discussed in Section 6.4.2.1 (The Innovation), there is a present concern that poor integration of Telehealth into traditional care modalities can disrupt patient care, and ultimately reduce the quality of care.

6.4.4.3 Access

Innovation Utilization and Stakeholder Workload Distribution

The providers anticipate seeing up to three patients via CVT one morning each week. The surgeon at the providing site will see all patients, and other surgeons will be consulted or lead Telehealth encounters, as necessary.

Barriers and Facilitators to Innovation Use

Although patient apprehension and anxiety towards Telehealth is a concern, most respondents felt that after explaining to Veterans that Telehealth was secure, most patients would feel the benefits would

90 An NP has a greater medical scope than that of a TCT.
outweigh such concerns and patients would embrace Telehealth. Moreover, respondents felt that as the Veteran population becomes younger, aversion to Telehealth would disappear.

**Impact on Enterprise Access**

An increase in Veteran access to care is the most frequently referenced advantage of Telehealth and is cited by every interview respondent. Primary examples of increased access include reduced travel and increased interactions with specialists at other facilities.

### 6.4.4.4 Satisfaction

**Stakeholder Satisfaction and Feedback Mechanisms**

All respondents anticipate patients, providers and leadership to appreciate CVT use in this clinic. Satisfaction surveys are part of the national quality and performance assessment of Telehealth programs. The surgeon is interested in using results of these surveys to help justify the use of, as well as to improve, the Telehealth clinic. However, satisfaction survey results may not accurately reflect patient satisfaction. Informal conversations with VHA researchers identify concerns regarding the ability of satisfaction surveys, such as the ones used for Telehealth, to accurately capture patient satisfaction.

**Reflection on Implementation Strategy**

Other than the application of new knowledge during implementation efforts (Section 6.4.3.2), no comments directly reflected on the implementation strategy used for this CVT clinic.

### 6.4.4.5 Phase IV Summary

Table 6-11 summarizes the key findings emerging from Phase IV evidence. Phase IV helps the enterprise identify whether it is evaluating the innovation, as well as how the innovation impacts existing enterprise operations. Facilities are less concerned with implementation costs (which are currently funded with national VHA dollars), but individuals anticipate some of the ongoing financial impacts of Telehealth on the facility.

Respondents provide numerous examples of how Telehealth can increase the quality of care, such as improving the patient-provider relationship, using digital images to improve a provider’s ability to review visual patient conditions, and how two individuals (the remote provider and the telepresenter) are attentive to the patient during a CVT appointment. Additionally, respondents expressed some concern that
Telehealth has the potential to reduce the quality of care if TCT competencies are not maintained and Telehealth is not sufficiently integrated into traditional health care modalities.

Responses explained that Telehealth is directly aligned with the VHA mission as it can greatly improve Veteran access to quality care. Satisfaction of the CVT clinic is expected to be high, and patient satisfaction surveys request patient feedback of their CVT experiences.

Table 6-11: Summary of key findings emerging from Phase IV evidence

<table>
<thead>
<tr>
<th>Section</th>
<th>Dimension</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
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<td>6.4.4.1</td>
<td>Cost</td>
<td>Few comments were made regarding implementation and innovation costs of Telehealth.</td>
</tr>
</tbody>
</table>
| 6.4.4.2     | Quality   | The impact of CVT on the quality of care has not been officially tested.  
Interviews provide examples of how Telehealth may improve or hinder the quality of health care provided to Veterans. |
| 6.4.4.3     | Access    | Increased patient access to health care is seen as the greatest impact of Telehealth patient care. For this reason, respondents believe Telehealth directly supports the VHA mission of providing quality health care to Veterans. |
| 6.4.4.4     | Satisfaction | The surgeon plans to use satisfaction surveys to capture patient feedback regarding the CVT clinic. |
6.5 Preliminary Recommendations

The analysis in Section 6.4 gave a detailed account of how concepts in the Timeline Implementation Framework were (or were not) present during implementation of the CVT clinic. Moreover, concepts across dimensions and phases were related in order to examine the dynamics and dependencies between various aspects of the framework. Findings allowed four key themes to emerge:

Theme 1: Organizational Learning
Theme 2: Clinic Implementation Overview
Theme 3: Communication during Implementation
Theme 4: Facility Telehealth Workload

Each theme informed a preliminary recommendations aimed to improve VHA Telehealth implementation. These themes and preliminary recommendations are provided in Table 6-12 and discussed below.

Table 6-12: Key themes and preliminary recommendations the analysis of a CVT implementation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Preliminary Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Learning</td>
<td>i. Greater support for individuals from local leadership is recommended for this clinic in order to promote organizational learning, and consequently foster an environment that facilitates innovation implementation.</td>
</tr>
<tr>
<td>Clinic Implementation Overview</td>
<td>ii. In order to ensure each participant understands the implementation plan, as well as the roles and responsibilities of others involved with the implementation, an implementation overview, such as a use case, should be available to all individuals directly involved with the implementation.</td>
</tr>
<tr>
<td>Communication during</td>
<td>iii. More consistent communication between all participants during clinic implementation is recommended in order to make sure each participant understands the implementation plan so that appropriate action can be taken in a timely manner when implementation progress slows.</td>
</tr>
<tr>
<td>Implementation</td>
<td></td>
</tr>
<tr>
<td>Facility Telehealth Workload</td>
<td>iv. Facilities re-assess the responsibilities and demands placed on the FTC and then use results from the assessment to determine the how Telehealth can best be supported throughout the facility.</td>
</tr>
</tbody>
</table>

6.5.1 Organizational Learning

Early phases of implementation can help characterize the level of organizational learning within an enterprise. The Culture for Change and Organizational Learning dimensions in Phase I directly address this concept. Evidence of VHA’s value of innovation and organizational learning throughout the enterprise were present in interview responses. As introduced by Senge and Sterman (1992), local action
global thinking is a natural component of organizational learning. Moreover, this concept is an inherent aspect of enterprise-wide implementation, as they require many local changes across an entire enterprise. The idea that local and global activities are linked came up multiple times in the interviews. Furthermore, there is a strong sense of stakeholder commitment and individual learning among all four respondents, which can help an organization “learn”.

Despite evidence of concepts that promote organizational learning, findings revealed concepts that can stifle organizational learning. Given the strong presence in the literature of leadership engagement and its positive influence in organizational change, it was surprising to see few comments of leadership engagement during the interviews. In fact, interview responses related to Support for Individuals and Enterprise Reflection in Phase I implied that leadership had little involvement with CVT implementation and that real change occurred when individuals championed local efforts.

**Preliminary Recommendation**

1. Greater support for individuals from local leadership is recommended for this clinic in order to promote organizational learning, and consequently foster an environment that facilitates innovation implementation.

### 6.5.2 Clinic Implementation Overview

In Phase III, *Implementation of Distinct Components* revealed a set of distinct components or steps required during implementation of a CVT clinic. These findings were used to generate the use case diagram in Figure 6-5. However, *Understanding of Distinct Components* and *Stakeholder Communication* reiterated the confusion that existed around the implementation progress that was first identified in Phase II (*Communication of Adoption Plans*). To that effect, it is recommended that a clear outline of the implementation, as well as the roles of individuals or groups involved with the implementation, is made available to all participants directly involved with the implementation.

**Preliminary Recommendation**

2. In order to ensure each participant understands the implementation plan, as well as the roles and responsibilities of others involved with the implementation, an implementation overview, such as a use case, should be available to all individuals directly involved with the implementation.
6.5.3 Communication during Implementation

Enterprise-wide implementations directly involve multiple stakeholders groups across the enterprise, and therefore inherently require communication among these groups. Phase I began the discussion of communication and its impact on implementation success. By considering Internal Communication methods of the four respondents, it was discovered that all respondents valued continuous and open communication. Consistent with the literature, evidence reveals examples of (good) communication promoting implementation and (poor) communication hindering implementation. In other words, the quality of communication directly impacted implementation progress. The idea that communication can influence an implementation re-emerged in Phase II, when examining the Communication of Adoption Plans, and Phase III when investigating Stakeholder Communication during implementation execution. In this case, insufficient understanding of distinct program components was evidence of inadequate communication of adoption plans before implementation execution. While this reality is a local example of how incomplete communication can impede implementation efforts, it also serves as a warning for other local and enterprise-wide efforts to administer adequate planning and communication before execution. Moreover, ramifications of such action at the facility and VISN level will be discussed in Chapter 7.

Preliminary Recommendation

iii. More consistent communication between all participants during clinic implementation is recommended in order to make sure each participant understands the implementation plan so that appropriate action can be taken in a timely manner when implementation progress slows.

6.5.4 Facility Telehealth Workload

However, evidence suggests that the volume of work required to manage Telehealth at a facility level limits the extent to which FTCs can engage in individual clinic implementations. Moreover, managing communication already takes up a significant amount of FTC time. This gives rise to a few questions: firstly, could FTC interactions be reduced and/or restructured in a way that results in more effective and efficient communication? Is another individual required to complete the tasks required by the FTC? This approach was taken at the providing site, and greater dependence on the TCT for administrative purposes proved effective in alleviating FTC workload, but greatly increased the already busy TCT’s agenda. To that effect, the final preliminary recommendation from the CVT analysis suggests reassessing the FTC responsibilities and demands in order to better support Telehealth throughout the facility:
Preliminary Recommendation

iv. Facilities re-assess the responsibilities and demands placed on the FTC and then use results from the assessment to determine the how Telehealth can best be supported throughout the facility.

6.6 Summary

Implementation of a CVT clinic was studied to better understand VHA's nation-wide Telehealth expansion. Two surgical clinics at separate VISN 1 facilities introduced CVT into their existing partnership in order to allow patients at one facility (i.e., the receiving site) to receive medical services rendered by a surgeon at the other facility (i.e., the providing site).

The Timeline Implementation Framework facilitated qualitative and quantitative analyses of interviews with four individuals directly involved with implementation of the clinic. The framework divides an implementation into four phases, each comprised of dimensions and subsequent concepts relevant to that particular phase. Evidence from the CVT clinic was gathered through interviews, observation and internal documents in order to populate the concepts within the Timeline Implementation Framework with the purpose of characterizing and assessing implementation of the clinic. Findings from within dimensions in each phase are summarized separately at the end of each phase discussion. Key themes that emerged from the analysis, along with preliminary recommendations when appropriate, are provided in Table 6-12 and discussed below.

Findings from the CVT analysis revealed potential opportunities for Telehealth implementation improvement, which ultimately led to four preliminary recommendations (Table 6-12) informed by the gathered evidence and emergent themes in analysis of a CVT clinic implementation. These preliminary recommendations lay the groundwork for addressing the forth research question:

Q4) Given the current state and objectives of the VHA Telehealth expansion, how can Telehealth implementation be improved?

Preliminary recommendations are revisited in Chapter 7 when an enterprise perspective of the VHA Telehealth expansion is sought. Varying perspectives from across VHA will reveal new insights, as well as reiterate concepts that emerged in Chapter 6. By comparing and contrasting local implementation efforts with national implementation strategies, relationships between various levels of the VHA

\(^{91}\) Refer to Sections 6.4.1.5 (Phase I), 6.4.2.5 (Phase II), 6.4.3.6 (Phase III) and 6.4.4.5 (Phase IV) for separate summary tables of the dimensions in each phase.
organization (e.g., facility, VISN, regional and national) emerge to help grasp the dynamics of these relationships during enterprise-wide implementations.
7 Enterprise Perspective of the VHA Telehealth Expansion

As part of a Veterans Health Administration (VHA) national initiative to reach 50% of all unique patients via virtual care before October 2014 (VHA Office of Healthcare Transformation 2011), the VHA Telehealth expansion not only impacts Veterans but VHA employees across the country. Moreover, such an enterprise-wide implementation requires the collaboration of stakeholder groups at all levels of the organization. Due to the complexity of enterprise-wide implementations, this thesis studies the VHA Telehealth expansion in an attempt to understand and provide recommendations to improve implementation strategies. Using the Timeline Implementation Framework, Chapter 6 conducted a complete analysis of a Clinical Video Telehealth\textsuperscript{92} (CVT) clinic implementation in Veterans Integrated Service Network 1 (VISN 1). This chapter considers an enterprise perspective of the VHA Telehealth expansion in order to understand how the implementation of this CVT clinic relates to the national expansion, as well as examines the dynamics between local implementation efforts and enterprise-wide implementation strategies.

An enterprise perspective was obtained through interviews with 15 VHA employees\textsuperscript{93}. These individuals cover eight Telehealth stakeholder groups\textsuperscript{94} and span four organizational levels. Figure 7-1 encapsulates the layered structure of VHA, as well as where study participants are located within this structure and relative to the CVT clinic from Chapter 6. Concentric circles represent the three highest organizational levels: national, regional, and VISN. The smaller, colored circles identify medical centers and Community Based Outpatient Clinics (CBOCs), and the black dots (●) represent study participants. The dashed green oval encompassing the two green circles (i.e., medical centers and/or CBOCs) portrays the organizational location of the CVT clinic implementation that was analyzed in Chapter 6. Therefore, the

\begin{itemize}
\item \textsuperscript{92} One of three Telehealth modalities in VHA
\item \textsuperscript{93} The 15 respondents include the 4 previously included in the CVT clinic implementation (Chapter 6) analysis as they are part of the VHA Telehealth enterprise.
\item \textsuperscript{94} Fifteen individuals consented to participate in the study, allowing input from the following stakeholder groups:
\begin{enumerate}
\item Providers (those who use Telehealth or are about to use Telehealth to see patients)
\item Facility Telehealth Coordinators (FTCs)
\item Telehealth Clinical Technicians (TCTs)
\item VISN Telehealth Lead
\item Facility Information Technology (IT)
\item Clinical Engineering
\item Office of Rural Health (ORH)
\item Office of Specialty Care Services (OSCS)
\end{enumerate}
Please refer to Section 5.3 for a description of each stakeholder group and their role in the VHA Telehealth expansion.

Please refer to Appendix B for separate interview protocols that guided interviews with respondents from each stakeholder group.
“providing site facility” and the “receiving site facility” in Figure 7-1 refer to the same providing site and receiving site facilities in Figure 6-1 (page 73) and Figure 6-3 (page 80).

Results from the local CVT clinic analysis are compared and contrasted with the enterprise perspective in order to realize how different organizational levels may impact the VHA Telehealth expansion, and vice versa. While Chapter 6 walked through each concept in the Timeline Implementation Framework to demonstrate exactly how the framework guided and facilitated analysis of the gathered evidence, this chapter specifically highlights findings that emerged during the enterprise-wide analysis. Three of the four themes identified in the local CVT clinic implementation re-emerged during the enterprise analysis, while three new themes were introduced. These six emergent themes, combined with an enterprise perspective of the preliminary recommendations introduced at the end of Chapter 6, led to seven

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95 Filled, concentric circles represent the three highest organizational levels: national, regional, and Veterans Integrated Service Network (VISN). The smaller, colored circles identify medical centers and Community Based Outpatient Clinics (CBOCs), and the black dots (●) represent study participants. The dashed green oval encompassing the two green circles (i.e., medical centers and/or CBOCs) is the organized location of the CVT clinic implementation that was analyzed in Chapter 6. Therefore, the “providing site facility” and the “receiving site facility” in Figure 7-1 refer to the same providing site and receiving site facilities in Figure 6-1 (page 72) and Figure 6-3 (page 78).
recommendations for the current VHA Telehealth expansion, as well as the development and execution of other VHA initiatives, thus addressing Research Questions 4 and 5 respectively.

Chapter 7 begins with an overview of the enterprise perspective in Section 7.1 and then moves on to revisit the preliminary recommendations that manifested from the CVT clinic analysis in Section 7.2. The following six emergent themes are then discussed in Section 7.3, tying in preliminary recommendations, when appropriate:

1. Culture for Change and Organizational Learning
2. Facility Telehealth Workload
3. Communication during Implementation
4. Internal Competition
5. “Cart before the Horse”
6. Local Insight to Global Strategies

These themes were found to directly influence implementation progress and success at various levels of VHA and directly informed the final recommendations. Finally, Section 7.4 completes the study by summarizing the emergent themes and final recommendations that transpired from this research. Research findings have been reviewed by individuals in VHA for input concerning a VHA perspective.

7.1 Overview of the Enterprise Perspective

Similar to how the Timeline Implementation Framework facilitated quantitative analysis of the CVT clinic implementation\(^\text{96}\), Figure 7-2 portrays the frequency by which concepts associated with each dimension emerged during the interviews with all 15 respondents. In general, response frequencies by dimension in Figure 7-2 take a similar distribution as in the CVT analysis. However, a few differences between the CVT clinic implementation and the enterprise-wide perspective are worth discussing:

- **Quality of Delivery** and **The Innovation** remain the two most frequently referenced dimensions, but their percentages dropped just over one percent. High response rates stemmed from responses that described the components and advantages of Telehealth (**The Innovation**), as well as stakeholder communication and barriers to Telehealth implementation (**Quality of Delivery**). Specific quotations suggested that respondents find Telehealth advantageous, but its potential may be hindered by implementation barriers such as insufficient resources, personnel turnover, competing initiatives, and insufficient incentives for non-Telehealth groups to support Telehealth.

\(^{96}\) See Figure 6-4 on page 81.
<table>
<thead>
<tr>
<th>Phase I</th>
<th>Phase II</th>
<th>Phase III</th>
<th>Phase IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise Analysis</td>
<td>Implementation Planning</td>
<td>Implementation Execution</td>
<td>Innovation Evaluation</td>
</tr>
<tr>
<td>(14.3%)</td>
<td>(28.0%)</td>
<td>(32.8%)</td>
<td>(24.8%)</td>
</tr>
</tbody>
</table>

- **Culture for Change** (5.9%)
- **Climate for Learning** (2.4%)
- **External Relationships** (3.0%)
- **Internal Communication** (3.0%)
- **The Innovation** (12.3%)
- **Stakeholder Involvement** (3.2%)
- **Implementation Strategy** (7.3%)
- **Communication About Innovation** (5.2%)
- **Program Differentiation** (1.1%)
- **Adherence** (2.6%)
- **Participant Responsiveness** (5.2%)
- **Quality of Delivery** (20.0%)
- **Cost** (3.5%)
- **Quality** (4.4%)
- **Access** (11.5%)
- **Satisfaction** (5.1%)

Figure 7-2: Response frequencies by phase and dimension across all fifteen respondents

- The **Dose** dimension in Phase III dropped from 8.0% to 5.1%. This is likely explained by the numerous references to the volume of facility level implementation tasks under the purview of the Facility Telehealth Coordinator (FTC) made by one FTC. While the concept still maintains over 5% of the responses, the decrease can be explained by the reduced weight of the FTC's emphasis on implementation **Dose** when additional respondents are included.

- The percentages of responses for **Cost**, **Access** and **Satisfaction** in Phase IV increased significantly, while the percentage of responses for **Quality** decreased slightly. Overall, responses reveal an increased awareness of Telehealth’s impact on enterprise performance. These instances reflected both positive and negative effects of Telehealth. For example, all 15 respondents mentioned Telehealth’s improvement to Veterans’ access to care, and many spoke of

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97 Darker shaded dimensions indicate concepts in that dimensions were more frequently discussed during the interview. Box sizes are proportional to the number of concepts within each dimension.

98 **Cost** increased from 2.4% to 3.5%; **Access** increased from 5.9% to 11.5%; **Satisfaction** increased from 2.9% to 5.1%; and **Quality** decreased from 4.5% to 4.4%.
high patient satisfaction with Telehealth. On the other hand, respondents expressed concerns with Innovation Task Efficiency (e.g., patient and provider recruitment, administrative tasks) as well as sufficient resources to support Telehealth expansion and use (e.g., space, bandwidth).

Interestingly, the changes highlighted in the above bullets, along with minor shifts in other dimensions, led to responses that were more evenly distributed across the four phases (Table 7-1).

Table 7-1: Comparison of response frequencies from CVT clinic and enterprise perspectives

<table>
<thead>
<tr>
<th></th>
<th>Phase I</th>
<th>Phase II</th>
<th>Phase III</th>
<th>Phase IV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CVT Clinic</strong></td>
<td>11.8%</td>
<td>29.9%</td>
<td>42.5%</td>
<td>15.8%</td>
</tr>
<tr>
<td><strong>Enterprise</strong></td>
<td>14.3%</td>
<td>28.0%</td>
<td>32.8%</td>
<td>24.8%</td>
</tr>
</tbody>
</table>

The following are two potential reasons for these differences:

i. Because only provider and FTC perspectives are represented in the case of the CVT clinic implementation, the concepts associated with implementation planning (Phase II) and execution (Phase III) may be more pertinent to these roles. Likewise, concepts associated with Phases I and IV could be relatively more important to the roles introduced in the enterprise perspective. A more detailed analysis of findings from this research, augmented with additional interviews with other individuals holding these same or similar positions will help reveal what concepts may be more closely associated with certain roles during implementation.

ii. Concepts related to implementation planning and execution may have been emphasized in the local perspective, given that this study was conducted during implementation of the CVT clinic. To investigate the influence of an implementation’s maturity when applying the Timeline Implementation Framework, one could conduct a longitudinal study of a single implementation, applying the Timeline Implementation Framework multiple times as the implementation matures.

99 References of high patient satisfaction included responses from individuals who have heard directly from patients that they appreciate Telehealth services, as well as references to the results of patient satisfaction surveys.

100 References of high provider satisfaction included direct comments from provider interviews, as well as responses from individuals who directly interact with Telehealth providers. As one respondent explained, providers "either love it or they don’t love it yet!"

101 Innovation Task Efficiency is defined as the amount of time, as well as mental and physical effort, required to complete innovation-related tasks. Please refer to Appendix A for definitions of all concepts, dimensions and phases in the Timeline Implementation Framework.

102 One respondent claimed that with scheduling, documentation and other administrative tasks, a Telehealth encounter was approximately 60% administrative work. The reason for such high administrative work was unclear; it could be due to the nature of Telehealth encounters or a result of Telehealth being in the early stages of implementation.
Alternatively, one could apply the framework to multiple CVT clinics at different levels of implementation maturity.

7.2 Preliminary Recommendations

Before addressing the six emergent themes from the enterprise perspective, the four preliminary recommendations from the CVT clinic implementation in Chapter 6 are revisited. Table 7-2 recalls the emergent themes and associated preliminary recommendations, and then indicates whether this theme re-emerged during the enterprise analysis (e.g., no, partial or full replication). Themes that re-emerged, or were replicated, are discussed in Section 7.3, and the related preliminary recommendation will be revisited with an enterprise perspective in order to provide final recommendations (see the right-most column in Table 7-2 for the section number). The preliminary recommendation associated with the theme that saw no replication, clinic implementation overview, is revisited now to consider its potential enterprise-wide implications before stating a final recommendation.

Table 7-2: Key themes and preliminary recommendations the analysis of a CVT implementation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Preliminary Recommendation</th>
<th>Enterprise Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Learning</td>
<td>i. Greater support for individuals from local leadership is recommended for this clinic in order to promote organizational learning, and consequently foster an environment that facilitates innovation implementation.</td>
<td>Partial Replication. Revisited in Section 7.3.1</td>
</tr>
<tr>
<td>Clinic Implementation Overview</td>
<td>ii. In order to ensure each participant understands the implementation plan, as well as the roles and responsibilities of others involved with the implementation, an implementation overview, such as a use case, should be available to all individuals directly involved with the implementation.</td>
<td>No Replication. See next page</td>
</tr>
<tr>
<td>Communication during Implementation</td>
<td>iii. More consistent communication between all participants during clinic implementation is recommended in order to make sure each participant understands the implementation plan so that appropriate action can be taken in a timely manner when implementation progress slows.</td>
<td>Partial Replication. Revisited in Section 7.3.3</td>
</tr>
<tr>
<td>Facility Telehealth Workload</td>
<td>iv. Facilities re-assess the responsibilities and demands placed on the FTC and then use results from the assessment to determine the how Telehealth can best be supported throughout the facility.</td>
<td>Partial Replication. Revisited in Section 7.3.2</td>
</tr>
</tbody>
</table>
During the CVT clinic case study, findings revealed confusion and insufficient communication during implementation. This was primarily evident when respondents were unsure what additional steps needed to be taken before the clinic was complete. Having a clinic implementation overview, such as the use case in Figure 6-5 (page 102), was recommended to help ensure everyone involved understood the distinct tasks needed to complete the implementation. Providers would likely find more benefit from such an overview, as they are less familiar with the overall process as the FTCs. Similar to how the Telehealth Service Agreement (TSA) establishes roles and responsibilities for a Telehealth clinic once implementation is complete, understanding the roles and responsibilities during the implementation (e.g., indicating whether the FTC or the clinic is responsible for creating the Telehealth clinic profiles).

Although the concept of a clinic implementation overview did not emerge during the enterprise analysis, numerous Telehealth implementations are performed throughout VHA. Considering the number of CVT clinics being implemented nation-wide, inclusion of an implementation overview may expedite and improve the process of these implementations, resulting in more significant improvements overall. Although the preliminary recommendation related to the theme of clinic implementation overview was specific to CVT implementation, Store-and-Forward (SF) programs are likewise being established in significant numbers across the country, and these implementations may benefit from a similar overview.

In summary, the first recommendation of this research is as follows:

Rec 1  In order to ensure each participant understands the implementation plan, as well as the roles and responsibilities of others involved with the implementation, an implementation overview, such as a use case, should be available to all individuals directly involved with the implementation.

However, a staged approach is recommended as implementation overviews are considered for other clinic implementations and at other facilities. Implementation steps can differ by the type of Telehealth and where the clinic is being implemented, so a staged approach would allow implementers to test the benefit of the recommendations outcome, to incorporate any necessary alterations as new knowledge is realized, and to reflect potential variations between how different facilities operate. VHA is already considering these ideas and taking a similar approach as they introduce Telehealth into specialty services.
7.3 Emergent Themes from the Enterprise Perspective

The following six themes emerged during the enterprise analysis: Culture for Change and Organizational Learning, Facility Telehealth Workload, Communication during Implementation, Internal Competition, “Cart before the Horse”, and Local Insight to Global Strategies. Sections 7.3.1 through 7.3.6 each discuss one theme, incorporating findings from the CVT clinic implementation and making recommendations, when appropriate. Because Chapter 6 demonstrated how the Timeline Implementation Framework facilitated analysis by providing evidence relevant to each framework concept, the full analysis process of the enterprise analysis is not documented in detail. Rather, relevant framework concepts that informed the identification and analysis of each theme are highlighted before the supporting evidence is discussed.

7.3.1 Culture for Change and Organizational Learning

The following concepts from the Timeline Implementation Framework contributed to the understanding of organizational learning at the clinic and facility levels:

<table>
<thead>
<tr>
<th>Phase I: Culture for Change</th>
<th>Phase III: Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of Innovation</td>
<td>Responsiveness</td>
</tr>
<tr>
<td>Stakeholder Commitment</td>
<td></td>
</tr>
<tr>
<td>Support for Individuals</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phase I: Climate for Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Action, Global Thinking</td>
</tr>
<tr>
<td>Individual Learning</td>
</tr>
<tr>
<td>Enterprise Reflection</td>
</tr>
</tbody>
</table>

Although findings did reveal concepts of the Culture for Change and Organizational Learning dimensions, the theme of organizational learning emerged during the CVT clinic implementation and led to a preliminary recommendation for greater support, particularly for individuals at the clinic level in order to promote innovation locally. The theme then re-emerged in the enterprise analysis with respect to organizational learning with respect to Telehealth implementation at a facility level. In contrast to the findings from the CVT clinic implementation, the facility environment surrounding Telehealth appeared conducive for learning, both from an organizational and individual perspective. This was most evident at the providing site in the perspectives of the providing site FTC (PS-FTC) and three TCTs located at medical centers and/or CBOCs in the providing site facility. In general, FTCs face many challenges when it comes to overseeing TCTs throughout their facility. For example, TCTs are geographically positioned at medical centers and CBOCs throughout the facility’s defined region, and the FTC oversees

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103 The shaded blue boxes illustrate the relevant dimensions, while the specific concepts are listed to the right.
104 Each located at different medical centers or CBOCs
105 Notably, although no TCTs from the receiving site participated in the interview, a similar sense of commitment and collaboration between the FTC and the TCTs at the receiving site came across in the receiving site FTC interview.
numerous Telehealth programs (e.g., in the last year alone the providing site established 20 new Telehealth partnerships). In turn, the role of a TCT requires a significant level of independence and self-motivation. Despite these managerial challenges, responses from TCTs expressed how the PS-FTC showed them immense support and encouragement.

Figure 7-3 compares the concepts associated with Culture for Change and Organizational Learning as they pertain to the CVT clinic and facility Telehealth environments. The concepts shared between the two environments all promoted organizational learning. However, the CVT clinic environment exhibited evidence counter to organizational learning, such as a lack of leadership involvement or support. The Facility Telehealth environment, specifically between the PS-FTC and the TCTs, was found to promote organizational learning. The main instance suggesting otherwise at a facility level is that occasional perceived resistance from facility leadership might delay Telehealth agreements.

![Figure 7-3: Concepts of Culture for Change and Organizational Learning as they pertain to the CVT clinic and facility Telehealth environments](image)

Evidence shows aspects of both the clinic and facility Telehealth environments that promote organizational learning, as well as aspects that may hinder organizational learning. With that, the preliminary recommendation (recommendation “i” in Table 7-2) is revisited to become the following:

**Rec 2 Greater support for individuals from local leadership is recommended in order to promote organizational learning, and consequently foster an environment that facilitates innovation and implementation.**

106 Red, bold-faced evidence (with open bullets) reveals concepts contrary to those supporting organizational learning, while evidence in black (with solid bullets) supports organizational learning.
Furthermore, assessing the environment surrounding future CVT clinic implementations for indicators of organizational learning prior to implementation could help reveal barriers that may hinder and facilitators that may promote implementation. Such knowledge could then inform clinic implementation strategies in order to overcome existing barriers or leverage facilitators during the implementation. Notably, the amount of organizational learning at higher and lower organization levels can influence the learning environment of other levels, and therefore may need to be considered in such an assessment.

### 7.3.2 Facility Telehealth Workload

The following concepts from the Timeline Implementation Framework contributed to the identification and analysis of workload associated with Telehealth throughout a given facility:

<table>
<thead>
<tr>
<th>Phase III: Adherence</th>
<th>Phase IV: Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation Objectives</td>
<td>Innovation Costs</td>
</tr>
<tr>
<td>Deadlines</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phase III: Dose</th>
<th>Phase IV: Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>Innovation Task</td>
</tr>
<tr>
<td>Volume</td>
<td>Efficiency</td>
</tr>
<tr>
<td>Pace</td>
<td>Stakeholder Workload</td>
</tr>
<tr>
<td></td>
<td>Distribution</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phase III: Participant Responsiveness</th>
<th>Phase IV: Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant Engagement</td>
<td>Stakeholder Satisfaction</td>
</tr>
<tr>
<td>Enterprise Engagement</td>
<td>Innovation Sustainability</td>
</tr>
<tr>
<td>Feedback</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phase III: Quality of Delivery</th>
<th>Phase IV:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholder Communication</td>
<td>满意</td>
</tr>
<tr>
<td>Barriers to Implementation</td>
<td>满意度</td>
</tr>
</tbody>
</table>

The concept of facility Telehealth workload specifically refers to the large volume of responsibilities placed on facility staff who support Telehealth. As identified in Section 6.5.4, there is a high demand placed on FTCs especially as Telehealth programs continue to grow. Additional evidence from the enterprise analysis further recognized the difficulty in effectively balancing and addressing the necessary action items placed on a FTC. One FTC described the demand in a growing Telehealth environment:

"You can’t ever clear your plate any one day. There’s a majority of days that I would come into work and go from one meeting to the next meeting. And in each meeting we would identify a list of action items, projects, and initiatives I had to spear head. And just march right on to the next meeting – same thing would happen. It was like this exponential growth of work, without any time to get it done. That’s not very motivating."
But as time went on, my only option was to come in extra hours – compensated or not – and just get through.”

Moreover, the workload can become so overwhelming that it promotes inefficiency:

“You’re always trying to use the most efficient ways to get things done, but at the same time you don’t always have the luxury of picking and choosing what you do have available. So sometimes you just don’t have the ability to do efficiency.”

Furthermore, TCTs can face similar challenges to an FTC when it comes to the workload required to support growing Telehealth programs. While Telehealth leadership at the facility and VISN levels expressed tremendous appreciation for the TCT role, the FTC explained that the TCT position can often be undervalued:

“Once you get a TCT that is supporting three, four, five programs, depending on volume, that is a massive job! And it is certainly deserving – because it’s technical and clinical and supports multiple disciplines – it is certainly deserving of more than the position description was graded\textsuperscript{107} and written out for them.”

This volume of TCT workload under these conditions is then validated by a TCT:

“We’re at the point where we’re busy. We’re so busy. It’s not funny! Like I said, the FTC works overtime, all the time. I don’t ever leave on time. Just trying to get everything moving, just because there’s not enough time to keep up with all the [administrative work], and doing the patient side of stuff. There’s just not enough time.”

Considering the evidence of high demand placed on TCTs and FTCs, especially in the early stages of implementation when Telehealth programs at a facility are quickly growing in number and maturity, the preliminary recommendation (recommendation “iv” in Table 7-2) from the CVT analysis is revisited to account for additional enterprise-wide insight:

\textsuperscript{107} Government salaries are defined by a position’s grade (based on work difficulty, required qualifications, etc.) and step (based on an employee’s skill and work experience) (U.S. Office of Personnel Management 2009).
Rec 3 Facilities should re-assess the responsibilities and demands placed on the stakeholder groups throughout the facility, specifically FTCs and TCTs. Results from the assessment, augmented with needs and constraints at a national level, should be used to determine the how Telehealth can best be support throughout the facility.

For example, the following potential solutions emerged during the interviews: employ more than one FTC at larger facilities, provide FTCs with additional assistance to specifically help with administrative tasks, base the number of TCTs employed at each medical center and CBOC on the number of Telehealth programs at a facility and the number of programs a single TCT can effectively support, or re-assess the demands of the FTC and TCT positions to ensure they are appropriately reflected in the set grades. However, such actions require consideration that goes beyond the needs of the facility to include needs and resources across the entire organization. For this reason, any decision must align with national strategies, needs and constraints.

7.3.3 Communication during Implementation

7.3.3.1 Clinic Level Implementation

Analysis of the CVT clinic implementation revealed instances of incomplete and inconsistent communication regarding implementation progress between individuals directly involved with the CVT clinic implementation that likely contributed to confusion, frustration, and delays. No additional findings spoke directly to communication during clinic level implementation, the preliminary recommendation from the CVT clinic analysis (recommendation “iii” in Table 7-2) becomes the fourth recommendation:

Rec 4 More consistent communication between all participants during clinic implementation is recommended in order to make sure each participant understands the implementation plan so that appropriate action can be taken in a timely manner when implementation progress slows.

As only one clinic-level implementation was included in the case study methodology, these findings cannot be generalized to other Telehealth implementations in VHA. However, the enterprise analysis did provide additional examples of incomplete and inconsistent communication at higher organizational levels.
7.3.3.2 *Facility Level Implementation*

The following image identifies concepts from the Timeline Implementation Framework that contributed to the analysis of IT Collaboration with respect to Telehealth:

The enterprise analysis extended the theme of communication during implementation to include communication and collaboration between integral facility stakeholders who are involved with providing the technical Telehealth infrastructure; this includes Clinical Engineering and Information Technology (IT). In addition to collaboration with the FTC and TCTs, IT also communicates with Department of Veterans Affairs (VA) Northeast Regional 4 IT (Region 4 IT), the regional IT network responsible for providing secure, dependable IT systems to facilities throughout VISNs 1-5 (Figure 7-4.)

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108 Clinical Engineering, sometimes referred to as Biomedical Engineering, is responsible for managing and maintaining all medical devices in the facility. See Section 5.3 for details on the role of IT in supporting Telehealth.

109 IT provides technical support to the entire facility and is made up of multiple smaller groups specializing in a particular type of technology: networking, desktop, servers, telecommunications and WANs (wide area networks). See Section 5.3 for details on the role of IT in supporting Telehealth.

110 VISN maps from the VA website on VHA locations (Department of Veterans Affairs 2010)
As Figure 7-5 illustrates, findings\textsuperscript{111} revealed great collaboration among IT, CE and TCTs with respect to Telehealth implementation. Regarding intra-facility communication, both IT and Clinical Engineering commented on the quality of their communication and collaboration. Specifically, one IT respondent attributed the success of CVT implementation at their facility to such cooperation:

"The extent that this gets going quickly and well and meets deadlines, has a lot to do with successful cooperation between all the different groups. And I think we are very good at that at [this facility]. We think so. And I have heard from talking to one of our technicians, we are one of those out in front in getting [CVT carts] up and going and in use. So, if you had a situation where there was a lot of infighting and people were interested in their turf rather than getting things done I could see where it would be harder to get a project like this moving quickly. That kind of stuff. We don't do that here."

This sentiment towards quality collaboration is shared among other key participants of Telehealth implementation in the facility, namely CE, the FTC and TCT.

![Figure 7-5: Communication levels within Facility IT and with Region 4 IT](image)

\textsuperscript{111} Findings were based on interviews with the FTC, a TCT, IT and CE.
While evidence showed quality collaboration and communication among TCTs, IT and Clinical Engineering within the facility for the purposes of Telehealth implementation, interviews revealed examples where communication with Region 4 IT could improve, specifically with regards to CE and facility IT’s role in Telehealth, as well as guidance on how certain tasks should be performed.

One explanation for this uncertainty may be that Region 4 IT is currently being re-organized as part of the National IT Realignment initiative to standardize technological processes and support all of VA:

“There is an old expression that ‘if you have seen one VA, you have seen one VA’. They couldn’t say you have seen them all. Because everyone, even though they are all part of the same umbrella, everyone did things differently. And they have spent the last half dozen years at least, trying to change that and get us standardized. Which is probably a good thing, but, you know, we complain all the time. We used to do it that way, why do we have to do it this way?”

The respondent goes on to describe how this standardization has been infused into the Telehealth expansion (e.g., standardized addresses for servers and VLANs, national documents). Standardized processes can increase overall efficiency, as well as effectiveness throughout the system, but reduced or unsatisfactory performance can be expected throughout VHA until the growing pains of such enterprise-wide transformations are reduced. (Please refer to the end of Section 2.2.1 for how this concept is supported in the literature). Potential explanations for such reduced performance could be that time is necessary to change processes and systems that are engrained in enterprise and employee operations. These delays in improvement could also be exacerbated by employee resistance, as alluded to in the previous quotation.

The discussion on innovation diffusion in Section 2.2.1 then suggested that such transitional phases could be used to manage organizational uncertainty, a concept highly encouraged by Galbraith (1974). In an earlier discussion on organizational communication methods (Section 2.1.2), communication was identified as a means for addressing organizational uncertainty. The literature regards feedback as an effective way to increase communication between organizational entities, which can then help informed decision makers respond appropriately.

This in mind, the following recommendations aims to address the concerns of communication during the regional transition of IT in VHA:

112 Virtual Local Area Networks
Rec 5  During the current Regional IT re-organization, Region 4 IT and facility IT groups throughout VISNs 1-5 should engage in discussions that address both Telehealth and general concerns.

These discussions would create the opportunity for both the regional and facility levels to partake in conversations about existing concerns and potential solutions to these concerns. Because Region 4 IT is currently filling vacancies and establishing its presence, it is an opportune time to receive feedback that informs the development of formal processes, strategies and initiatives. Notably, the national Office of Information Technology (OI&T) recently requested all VHA employees complete a satisfaction survey online as a way to track employee satisfaction with IT systems and services. In addition to such surveys, in-person and/or virtual discussions between Region 4 IT and facility IT groups may be more effective in addressing concerns.

7.3.4 Internal Competition

The following image highlights concepts from the Timeline Implementation Framework that contributed to the identification of internal competition as a barrier to Telehealth implementation:

Chapter 6 mentioned the concept of internal competition as a barrier to implementation. Interviews with additional VHA employees provided further insight to how Telehealth has been impacted by internal competition. Respondents recognized internal competition at multiple levels throughout the VHA organization (see Figure 7-6 for a visual comparison):

- Between national entities for funding and authority
- Between VISN facilities for funding (i.e., patients)
- Between stakeholder groups at a single facility
- Between patient groups, regarding which groups will receive Telehealth services
7.3.4.1 National Level Competition

Because of the advantage Telehealth offers in increasing access to care for rural Veterans, ORH is a national VHA office that has a strong interest in promoting the use of Telehealth services in rural medical centers and CBOCs. Before the national push for Telehealth, ORH had already been supporting Telehealth to serve rural Veterans. At the onset of VHA Telehealth expansion these separate initiatives interfered with one another:

"Because of the way funding and all the other things go, [the national entities] work for separate parts of the VA silo – and initially they didn’t really have a good way of communicating to each other. Although they were both working for the same goals... so there was somewhat of a competition for the first couple years. [...] And there wasn’t a natural communication bridge between the two, both very well funded, but kind of launching off into their own systems."

The impression was that these conflicts stemmed from confusion and a lack of communication between national offices. In fact, the conflict was resolved when someone at the national level cultivated collaborative efforts between the two entities.

7.3.4.2 VISN Level Competition

The concept of rivalry between facilities in a given VISN revolved around competing financial interests in serving patients locally. This is relevant to Telehealth, because the providing site receives payment for a Telehealth appointment while the receiving site accommodates the patient. While the financial burden has less impact now while national funds cover all Telehealth expenses (including staff and equipment
purchases), in FY 2015 these financial burdens will be placed directly on facilities and could potentially be seen differently.

### 7.3.4.3 Facility Level Competition

Internal competition for stakeholder interest and time can directly influence Telehealth implementation efforts. Telehealth, along with other new initiatives (e.g., recent national push for expansion of mental health services), is added-on to existing priorities and responsibilities of groups throughout the facility (e.g., leadership, IT, providers, CBOC staff). Additional efforts (primarily on behalf of the FTCs and TCTs) are required to persuade these stakeholders to contribute to the Telehealth program. Telehealth can be seen as an undue burden that interferes with their existing responsibilities when they do not consider Telehealth part of their traditional job description. The level of resistance could depend on the workload and complexity of the demands, how change management was handled during the transition, as well as the individuals within the stakeholder groups.

Both FTCs faced challenges getting buy-in from important stakeholder groups. The level of resistance varied by group and within each facility. For example, one FTC had a good working relationship with Information Technology (IT) and Clinical Engineering, but the other struggled to coordinate with these groups for Telehealth setup and installation. One FTC described the resistance that was received when seeking help from others throughout the facility:

"It's not like all the other people who are stakeholders are sitting around to make this decision and build this with you. You have to compete for their time – it's the VA, these people are already stretched. They have multiple hats.

[...] You always have to be able to justify why you're doing what. If you're going to ask something of someone, there's always a why. [...] Everyone you interact with, because you're breaking those rules or do things differently than all the other face-to-face programs and services, you're constantly getting that feedback and questions. So you always have to be able to justify and manage."

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113 IT is responsible for maintaining computer systems throughout the enterprise. Local IT at each facility manages the local IT systems and provides technical support to employees.

114 Clinical Engineering is responsible for setting up and maintaining medical devices throughout the enterprise.
The FTC noted that this type of response is not specific to Telehealth, but competing initiatives exist everywhere, given the numerous objectives across the system and limited resources (e.g., time, money, people, equipment and space).

Justifying the basis for a program and explaining to stakeholders why their participation is essential for its success during the planning and earlier implementation stages could prevent future resistance to new programs. In order to reduce resistance and improve implementation efforts, it is recommended this “justification” (in the form of supporting evidence and adoption plans) is communicated during the implementation planning (Phase II) before enterprise-wide implementation takes place.

7.3.4.4 Patient Level Competition

Facilities throughout VISN 1 are aiming to meet similar performance targets for Telehealth encounters, regardless of potential variations in local patient needs and/or provider services available. One FTC explained how providers were more inclined to establish programs benefiting rural patients than urban patients who live closer to a medical center, making it more challenging to generate similar patient-site encounter counts at all facilities:

“So the challenge really becomes, myself, I have to pull out the magnifying glass and show it to providers and say 'you still have a margin of benefit that these patients will benefit' [...], versus all the providers immediately want to go to where they can do the most good, which I’m all for. [...] But one of the shortcomings is going to be ultimately on myself, when I go to the leadership here and go: well, I wasn’t able to put these patients-sided TH services together here because all of our providers here are only interested in caring for other facilities”
7.3.5 "Cart before the Horse"

The following image lists the dimensions and concepts from the Timeline Implementation Framework that helped detect the consequences of implementing without a complete plan:

<table>
<thead>
<tr>
<th>Phase I: Culture for Change</th>
<th>Phase II: Implementation Strategy</th>
<th>Phase III: Adherence</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of Innovation</td>
<td>Implementation Plan</td>
<td>Implementation</td>
</tr>
<tr>
<td>Value of Innovation</td>
<td></td>
<td>Objectives</td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
<td>Deadlines</td>
</tr>
<tr>
<td>Commitment</td>
<td></td>
<td></td>
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<tr>
<td>Support for individuals</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

"Cart before the horse" is a common phrase that describes actions taken with insufficient planning or forethought. With respect to Telehealth implementation, the exact phrase was explicitly used twice in one interview, and the concept emerged in seven of the fifteen study participants. One excerpt from each of these respondents is included in Figure 7-7 to portray the consensus.

In general, the perception is that overall impact of Telehealth on the entire facility was not realized before Telehealth implementation began. When this occurred, the impact of Telehealth on the facility was greater than anticipated, which could potentially cause stakeholder groups to see Telehealth as imposing on current facility activities (see Section 7.3.4.3). This can ultimately increase the challenge of managing change at the facility level (as was evident in the previous section when discussing internal competition). Perhaps a more complete understanding of the impact of Telehealth at a facility level beforehand could have improved the overall implementation process. To that effect, the following theme considers the value of including local needs and capabilities into global implementation strategies.
"I think the 'cart before the horse' syndrome is really affected, because what you have to do (which is very logical), you have to back-pedal. We've spend an enormous amount of time re-deploying equipment instead of being able to do that correctly the first time. We're very happy that we received everything, but... it's kind of difficult sometimes with what we do."

"There are certainly situations, not only in Telehealth but in other fields, where they will send out this thing saying, okay everybody you have three days to do this and this is what you have to do and then two days into those three days you get another message, saying oops, that wasn't quite right. You have to do this."

"A lot of this is being funded by T21 funds. They didn't put in for a clerk; they didn't think they needed a clerk... Telehealth techs can be clerks... it's a nightmare! I mean, it really is."

"But there are some key areas to where you could just do it so much better with more communication, more of a timeline, more of a project management concept to where: we're going to do this, develop this plan, and there's going to be some level of detail to it. Versus, we're going to push this out to these people who already have all these issues and programs and are just running crazy, and we're going to throw this new one on and they're going to stride and take it as it goes. It's not that way. Ultimately the biggest thing is having seeing things at the facility level. At the same time, I know that Telehealth isn't the only place."

"Maybe if all of this was looked at really well beforehand, there wouldn't have been so much frustration and chaos trying to get it up and running."

"And in some cases you have to make up for years of planning..."

Figure 7-7: Responses from the seven respondents discussing the concept of putting the "Cart before the Horse" in Telehealth implementation

7.3.6 Local Insight to Global Strategies

In addition to the previous themes in this chapter, the following image reveals the dimensions and concepts from the Timeline Implementation Framework that helped identify the benefits of incorporating local insight into the development, execution and evaluation of global strategies.

Local insight to global strategies refers to the incorporation of local needs and capabilities into the development, execution and evaluation of enterprise-wide implementation strategies. With respect to
One respondent captured how national programs can be implemented without directly addressing local needs when describing the Telehealth expansion as a “cookie-cutter” implementation. Simply put, one general model forms the basis of Telehealth implementation at all 152 medical centers and surrounding CBOCs. Moreover, each VISN is expected to meet the same target of providing 50% of unique patients with virtual care services by October 2014. The fact that VISNs (as well as facilities within a VISN) differ by Veteran demographics, available medical services and specialties, and organizational infrastructures suggests different VISNs may have varying Telehealth needs and varying levels of infrastructures to support Telehealth implementation. For example, the level of infrastructure (e.g., equipment, programming maturity) in VISN 19, where CVT was originally established in VHA, is likely much different than in VISN 1, which served the second fewest number of patients via CVT in FY 2012\(^\text{116}\). Yet, both are working to meet the same performance targets.

\(^{115}\) The image of concentric circles in the center refers to the previous images that illustrate levels in VHA.

\(^{116}\) While CVT alone is not a sufficient measure of Telehealth capabilities, it is used as a proxy to illustrate the relatively nascent Telehealth infrastructure in VISN 1.
Internal competition and “cart before the horse” syndrome further motivate the recommendation to incorporate local needs and capabilities into global strategies. For example, if local needs and capabilities were considered prior to Telehealth expansion nation-wide, the consequences of internal competition and “cart before the horse” syndromes evident in the VHA Telehealth expansion could potentially have been prevented. If local needs and capabilities were considered now, the consequences of internal competition and “cart before the horse” syndromes evident in the VHA Telehealth expansion could potentially be mitigated. Identifying the current needs and capabilities of local entities could inform strategies for improving current Telehealth implementation strategies, as well as strategies for other VHA programs.

However, before local conditions can be incorporated into higher level strategies, the local conditions must first be realized. One respondent described the perception that local input may not be accurately reflected in the current implementation activities:

"I think that they do not have a pulse on really what’s happening in the field\textsuperscript{117}. And I’m not sure if that’s their role."

Failure to incorporate local conditions into the evaluation of enterprise-wide implementation may fail to address how local entities can best use what is being implemented and what is needed locally to support implementation. With that, the final recommendation offered to VHA is based on the concept of local insight into global strategies, a suggestion found both in the literature as well as in the interviews.

\begin{framed}
Rec 6  After identifying local needs and capabilities with respect to Telehealth technologies throughout VHA, they should be used to inform decisions, strategies and evaluation. Moreover, local needs and capabilities should be gathered to inform the development, execution and evaluation of other current and future enterprise-wide initiatives.
\end{framed}

7.4 Summary
Chapter 7 addressed the final two research questions by obtaining an enterprise perspective of the VHA Telehealth expansion and then used insights to produce six final recommendations aimed to improve the current VHA Telehealth expansion, as well as the development and execution of implementation strategies for current and future VHA initiatives. The final research questions are as follows:

\textsuperscript{117} “Field” refers to operations at the facilities.
Q4) **Given the current state and objectives of the VHA Telehealth expansion, how can Telehealth implementation be improved?**

Q5) **How can the characterization and evaluation of Telehealth implementation efforts inform the development and execution of implementation strategies for current and future VHA initiatives?**

This chapter extended the case study of a CVT clinic implementation from Chapter 6 to obtain an enterprise perspective of the VHA Telehealth expansion by considering interview responses from 15 VHA employees. Study participants represented eight roles in Telehealth and four organizational levels. Section 7.1 presented an overview of the enterprise perspective, using qualitative and quantitative accounts of interviews as they pertained to concepts in the Timeline Implementation Framework. Before launching into a discussion on the findings from the enterprise analysis, Section 7.2 revisited the emergent themes and preliminary recommendations that transpired from the analysis of a local CVT clinic implementation in Chapter 6. This section also provided the first recommendation “i”, as the theme “clinic implementation overview” was not replicated in the enterprise analysis. Section 7.3 introduced the six emergent themes uncovered during the qualitative analysis. Each theme highlights a different aspect of the VHA Telehealth expansion and led to the recommendations in Table 7-3.

**Theme: Clinic Implementation Overview**

Inadequate understanding of the implementation process by some individuals involved with the CVT clinic implementation appeared to contribute to delays in completing the implementation. Findings led to a recommendation suggesting that an implementation overview be provided to all individuals who are directly involved with the implementation of a Telehealth clinic.

**Theme: Culture for Change and Organizational Learning**

Evidence supporting organizational learning at both clinic and facility level environments were considered. The PS-FTC and TCTs exhibited strong evidence of stakeholder commitment, individual learning, “Local Action, Global Thinking” and enterprise reflection. On the contrary, less leadership engagement at clinic and facility levels led to a recommendation seeking to promote organizational learning.
### Table 7-3: Final recommendations of the analysis to VHA aimed to improve Telehealth implementation (Research Question 4), as well as other VHA implementation initiatives (Research Question 5)

<table>
<thead>
<tr>
<th>Section(s)</th>
<th>Theme</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rec 1</td>
<td>7.2</td>
<td><strong>Clinic Implementation Overview</strong>&lt;br&gt;In order to ensure each participant understands the implementation plan, as well as the roles and responsibilities of others involved with the implementation, an implementation overview, such as a use case, should be available to all individuals directly involved with the implementation.</td>
</tr>
<tr>
<td>Rec 2</td>
<td>7.3.1</td>
<td><strong>Culture for Change and Organizational Learning</strong>&lt;br&gt;Greater support for individuals from local leadership is recommended in order to promote organizational learning, and consequently foster an environment that facilitates innovation and implementation.</td>
</tr>
<tr>
<td>Rec 3</td>
<td>7.3.2</td>
<td><strong>Facility Telehealth Workload</strong>&lt;br&gt;Facilities should re-assess the responsibilities and demands placed on the stakeholder groups throughout the facility, specifically FTCs and TCTs. Results from the assessment, augmented with needs and constraints at a national level, should be used to determine the how Telehealth can best be support throughout the facility.</td>
</tr>
<tr>
<td>Rec 4</td>
<td>7.3.3</td>
<td><strong>Communication during Implementation</strong>&lt;br&gt;More consistent communication between all participants during clinic implementation is recommended in order to make sure each participant understands the implementation plan so that appropriate action can be taken in a timely manner when implementation progress slows.</td>
</tr>
<tr>
<td>Rec 5</td>
<td>7.3.3</td>
<td><strong>Communication during Implementation</strong>&lt;br&gt;During the current Regional IT re-organization, Region 4 IT and facility IT groups throughout VISNs 1-5 should engage in discussions that address both Telehealth and general concerns.</td>
</tr>
<tr>
<td>Rec 6</td>
<td>7.3.6</td>
<td><strong>Local Insight to Global Strategies</strong>&lt;br&gt;After identifying local needs and capabilities with respect to Telehealth technologies throughout VHA, they should be used to inform decisions, strategies and evaluation. Moreover, local needs and capabilities should be gathered to inform the development, execution and evaluation of other current and future enterprise-wide initiatives.</td>
</tr>
</tbody>
</table>
Theme: Facility Telehealth Workload
Evidence revealed high demands were placed on the FTC and TCTs during rapid Telehealth expansion at a facility. It was recommended that a facility level assessment be conducted to identify the best way to provide support for Telehealth implementation and sustained use.

Theme: Communication during Implementation
The theme of insufficient communication first emerged in the CVT clinic analysis and re-emerged in the context of IT support groups and the providing facility, leading to two recommendations: first, consistent communication during Telehealth clinic implementations and second, discussions between Region 4 IT and facility IT groups throughout Region 4 that address existing concerns regarding Telehealth or the current IT re-organization initiative.

Theme: Internal Competition
Evidence revealed internal competition at many organizational levels: between national entities for funding and authority; between facilities in a given VISN for funding and patients; between facility stakeholder groups for resources (e.g., time); and between providers regarding which services locations will have access to Telehealth services.

Internal competition was the first theme that hinted at the need for inclusion of local insights into global implementation strategies. Specifically, input from stakeholder groups that might be affected by an enterprise-wide implementation, could inform implementation strategies and facilitate change management. Likewise, insight into existing capabilities of stakeholder groups who may have an interest in the innovation (its implementation and/or outcomes) could help identify implementation facilitators (the enterprise could leverage) and implementation barriers (the enterprise should address) in a way that could improve implementation success.

Theme: “Cart before the Horse”
Execution without developing a complete implementation strategy can result in unnecessary challenges. “Cart before the horse” is a colloquial phrase describing the unfortunate scenario that results from such a lack of planning. Seven of the fifteen respondents referenced this concept when discussing the current challenges facing Telehealth. It is likely that many of the challenges Telehealth currently faces could have been reduced or avoided if local needs and/or capabilities were considered during the planning and early stages of the national expansion.
Theme: Local Insight to Global Strategies

Lastly, evidence of internal competition and "Cart before the horse" presented an argument for inclusion of local insight into global strategies. The last theme considered the consequences of neglecting local needs and capabilities in enterprise-wide implementation strategies.

In conclusion, the Timeline Implementation Framework guided and facilitated analysis of a local CVT clinic implementation, as well as the enterprise-wide Telehealth expansion. After presenting the results and highlighting emergent themes, final conclusions were provided in the form of seven recommendations that can facilitate improvement of the VHA Telehealth expansion, as well as other VHA enterprise-wide initiatives.
8 Conclusions and Future Work

8.1 Research Motivation

Veterans Health Administration (VHA) is currently embarking on a nation-wide Telehealth expansion as a way to increase Veterans’ access to care. Telehealth consists of three modalities:

1. Home Telehealth (HT), a form of care coordination in which patients use a monitoring device kept in their home to manage chronic conditions;
2. Store-and-Forward (SF), in which clinical data that reflects a patient’s medical condition is stored in their electronic medical record for a provider to review at a later time; and
3. Clinical Video Telehealth (CVT), a secure, real-time video-conferencing system that allows patients to meet with a provider located elsewhere.

VHA formally began using HT nationally in 2003 (Darkins, et al. 2008), then referred to as Care Coordination/Home Telehealth, when HT was adopted as a means to reduce the need for long-term inpatient stays. Over the last decade, HT has grown tremendously nation-wide. For this reason, the recent VHA Telehealth expansion primarily focuses on the clinic-based modalities: CVT and SF.

Figure 8-1 portrays the growth of CVT (left) and SF (right) nationally and in Veterans Integrated Service Network¹¹⁸ 1 (VISN 1) from Fiscal Year (FY) 2010-2012. This growth has been motivated by a national performance target that requires all VISNs to “ensure that 50% of [unique patients] are receiving services through virtual care on or before October 2014” (VHA Office of Healthcare Transformation 2011). Although “virtual care” is not limited to Telehealth, but refers to various electronic health care methods, such as opting in for secure messaging (SM)¹¹⁹ through My HealtheVet¹²⁰, Telehealth is seen as a key component of meeting this goal.

¹¹⁸ VHA is comprised of 21 regional networks, known as Veteran Integrated Service Networks (VISNs), and VISN 1 is composed of the New England states.
¹¹⁹ Secure messaging (SM) refers to patient-provider direct, bi-directional communication via secure electronic messages
¹²⁰ My HealtheVet is an online secure portal where patients can access their electronic medical records, as well as medical educational material
Given the scope and complexity of the VHA Telehealth expansion, this thesis used a systems approach to analyze this enterprise-wide implementation. Conclusions aim to improve VHA implementation strategies in using case study results to help depict Telehealth expansion in VISN 1 and to inform constructive recommendations regarding implementation strategies throughout VHA. To do so, the research addresses five separate research questions:

Q1) How have enterprise-wide implementations and innovation been characterized in the literature?
Q2) How can enterprise-wide implementations be characterized over time, from implementation conceptualization to evaluation and sustainment, in a way that informs current and future implementation efforts?
Q3) What is the current state of the VHA Telehealth expansion?
Q4) Given the current state and objectives of the VHA Telehealth expansion, how can Telehealth implementation be improved?
Q5) How can the characterization and evaluation of Telehealth implementation efforts inform the development and execution of implementation strategies for current and future VHA initiatives?

To address these questions, this thesis developed and applied a framework structured around the timeline of the implementation process in order to, (a) identify and categorize concepts and activities important during an enterprise-wide implementation, and (b) understand the relationship between different concepts and phases of the implementation timeline.

8.2 Research Overview

Figure 8-2 provides a conceptual overview of the research methods, as well as where each research question (Q1-Q5) was addressed throughout the process. Interest in enterprise-wide implementations and
the VHA Telehealth expansion began in the fall of 2011 with a class project on Telehealth. After conducting informal interviews with 19 Telehealth stakeholders nation-wide, a general understanding of the Telehealth program revealed many challenges and complexities that occur when a large organization, such as VHA, takes on enterprise-wide initiatives. These findings motivated further research on enterprise-wide implementations.

An extensive literature review was performed to understand how enterprise-wide implementations and innovation were characterized in the literature (Step 2). In doing so, many concepts and existing frameworks regarding enterprise-wide implementations were identified, addressing Research Question 1. However, no individual framework was found to break down the implementation process in a manner that addressed the purpose of this research: to understand implementations within a complex socio-technical system over time, from conceptualization to evaluation and sustainment. To that effect, the Timeline Implementation Framework was developed to address Research Question 2 (Step 3). The Timeline Implementation Framework uses concepts gleaned from the literature and structures them in a manner that realizes four phases of implementation.

Exploratory research of the VHA Telehealth expansion (Step 4) continued after the class project as a means to inform the study design developed in Step 5. Steps 2 through 4 were repeated in an iterative fashion to allow for more detailed literature reviews, practical knowledge gained from exploratory research to be incorporated into literature reviews, and the researcher to revisit these steps with increasing research maturity.
Eventually, this iterative process began to converge, and the results informed the study design outlined in Section 4.2. Exploratory findings identified potential interview respondents and the Timeline Implementation Framework structured interview protocols and the data analysis. Implementation of a CVT clinic in New England was selected as a case study and individuals at varying levels of the VHA were included to provide an enterprise perspective of Telehealth implementation in the VHA. In addition to interviews with 15 VHA employees holding various roles associated with Telehealth, observation, internal documents and archival records were gathered in the data collection (Step 6) in order to enhance and validate interview responses. The Timeline Implementation Framework and MAXQDA11, a specialized coding software, facilitated quantitative and qualitative analysis (Step 7) of the gathered evidence. Results from the data collection and analysis helped characterize the current state of the VHA Telehealth expansion, addressing Research Question 3.

Finally, results and conclusions informed seven recommendations aimed to improve the VHA Telehealth expansion, as well as the development and execution of other VHA initiatives (Step 8), in turn addressing Research Questions 4 and 5. Throughout the course of the research, the author has been in contact with VHA representatives for input on study design, execution and conclusions.

8.3 Literature Review and Timeline Implementation Framework
The term "framework" is used to describe a specific tool or means of analyzing, characterizing and/or evaluating a particular unit. As Reijers and Mansar (2005) explained, frameworks can assist with such analyses in that they can help identify important factors that are present and the relationships between these factors that are found within an organization. They continue to show how knowledge gained from this exercise can be used to inform and potentially redesign aspects of the organization. Nadler and Tushman (1980) would agree that frameworks and models are necessary in understanding, predicting and controlling organizational behaviors. With respect to understanding organizational behavior, frameworks can be used to inform data collection and analysis, while prediction and control can be used to guide organizational analysis and action. Many implementation frameworks exist in the literature. There are different approaches to developing an implementation framework, each having its own strengths and weaknesses. Depending on the framework’s structure, each emphasizes different aspects of the implementation. For example, while one framework could primarily be concerned with organizational entities, another framework may be more concerned with the implementation itself.
Implementation is a dynamic process that can take months, years or even decades to complete, and it may be misleading to directly compare implementations in different stages of the timeline. With this in mind, the Timeline Implementation Framework developed by this work divides an implementation into four time-dependent phases:

- Phase I: Enterprise Analysis
- Phase II: Implementation Planning
- Phase III: Implementation Execution
- Phase IV: Innovation Evaluation

Phase I analyzes the enterprise culture and environment, as well as their potential impact on implementation. Phase II incorporates knowledge of the innovation, stakeholders, and enterprise capabilities as they pertain to enterprise-wide implementations. Phase III focuses on the execution and adaptation of plans with respect to implementation fidelity, and Phase IV assesses the enterprise’s efforts in evaluating an implementation and its impact on enterprise performance. To be clear, Phase IV does not evaluate innovation performance. Preliminary evaluation of the innovation should be considered in Phase II, where the implementation decision and strategies are made. Lastly, lessons learned should inform future implementation efforts.

Concepts in the Timeline Implementation Framework were directly informed by 12 themes that emerged during the review of three primary fields in the literature: organizations, implementation and evaluation. Figure 8-3 shows how these themes informed the structure of the Timeline Implementation Framework. Because these concepts from the literature directly informed the development of the Timeline Implementation Framework, the framework not only identifies opportunities for improvement, but can (using insight from the literature) inform strategic recommendations for improvement.

Each phase consists of four or five “dimensions” that reflect high level themes relevant to enterprise-wide implementations. Each dimension is further broken down into multiple “concepts” highlighting characteristics, items, activities, etc. that may influence implementation success. For example, Cost considers three concepts: Implementation Costs, ongoing Innovation Costs, as well as the innovation’s Impact on Enterprise Finances. Chapter 3 walked through the framework, describing each concept and its relevance to enterprise-wide implementations and potential interactions with other elements in the framework.
Figure 8-3: Relationship between the Timeline Implementation Framework and the literature review themes presented in Chapter 2.1.1.

Figure 8-4: Each phase is composed of "dimensions" that reflect high level themes relevant to enterprise-wide implementations.

121 For the discussion on a particular theme, refer to the section number listed before the theme (e.g., organization uncertainty is discussed in Section 2.1.1).
8.4 Case Study: VHA Telehealth Expansion

The Timeline Implementation Framework was then applied to characterize and assess the VHA Telehealth expansion. Implementation of a CVT clinic in New England was selected for the case study, which was then compared and contrasted with an enterprise perspective of the VHA Telehealth expansion. Through the analysis seven themes in total emerged during the analysis of the VHA Telehealth expansion:

1. Clinic Implementation Overview
2. Culture for Change and Organizational Learning
3. Facility Telehealth Workload
4. Communication during Implementation
5. Internal Competition
6. “Cart before the Horse”
7. Local Insight to Global Strategies

These emergent themes directly informed the development of six recommendations (see Table 8-1) for improving the VHA Telehealth expansion, as well as other VHA initiatives.
Table 8-1: Final recommendations of the analysis to VHA aimed to improve Telehealth implementation (Research Question 4), as well as other VHA implementation initiatives (Research Question 5)

<table>
<thead>
<tr>
<th>Section(s)</th>
<th>Theme</th>
<th>Recommendation</th>
</tr>
</thead>
</table>
| Rec 1      | 7.2   | Clinic Implementation Overview  
In order to ensure each participant understands the implementation plan, as well as the roles and responsibilities of others involved with the implementation, an implementation overview, such as a use case, should be available to all individuals directly involved with the implementation. |
| Rec 2      | 7.3.1 | Culture for Change and Organizational Learning  
Greater support for individuals from local leadership is recommended in order to promote organizational learning, and consequently foster an environment that facilitates innovation and implementation. |
| Rec 3      | 7.3.2 | Facility Telehealth Workload  
Facilities should re-assess the responsibilities and demands placed on the stakeholder groups throughout the facility, specifically FTCs and TCTs. Results from the assessment, augmented with needs and constraints at a national level, should be used to determine the how Telehealth can best be support throughout the facility. |
| Rec 4      | 7.3.3 | Communication during Implementation  
More consistent communication between all participants during clinic implementation is recommended in order to make sure each participant understands the implementation plan so that appropriate action can be taken in a timely manner when implementation progress slows. |
| Rec 5      | 7.3.3 | Communication during Implementation  
During the current Regional IT re-organization, Region 4 IT and facility IT groups throughout VISNs 1-5 should engage in discussions that address both Telehealth and general concerns. |
| Rec 6      | 7.3.6 | Local Insight to Global Strategies  
After identifying local needs and capabilities with respect to Telehealth technologies throughout VHA, they should be used to inform decisions, strategies and evaluation. Moreover, local needs and capabilities should be gathered to inform the development, execution and evaluation of other current and future enterprise-wide initiatives. |
8.5 Generalizability

Generalizability speaks to the validity of applying results or conclusions to other domains or cases. Before using a particular framework, it is important to recognize that empirical testing of a framework is first necessary in order to establish validity and generalizability (Nadler and Tushman 1980) (Clarkson 1995). In the context of this research, there are two pertinent scopes that must be considered with respect to generalizability: generalizability across implementation initiatives and generalizability across domains.

1. Are results and recommendations from applying the Timeline Implementation Framework generalizable to other initiatives?

2. Is the Timeline Implementation framework applicable in other domains?

See Figure 8-5 for an illustration.

If the Timeline Implementation Framework is applied to the VHA Telehealth expansion in the health care domain...

Figure 8-5: Application and domain scopes in generalizing the Timeline Application Framework
8.5.1 Generalizability of Findings and Conclusions

The small sample size, with respect to the number of implementations (i.e., one) and the number of interview respondents (i.e., 15) is a limitation of these research findings. First, additional studies of Telehealth implementations (CVT, SF and HT) at facilities across the country should be compared and contrasted with these findings and recommendations to test whether they are generalizable to other Telehealth implementations and at other locations. Furthermore, because a high percentage of respondents were from a local level, there is an emphasis on the local level perception of the VHA expansion. With that, more respondents are required at all levels throughout VHA to ensure an accurate representation of the enterprise-wide implementation. An attempt to include more respondents at higher levels was made when conducting this study, but a lower response rate required study redesign (see Section 4.2).

Despite these limitations, the Timeline Implementation Framework offers an advantage to generalizing research findings. Phase I concepts are independent to the innovation or the implementation, asking questions about the enterprise culture, environment and their potential impact on enterprise-wide implementations. For example, in considering the Culture for Change, the framework questions the enterprise’s history and value of innovation, as well as other concepts that speak to the enterprise’s desire and ability, i.e. “readiness” (Weiner 2009), for change. Similarly, Organizational Learning questions the quality by which organizations learn. Depending on the nature of the relationship, External Relationships can have a significant impact on enterprise-wide implementations, and Internal Communication helps identify the communication infrastructure within the enterprise (recall how communication played a key role in the success of Telehealth implantation at multiple organizational levels).

8.5.2 Generalizability of the Timeline Implementation Framework

Limited sample size is also a limitation with respect to generalizability of the Timeline Implementation Framework to other domains. Although the well-cited, multi-disciplinary literature informed the framework development (see Figure 8-6), an extensive literature review is required to fully capture how enterprise-wide implementations are characterized in the literature. Similar to the iterative process taken in the framework’s initial development (i.e., literature review, framework development and exploratory research), an iterative process that results in an extensive literature review, framework iteration to the point of convergence, and framework applications to various types of implementations is necessary for framework generalizability to other domains. There are a number of ways to further apply the framework to bolster its generalizability:
Applications that involve a much greater number of respondents

Applications to other types of implementations (e.g., technological, changes in social norms, process/operational, etc.)

Applications to implementations in other domains

Applications to implementations with varying implementation maturity

Different implementations and domains would provide a new environment, allowing for new concepts to potentially emerge. Additional applications will test and inform the existing framework just as exploratory research findings informed previous framework drafts.

With respect to implementation maturity, it is important to include implementations in various implementation phases in order to determine the impact of an implementation’s progress on findings that emerge in applying the framework. A longitudinal study of a single implementation, applying the Timeline Implementation Framework multiple times as the implementation progresses, would improve understanding of implementation maturity. Alternatively, one could compare and contrast findings from multiple implementations at varying levels of maturity.

Therefore, in order to comfortably apply the Timeline Implementation Framework to implementations in other domains, for example the aerospace domain, the framework should ideally endure a longitudinal study as well as be tested within the aerospace domain to identify potential concepts that are present in the aerospace industry that did not emerge in the literature, exploratory studies or application to the VHA Telehealth expansion.
<table>
<thead>
<tr>
<th>Literature Review</th>
<th>Phase I</th>
<th>Phase II</th>
<th>Phase III</th>
<th>Phase IV</th>
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<tbody>
<tr>
<td>Ash (2003)</td>
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<td>Banker (2000)</td>
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<td>Bashshur (1995)</td>
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<td>Chapko (2002)</td>
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<td>Damshcroder (2009)</td>
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<td>Davenport (1998)</td>
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<td>Dusenbury et al.</td>
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<td>Edmondson (1998)</td>
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<td>Emery (1995)</td>
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<td>Eminovic (2007)</td>
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<td>Gagnon (2006)</td>
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<td>Gersten (2012)</td>
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<td>Greenhalgh (2004)</td>
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<td>Grigsby (2005)</td>
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<td>Keshavjee (2001)</td>
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<td>March (1991)</td>
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<td>McGrew (1994)</td>
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<td>Meyer (1988)</td>
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<td>Mohammadi (2009)</td>
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<td>Mowbray et al. (2003)</td>
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<td>Nadler and Tushman (1980)</td>
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<td>Obstfelder (2007)</td>
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<td>O'Donnell (2008)</td>
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<td>Pizziferri (2005)</td>
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<td>Rogers (1995)</td>
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<td>Scott (2007)</td>
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<td>Senge (1992)</td>
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<td>Simpson (2002)</td>
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<td>Tsang (1997)</td>
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<td>Warren (2009)</td>
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<tr>
<td>Weiner (2009)</td>
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<tr>
<td>Zanaboni (2012)</td>
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<td>X</td>
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</tr>
</tbody>
</table>

Figure 8-6: Well-Cited articles that reference framework concepts (by dimension)\textsuperscript{122}

\textsuperscript{122} “X” indicates that one or more concepts in the dimension (column) is present in the listed article (row).
8.6 Future Work

While the case study in this thesis fostered a greater appreciation for enterprise-wide implementations, research conclusions prompted further research. Both the CVT clinic implementation and the enterprise analyses heavily relied on qualitative evidence. External validity of qualitative interview responses should be obtained with alternative evidence sources. Specifically, greater emphasis on quantitative data is necessary to support a multi-disciplinary research approach. For an example of a multi-disciplinary, approach to developing a systems understanding of health care enterprises through exploratory case studies of two leading hospitals (one in the United States, one in the United Kingdom), the reader is referred to a recent study by Fradinho et al. (2012).

As discussed in Section 8.5 on generalizability, additional applications of the Timeline Implementation Framework is required before it can be generalized to other types of implementations and other domains. This includes variation in domain, implementation type and implementation maturity.

8.6.1 Implementation Maturity

Implementation maturity refers to evolution that occurs over time as an innovation is incorporated into existing practices. It begins with innovation conception and implementation and ends when implementation is completed and the innovation is fully incorporated into enterprise practices. While the implementation maturity is inherent in the four phases of the Timeline Implementation Framework, the impact of implementation maturity in validating the framework became increasingly clear as research progressed. Two quotations from the study speak directly to the concept of implementation maturity and that the enterprise should consider such during implementation execution and evaluation:

"[...] sometimes though you forget that it takes time. Change doesn’t happen as rapidly as people think."

"You start building on a structure that hasn’t solidified itself well enough. With all this last initiative and push, you just can’t put on more than the structure can support."

DeChant et al. (1996) proposed a staged approach for evaluating a technological advancement as a way to incorporate the different stages of a development process. By considering different aspects and weights of access, quality and cost at each stage, they obtained a richer evaluation of the development process. Similar to Keshavjee et al. (2001) and Pizziferri et al. (2005), DeChant et al. also emphasized the challenge of capturing how the adoption of a new technology indirectly affects the enterprise. In their
studies on the implementation of electronic medical records, Keshavjee et al. (2001) looked at both objective effects (e.g., time spent on a given task) and subjective effects (e.g., physician perception) of the implementation of an electronic medical record system to determine the overall impact, and Pizziferri et al. (2005) focused on changes in physician workload. DeChant et al.’s systematic, phased evaluation method simplified the transfer of evaluation conclusions throughout the entire development process, because subsequent stages are informed by evaluations conducted in previous development stages. Campbell et al. (2000) and Curran et al. (2012) agreed that different evaluation emphasis should be used at different stages of medical research: once an intervention has been proven effective, separate studies should be carried out to support its implementation into practice. This concept is highly supported by others evaluating Telehealth (Eminovic, et al. 2007) and implementation scientists within the VA (Mittman 2012) (Hamilton 2012).
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Appendix A

Framework Definitions

Appendix A lists definitions for all phases, dimensions and concepts in the Timeline Implementation Framework. Directly following the definition of a given phase, separate tables define each dimension (shaded gray) and their sub-concepts (no color).

Phase I: Enterprise Analysis

Def: Analysis of the enterprise and enterprise activity that may influence innovation adoption. Such an analysis is independent of the innovation and can be carried out regardless of whether the enterprise is considering an innovation.

<table>
<thead>
<tr>
<th>Culture for Change</th>
<th>The behaviors and beliefs that encourage or discourage enterprise change.</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of Innovation</td>
<td>The enterprise’s history of adopting and generating innovations. These experiences made aware within the enterprise and are documented such that the history is readily available to enterprise stakeholders.</td>
</tr>
<tr>
<td>Value of Innovation</td>
<td>The enterprise values and strategies regarding the adoption or generation of new ideas and innovations. Innovation is seen as an opportunity for improvement, rather than a burden. Stakeholders throughout the enterprise share this value of innovation.</td>
</tr>
<tr>
<td>Stakeholder Commitment</td>
<td>The support and dedication of enterprise stakeholders to enterprise values, mission, and operations. This commitment is experienced through both smooth and turbulent enterprise times and does not depend on direct compensation.</td>
</tr>
<tr>
<td>Support for Individuals</td>
<td>The support felt by individuals from their colleagues and leadership. Individuals feel as though they are listened to when they speak, and others are committed to their success.</td>
</tr>
<tr>
<td>Enterprise Documentation</td>
<td>Processes, improvements, and other aspects of the enterprise are documented in a way that individuals within the enterprise can access and learn from them.</td>
</tr>
</tbody>
</table>

| Organizational Learning | The attitudes, standards, and environmental conditions that support or inhibit organizational and individual learning. |
| Local Action, Global Thinking | Action at the local level is taken with the understanding of how these actions affect the enterprise on a global scale and with the purpose to improve the enterprise as a whole. |
Individual Learning  The value of learning and personal growth experienced by enterprise individuals with respect to their role in the enterprise. The enterprise could consider whether individuals are comfortable applying new concepts to enterprise practices.

Enterprise Reflection  The enterprise values the reflection and evaluation of past experiences (both successes and failures). The enterprise encourages the identification of lessons learned, evaluation of outcomes/effects, and application of resulting insights to future endeavors.

External Influence  The relationships established with external entities. The nature of these relationships can be collaborative (partners) and/or conflicting (competitors).

Influence of external entities  The influence of external entities on the strategies and operations of the enterprise; this includes restrictions/regulations/barriers and support/enablers. Interactions can be tangible (e.g., money, products, etc.) or intangible (e.g., services, information, knowledge, policies, etc.).

Influence on external entities  The influence of the enterprise on the strategies and operations of external entities; this includes restrictions/barriers and support/enablers. Interactions can be tangible (e.g., money, products) or intangible (e.g., services, information, knowledge, policies).

Internal Communication  The existence and utilization of communication pathways within the enterprise.

Formal Communication  Formal communication pathways and processes in place and used for interaction between enterprise levels (vertical), between groups, and within groups.

Informal Communication  Informal communication pathways and processes are available and used within the enterprise. Individuals and groups freely communicate outside the formally established communication pathways with other groups and others within their group.

Continuous Communication  There is frequent and open communication between individuals in the enterprise. This communication allows individuals to update one another, keep each other informed of enterprise activity, and know what is being done well and what needs improvement.

Stakeholder Collaboration  Collaboration between enterprise individuals and groups towards a shared purpose or interest.

Phase II: Implementation Planning  
Def: Prior to implementation, the enterprise and its stakeholders are introduced to the innovation, whether it is from an external or internal source. The enterprise will formally decide whether to adopt the innovation and begin planning the implementation process.
<table>
<thead>
<tr>
<th>The Innovation</th>
<th>Aspects of the innovation and its ability to address enterprise needs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation Components</td>
<td>Components of the innovation that can be altered to better support innovation adoption and use (adaptable components), and components of the innovation that define the innovation and cannot be compromised during the adoption (core components). Core and adaptable components of the innovation should be accounted for in the implementation plan.</td>
</tr>
<tr>
<td>Enterprise Components</td>
<td>Components of the enterprise that can be altered and/or used to better support innovation adoption and use (adaptable components), and components of the enterprise that cannot be compromised or changed during adoption. Core and adaptable components of the enterprise should be incorporated into the implementation plan.</td>
</tr>
<tr>
<td>Innovation Advantages</td>
<td>The advantages or benefits of the innovation to the enterprise, should the enterprise decide to implement. Specifically, the enterprise should consider how the innovation aligns with its mission/strategy and is expected to reduce any existing performance gaps.</td>
</tr>
<tr>
<td>Innovation Disadvantages</td>
<td>The disadvantages or negative consequences of the innovation, should the enterprise decide to implement. Specifically, the enterprise should consider how the innovation may hinder its mission/strategy.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stakeholder Involvement</th>
<th>Stakeholders are actively involved in enterprise decision making and transformation processes, and they are viewed as valuable partners of the enterprise.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership Engagement</td>
<td>Leadership is engaged during the planning and implementation processes of innovation adoption or generation. Support should come from all levels of leadership, but the amount of leadership engagement from each level will depend on the innovation.</td>
</tr>
<tr>
<td>Champions</td>
<td>Stakeholders who actively promote innovation adoption. Through their actions and opinions, they influence the opinions of other stakeholders regarding adoption.</td>
</tr>
<tr>
<td>Stakeholder acceptance and support</td>
<td>Stakeholders feel the benefits of adopting the innovation outweigh the costs of change; they believe the enterprise is capable of innovation implementation and support implementation.</td>
</tr>
<tr>
<td>Stakeholder Engagement</td>
<td>Input and participation from stakeholders who would be directly or indirectly impacted by the innovation (either use and/or implementation) is incorporated into the implementation decision and/or plan.</td>
</tr>
<tr>
<td>Formally appointed internal agents</td>
<td>Individuals are formally appointed within the enterprise to facilitate innovation implementation and sustainability. They communicate with entities that support the innovation (e.g., technical, financial, etc.) and provide direct support to stakeholders who implement and use the innovation.</td>
</tr>
<tr>
<td>Formally appointed external agents</td>
<td>Individuals are formally appointed within the enterprise to facilitate innovation implementation and sustainability. Their level of involvement should facilitate change, but be such that the adoption is sustainable without them.</td>
</tr>
</tbody>
</table>
Implementation Strategy

The strategy taken by the enterprise that determines the implementation decision and approach.

<table>
<thead>
<tr>
<th>Implementation Strategy</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative Solutions</td>
<td>Alternative solutions are considered and compared to the innovation, and the option that suitably addresses the enterprise needs(s) is identified.</td>
</tr>
<tr>
<td>Enterprise Infrastructure</td>
<td>The enterprise infrastructure necessary to support innovation integration and use. The implementation plan should utilize existing infrastructure and address where the current infrastructure is insufficient.</td>
</tr>
<tr>
<td>Barriers and Facilitators to Implementation</td>
<td>Aspects of the innovation or enterprise that may hinder (barriers) or enable (facilitators) implementation are considered before deciding whether to implement. Barriers and facilitators can be economical, geographical, temporal, social, etc. [Scott et al.].</td>
</tr>
<tr>
<td>Innovation Evaluation</td>
<td>Evaluation of the innovation and its impact on the enterprise leads to a decision whether to adopt and to what extent the enterprise will adopt. Specific metrics should be followed and used in this evaluation.</td>
</tr>
<tr>
<td>Adoption Decision</td>
<td>The enterprise’s decision whether to implement.</td>
</tr>
<tr>
<td>Implementation Plan</td>
<td>The plan established by the enterprise to execute the innovation planning and implementation. The plan should be clear, executable, and be tailored to both the innovation and enterprise.</td>
</tr>
</tbody>
</table>

Communication about Innovation

The communication to enterprise stakeholders regarding the innovation and the implementation plan.

<table>
<thead>
<tr>
<th>Communication about Innovation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supporting Evidence</td>
<td>Evidence (e.g., information, documentation, pilot/trial results, etc.) supports innovation adoption. Evidence should accurately reflect the innovation characteristics/capabilities and be delivered to all stakeholders, as this evidence influences opinions of the innovation.</td>
</tr>
<tr>
<td>Innovation Source</td>
<td>The source from which information and supporting evidence about the innovation is given to the enterprise and the various stakeholders. The credibility of this source may (negatively or positively) affect the opinions of the enterprise and the stakeholders of the innovation.</td>
</tr>
<tr>
<td>Clear Definition of Roles</td>
<td>Stakeholders understand their role, and the role of others, with respect to the innovation; they know what is expected of them and what it can/should expect from others.</td>
</tr>
<tr>
<td>Understanding of Adoption Plans</td>
<td>Adoption plans and objectives, as well as the thought process behind the plans, are transparently communicated to the stakeholders.</td>
</tr>
</tbody>
</table>

Phase III: Implementation Execution

Def: Phase III considers the implementation of the innovation into existing enterprise operations.

Dimensions in this phase aim to characterize the process by which the innovation is incorporated into the enterprise by the primary dimensions in the literature on implementation fidelity.
<table>
<thead>
<tr>
<th>Program Differentiation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation of Distinct Components</td>
<td>Components of the innovation are implemented in such a way that these components are distinct from one another and existing enterprise components.</td>
</tr>
<tr>
<td>Understanding of Distinct Components</td>
<td>The distinction between various innovation and enterprise components is understood by the stakeholders.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adherence</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation Objectives</td>
<td>These are objectives of the implementation that are laid out in the implementation plan. Most of the time adherence to these objectives is desired.</td>
</tr>
<tr>
<td>Deadlines</td>
<td>The implementation plan should lay out specific deadlines and milestones for the implementation at adhere to.</td>
</tr>
<tr>
<td>Application of New Knowledge</td>
<td>When the initial implementation plan is insufficient for successful implementation, the plan is revised to account for additional knowledge gained through the implementation process.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dose</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>The intensity of the involvement shown by participants when learning about how to use the innovation (e.g., during training).</td>
</tr>
<tr>
<td>Volume</td>
<td>The time spent by participants learning about the innovation and completing implementation tasks.</td>
</tr>
<tr>
<td>Frequency</td>
<td>The frequency at which participants are involved with implementation tasks.</td>
</tr>
<tr>
<td>Pace</td>
<td>The pace at which the implementation is rolled out, individuals are exposed to innovation information, and how quickly components of the implementation is expected to be completed.</td>
</tr>
<tr>
<td>Staged Implementation</td>
<td>A phased or pilot implementation is incorporated into implementation, where necessary.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Participant Responsiveness</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant Engagement</td>
<td>Participants directly involved with the innovation are involved and engaged during the implementation; this includes trainings, trials, and self-motivation in incorporating the innovation into practice.</td>
</tr>
<tr>
<td>Enterprise Engagement</td>
<td>Stakeholders groups throughout the enterprise are actively engaged in the implementation. This includes the implementation team, leadership, champions, and other stakeholder groups involved with the implementation process.</td>
</tr>
<tr>
<td>Feedback</td>
<td>Stakeholders provide feedback regarding the implementation to appropriate persons.</td>
</tr>
</tbody>
</table>
Quality of Delivery

| Stakeholder Communication | The communication between stakeholders who are involved with the implementation and its impact on the implementation. Relevant topics include: collaboration, continuous communication, shared knowledge, lack of communication, importance of communication, challenge of communication, etc. |
| Program Material | The material that is communicated to the different stakeholder groups during implementation. This material should accurately reflect information about the innovation and should be sufficient, such that individuals who obtain this information are capable of correctly using the innovation. |
| Delivery Methods | Methods used to delivery program and implementation material to stakeholders. Methods should be suitable to provide information about the innovation and targeted towards stakeholders receiving the material. |
| Facilitators to Implementation | Facilitators before and during execution that positively impacted or encouraged implementation of the innovation. |
| Barriers to Implementation | Barriers encountered during execution that negatively impacted or hindered implementation of the innovation. |

Phase IV: Innovation Evaluation

Def: Reflection and evaluation of (a) innovation outcomes and (b) the impact of the innovation on enterprise operations. The purpose of the evaluation phase is not to evaluate the innovation or its impact on the enterprise, rather it is to identify whether the enterprise is considering these concepts when evaluating the innovation and implementation.

<p>| Cost | The financial costs associated with (a) innovation implementation and sustenance and (b) the impact of the innovation on enterprise operations. These costs should be analyzed from multiple perspectives, such as the overall enterprise, individual stakeholder groups, society, etc. Types of costs considered should include direct/indirect, fixed/variable, marginal, general, etc. |
| Implementation Costs | Financial costs (in particular fixed and direct costs) associated with innovation implementation (e.g., initial equipment purchases). |
| Innovation Costs | Financial costs required for innovation use (e.g., staffing) and maintenance (e.g., costs associated with program, infrastructure, etc. necessary to maintain innovation operations). |
| Impact on Existing Enterprise Costs | Previous costs no longer necessary now that the innovation is fully implemented. |</p>
<table>
<thead>
<tr>
<th>Quality</th>
<th>Characteristics of the innovation or integration that impact user-experience.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation Performance</td>
<td>The innovation's level of performance, both when properly and improperly used.</td>
</tr>
<tr>
<td>Innovation Reliability</td>
<td>The reliability of the innovation to perform as expected.</td>
</tr>
<tr>
<td>Innovation Safety and Risk</td>
<td>Risk and safety measures associated with the innovation. This should be known for when innovation tasks are performed both correctly and incorrectly.</td>
</tr>
<tr>
<td>Impact on the Quality of Existing Operations</td>
<td>Impact of the innovation on the quality (e.g., processes performance, reliability, safety, risk, etc.) of enterprise activity or operations indirectly associated with the innovation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Access</th>
<th>Enterprise access to the innovation and information about the innovation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation Utilization</td>
<td>Enterprise utilization of the innovation.</td>
</tr>
<tr>
<td>Innovation Task Efficiency</td>
<td>The amount of time, as well as mental and physical effort, required to complete innovation-related tasks.</td>
</tr>
<tr>
<td>Stakeholder Workload Distribution</td>
<td>The impact of the innovation on stakeholder workload (e.g., percentage of time spent using innovation).</td>
</tr>
<tr>
<td>Innovation Documentation</td>
<td>Information regarding the innovation itself, as well as the implementation process and lessons learned, are documented for current and future reference.</td>
</tr>
<tr>
<td>Barriers and Facilitators to Innovation Use</td>
<td>Any barriers or facilitators that are hindering or enabling innovation use. Barriers should be acknowledged and addressed when necessary; facilitators should be utilized when appropriate.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Satisfaction</th>
<th>The ability of the implemented innovation to fulfill the needs, expectations and demands of the enterprise and its stakeholders.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholder Satisfaction</td>
<td>The opinions and beliefs of the various stakeholder groups within the enterprise regarding the innovation status, implementation process and on-going progress.</td>
</tr>
<tr>
<td>Feedback Mechanisms</td>
<td>Feedback about the innovation is shared and between different stakeholder groups and enterprise levels and addressed in a way that can improve the impact of the innovation on the enterprise.</td>
</tr>
<tr>
<td>Innovation Sustainability</td>
<td>The ability of the enterprise to provide continuous support and maintain the innovation without draining from resources needed for other enterprise operations.</td>
</tr>
<tr>
<td>Implementation Reflection</td>
<td>Enterprise reflection of the implementation to determine which aspects of the process were beneficial and which could have been improved, such that this information can be used to improve future enterprise implementation efforts.</td>
</tr>
</tbody>
</table>
Appendix B

Interview Protocols

Framework developed in this thesis (see Chapter 3 for details) was used to structure and develop the questions incorporated into the protocols. Separate interview protocols were designed for each role and are all provided in Appendix B. The following roles throughout Veterans Health Administration were interviewed for the study:

(1) Non-Practicing Telehealth Provider
(2) Practicing Telehealth Provider
(3) Facility Telehealth Coordinator
(4) Telehealth Clinical Technician
(5) VISN Telehealth Lead
(6) Supporting Offices
  Information Technology
  Clinical Engineering
  Office of Rural Health
  Office of Specialty Care Services
1. We will begin the interview a little background information:
   - What is your position in the VA?
   - How long have you been working at the VA?
   - Have you held any other positions while at the VA?
     - If so, what were these positions?

2. Before we discuss the details of Telehealth, I would like to get a picture of how Telehealth fits into the mission of the Veterans Health Administration.
   - Please describe the primary objectives of the VHA mission.
   - How does Telehealth support the VHA mission, if at all?
   - How does Telehealth hinder the VHA mission, if at all?

3. I would like to hear about how you were first introduced to Telehealth.
   - How did you get involved with Telehealth?
     - What were you first told about Telehealth?
     - Did you seek any information on your own?
     - What was your initial opinion about Telehealth? (favorable/unfavorable)
   - Do you have any previous experience with Telehealth?
     - If so, please explain.
   - What is your involvement, if any, with the establishment of Telehealth at your facility?

4. What do you expect your role and responsibilities to be with respect to Telehealth, once Telehealth is incorporated into your Vascular Surgery clinic?
   - What will your Telehealth-related tasks be?
   - How will Telehealth impact your role as a provider?

5. How do you expect Telehealth to impact your clinic?
   - Please describe the current overall process of delivering healthcare to patients at your clinic.
   - How do you envision Telehealth will impact the way the VA provides health care to patients?
     - E.g. cost, quality, access, satisfaction
   - How will these changes impact the Veterans receiving health care from the VHA? Please consider both how the VHA is using Telehealth to provide health care, as well as how Telehealth is being incorporated into the VHA’s health care delivery system.
   - What are the key differences between Telehealth and traditional health care delivery, if any?
     - Think about employee-patient interactions, employee-employee interactions, the health care delivery processes, procedures that occur before/during/after an encounter.
     - In what ways do you see Telehealth augmenting (e.g. enhancing or supplementing) traditional health care methods?
(1) Non-Practicing Telehealth Provider (cont.)

- What are the similarities between Telehealth and traditional health care delivery, if any?
  - Think about employee-patient interactions, employee-employee interactions, the healthcare delivery processes, procedures that occur before/during/after an encounter.
  - In what ways do you see Telehealth replacing traditional methods in health care delivery?
- Do you feel your clinic and its patients will benefit from using Telehealth? If so, please explain.
- Do you have any concerns regarding the use of Telehealth? If so, please explain.
- Do you have any concerns regarding the implementation of Telehealth? If so, please explain.
- Do you feel the benefits of Telehealth use outweigh the challenges?

6. What groups or individuals do you interact with as a provider? (Think about the central offices, individuals or groups at the network or regional level, and individuals or groups at the facility level.)
   - How do you interact with these groups or individuals?
   - How frequently do you interact with them?
   - What is the purpose of these interactions?
   - How do you expect Telehealth will impact these interactions, if at all?

7. I would now like to ask you about any Telehealth training you may have received. Have you completed any Telehealth specific training?
   - If so, please describe any formal training you received in preparation for your role in Telehealth.
     - What were the main components of this training? (I.e. what did you learn?)
     - How did you benefit, if at all, from this training?
   - Please describe any informal training you have received in preparation for your role in Telehealth.
     - How was this different from any formal training that you received?
     - How did you benefit, if at all, from this informal training?
   - Do you feel prepared to use Telehealth? Please explain.
   - What recommendations, if any, would you offer to improve this training?

8. I am now interested in hearing about how feedback on Telehealth is given and received.
   - How do you provide feedback regarding Telehealth, if any?
   - Who receives your Telehealth feedback, if anyone?
   - Do you know if this feedback is incorporated into Telehealth implementation processes? Please explain.
   - What kind feedback regarding Telehealth do you receive, if any?
   - How, if at all, is this feedback that you receive incorporated into Telehealth implementation?
9. I am now interested in hearing about other implementation rolls-outs that you may have experienced while working at the VA. For example, I have talked to individuals about the PACT model or secure messaging. Can you think of any new policies or directives that have impacted your role in the VA?
   - If so, please describe these roll-outs.
   - How information about these changes were communicated to you.
   - Is there anything that could have been done differently to make this transition easier for you, or others who were impacted by these changes?
   - Do you feel does these roll-outs compare to the way Telehealth is being rolled-out? If so, how? (I.e. what is similar? What is different?)

10. If you were king/queen for a day, what would you like to see done to improve health care delivery to Veterans in the VHA?

11. Would it be ok with you if I contacted you with any follow up questions I may have?
   - If so, how do you prefer I contact you by phone or email?
(2) Telehealth Practicing Provider

1. We will begin the interview a little background information:
   - What is your position in the VA?
   - How long have you been working at the VA?
   - Have you held any other positions while at the VA?
     - If so, what were these positions?

2. Before we discuss the details of Telehealth, I would like to get a picture of how Telehealth fits into the mission of the Veterans Health Administration.
   - Please describe the primary objectives of the VHA mission.
   - How does Telehealth support the VHA mission, if at all?
   - How does Telehealth hinder the VHA mission, if at all?

3. I would like to hear about how you were first introduced to Telehealth.
   - How did you get involved with Telehealth?
     - What were you first told about Telehealth?
     - Did you seek any information on your own?
     - What was your initial opinion about Telehealth? (favorable/unfavorable)
   - Do you have any previous experience with Telehealth?
     - If so, please explain.
   - What was your involvement, if any, with the establishment of Telehealth at your facility?

4. What groups or individuals do you interact with as a provider? (Think about the central offices, individuals or groups at the network or regional level, and individuals or groups at the facility level.)
   - How do you interact with these groups or individuals?
   - How frequently do you interact with them?
   - What is the purpose of these interactions?
   - Please describe how Telehealth has impacted these interactions, if at all.
     - Was this change anticipated?
   - How do these interactions impact Telehealth implementation and use of Telehealth at your facility, if at all?

5. Now let’s discuss the implementation of Telehealth into practice in your clinic.
   - Please describe your role in the establishment of Telehealth in your clinic, if any.
   - Please walk me through what is required to establish a Telehealth clinic. Think about what needs to be done in preparation of the clinic, as well as what is done afterwards to maintain the clinic.
   - Please describe any lessons you have learned during this Telehealth implementation.
   - Have these lessons been incorporated into current implementation practices? If so, please explain.
6. I would now like to discuss the Telehealth clinic in which you work.
   - What are your primary tasks as a Telehealth provider?
   - How has Telehealth impacted your role as a provider, if at all?
   - Please walk me through what is required for an encounter. Think about what needs to be done prior to the encounter, what happens during the encounter, and what is done after the encounter.
   - How has Telehealth impacted the way the VA provides health care to patients?
     - E.g. cost, quality, access, satisfaction
   - How do you feel these changes impact the Veterans receiving care from the VHA? Please consider both how the VHA is using Telehealth to provide health care, as well as how Telehealth is being incorporated into the VHA’s health care delivery system.
   - What are the key differences between Telehealth and traditional health care delivery, if any?
     - Think about employee-patient interactions, employee-employee interactions, the health care delivery processes, procedures that occur before/during/after an encounter.
     - In what ways do you see Telehealth augmenting (e.g. enhancing or supplementing) traditional health care methods?
   - What are the similarities between Telehealth and traditional health care delivery, if any?
     - Think about employee-patient interactions, employee-employee interactions, the health care delivery processes, procedures that occur before/during/after an encounter.
     - In what ways do you see Telehealth replacing traditional methods in health care delivery?
   - Please describe how health care delivery in your clinic has benefited from Telehealth, if at all.
   - Please describe any barriers that currently hinder the use of Telehealth.
     - Are these being addressed? If so, how?
   - Do you feel the benefits of Telehealth outweigh the challenges?

7. I would now like to ask you about any Telehealth training you may have received. Have you completed any Telehealth specific training?
   - If so, please describe any formal training you received in preparation for your role in Telehealth.
     - What were the main components of this training? (I.e. what did you learn?)
     - How did you benefit, if at all, from this training?
   - Please describe any informal training you have received in preparation for your role in Telehealth.
     - How was this different from any formal training that you received?
     - How did you benefit, if at all, from this informal training?
   - After completing this training, did you feel prepared to use Telehealth? Please explain.
   - What recommendations, if any, would you offer to improve this training?
8. I am now interested in hearing about how feedback on Telehealth is given and received.
   • How do you provide feedback regarding Telehealth, if any?
   • Who receives your Telehealth feedback, if anyone?
   • Do you know if this feedback is incorporated into Telehealth implementation processes? Please explain.
   • What kind feedback regarding Telehealth do you receive, if any?
   • How, if at all, is this feedback that you receive incorporated into Telehealth implementation?

9. I am now interested in hearing about other implementation roll-outs that you may have experienced while working at the VA. For example, I have talked to individuals about the PACT model or secure messaging. Can you think of any new policies or directives that have impacted your role in the VA?
   • If so, please describe these roll-outs.
   • How information about these changes were communicated to you.
   • Is there anything that could have been done differently to make this transition easier for you, or others who were impacted by these changes?
   • Do you feel do these roll-outs compare to the way Telehealth is being rolled-out? If so, how? (I.e. what is similar? What is different?)

10. If you were king/queen for a day, what would you like to see done to improve health care delivery to Veterans in the VHA?

11. Would it be ok with you if I contacted you with any follow up questions I may have?
    • If so, how do you prefer I contact you by phone or email?
(3) Facility Telehealth Coordinator

1. We will begin the interview a little background information:
   - What is your position in the VA?
   - How long have you been working at the VA?
   - Have you held any other positions while at the VA?
     - If so, what were these positions?

2. I would like to hear about how you were first introduced to Telehealth.
   - How did you get involved with Telehealth?
     - What were you first told about Telehealth?
     - Did you seek any information on your own?
     - What was your initial opinion about Telehealth? (favorable/unfavorable)
   - Do you have any previous experience with Telehealth?
     - If so, please explain.
   - What is your involvement, if any, with the establishment of Telehealth at your facility?

3. Before we discuss the details of the Telehealth expansion, I would like to get a picture of how Telehealth fits into the mission of the Veterans Health Administration.
   - Please describe the primary objectives of the VHA mission.
   - How does Telehealth support the VHA mission, if at all?
   - How does Telehealth hinder the VHA mission, if at all?

4. I would now like to talk about the implementation of Telehealth into practice at your facility.
   - Please describe your role in the establishment of Telehealth at your facility, if any?
   - Please walk me through what is required to establish a Telehealth clinic. Think about what needs to be done in preparation for the clinic, what happens during the implementation, and what is done afterwards to maintain the clinic.
   - Please describe any lessons you have learned during this Telehealth implementation.
   - Have these lessons been incorporated into current implementation practices? If so, please explain.

5. I would like to understand what Telehealth looks like at your facility.
   - What are your primary tasks as a Facility Telehealth Coordinator?
   - How has Telehealth impacted the way the VA provides health care to patients?
     - E.g. cost, quality, access, satisfaction
   - What are the key differences between Telehealth and traditional health care delivery, if any?
     - Think about employee-patient interactions, employee-employee interactions, the health care delivery processes, procedures that occur before/during/after an encounter.
     - In what ways do you see Telehealth augmenting (e.g. enhancing or supplementing) traditional health care methods?
(3) Facility Telehealth Coordinator (cont.)

- What are the similarities between Telehealth and traditional health care delivery, if any?
  - Think about employee-patient interactions, employee-employee interactions, the health care delivery processes, procedures that occur before/during/after an encounter.
  - In what ways do you see Telehealth replacing traditional methods in health care delivery?
- Please describe how health care delivery at your facility has benefited from Telehealth, if at all.
- Please describe any barriers that currently hinder the use of Telehealth.
  - Are these being addressed? If so, how?
- Do you feel the benefits of Telehealth outweigh the challenges?

6. I would now like to ask you about any Telehealth training you may have received. Have you completed any Telehealth specific training?
- If so, please describe any formal training you received in preparation for your role in Telehealth.
  - What were the main components of this training? (I.e. what did you learn?)
  - How did you benefit, if at all, from this training?
- Please describe any informal training you have received in preparation for your role in Telehealth.
  - How was this different from any formal training that you received?
  - How did you benefit, if at all, from this informal training?
- After completing this training, did you feel prepared to head Telehealth implementation at your facility? Please explain.
- What recommendations, if any, would you offer to improve this training?

7. What groups or individuals do you interact with as a Facility Telehealth Coordinator? (Think about the central offices, individuals or groups at the network or regional level, and individuals or groups at the facility level.)
- How do you interact with these groups or individuals?
- How frequently do you interact with them?
- What is the purpose of these interactions?
- How do these interactions impact Telehealth implementation and use of Telehealth at your facility, if at all?

8. Are there any metrics being used to track Telehealth at your facility?
- If so, please describe these metrics.
  - E.g. cost, quality, access, satisfaction.
- How is this information used to improve Telehealth implementation, if at all?
- What is being done to ensure the sustainability of Telehealth?
- How does the VHA measure / track sustainability?
- What do you see are the major effects of large Telehealth expansion on a facility?
9. I am now interested in hearing about how feedback on Telehealth is given and received.
   - How do you provide feedback regarding Telehealth, if any?
   - Who receives your Telehealth feedback, if anyone?
   - Do you know if this feedback is incorporated into Telehealth implementation processes? Please explain.
   - What kind feedback regarding Telehealth do you receive, if any?
   - How, if at all, is this feedback that you receive incorporated into Telehealth implementation?

10. I am now interested in hearing about other implementation rolls-outs that you may have experienced while working at the VA. For example, I have talked to individuals about the PACT model or secure messaging. Can you think of any new policies or directives that have impacted your role in the VA?
    - If so, please describe these roll-outs.
    - How information about these changes were communicated to you.
    - Is there anything that could have been done differently to make this transition easier for you, or others who were impacted by these changes?
    - Do you feel do these roll-outs compare to the way Telehealth is being rolled-out? If so, how? (I.e. what is similar? What is different?)

11. If you were king/queen for a day, what would you like to see done to improve health care delivery to Veterans in the VHA?

12. Would it be ok with you if I contacted you with any follow up questions I may have?
    - If so, how do you prefer I contact you by phone or email?
1. We will begin the interview a little background information:
   - What is your position in the VA?
   - How long have you been working at the VA?
   - Have you held any other positions while at the VA?
     - If so, what were these positions?

2. Before we discuss the details of Telehealth, I would like to get a picture of how Telehealth fits into the mission of the Veterans Health Administration.
   - Please describe the primary objectives of the VHA mission.
   - How does Telehealth support the VHA mission, if at all?
   - How does Telehealth hinder the VHA mission, if at all?

3. I would like to hear about how you were first introduced to Telehealth.
   - How did you get involved with Telehealth?
     - What were you first told about Telehealth?
     - Did you seek any information on your own?
     - What was your initial opinion about Telehealth? (favorable/unfavorable)
   - Do you have any previous experience with Telehealth?
     - If so, please explain.
   - What was your involvement, if any, with the establishment of Telehealth at your facility?

4. Now let’s discuss the implementation of Telehealth into practice.
   - Please describe your role in the establishment of Telehealth at your facility, if any?
   - Please walk me through what is required to establish a Telehealth clinic. Think about what needs to be done in preparation for the clinic, what happens during the implementation, and what is done afterwards to maintain the clinic.
   - Please describe any lessons you have learned during this Telehealth implementation.
   - Have these lessons been incorporated into current implementation practices? If so, please explain.

5. I would now like to learn about what Telehealth looks like at your facility.
   - What are your primary tasks as a Telehealth technician?
   - Please walk me through what is required for an encounter. Think about what needs to be done prior to the encounter, what happens during the encounter, and what is done after the encounter.
   - How has Telehealth impacted the way the VA provides health care to patients?
     - E.g. cost, quality, access, satisfaction
   - How do you feel these changes impact the Veterans receiving care from the VHA? Please consider both how the VHA is using Telehealth to provide health care, as well as how Telehealth is being incorporated into the VHA’s health care delivery system.
(4) Telehealth Clinical Technician (cont.)

- What are the key differences between Telehealth and traditional health care delivery, if any?
  - Think about employee-patient interactions. Employee-employee interactions, the health care delivery processes, procedures that occur before/during/after an encounter.
  - In what ways do you see Telehealth augmenting (e.g. enhancing or supplementing) traditional health care methods?
- What are the similarities between Telehealth and traditional health care delivery, if any?
  - Think about employee-patient interactions. Employee-employee interactions, the health care delivery processes, procedures that occur before/during/after an encounter.
  - In what ways do you see Telehealth replacing traditional methods in health care delivery?
- Please describe how health care delivery in your clinic has benefited from Telehealth, if at all.
- Please describe any barriers that currently hinder the use of Telehealth.
  - Are these being addressed? If so, how?
- Do you feel the benefits of Telehealth outweigh the challenges?

6. I would now like to ask you about any Telehealth training you may have received. Have you completed any Telehealth specific training?
  - If so, please describe any formal training you received in preparation for your role in Telehealth.
    - What were the main components of this training? (i.e. what did you learn?)
    - How did you benefit, if at all, from this training?
  - Please describe any informal training you have received in preparation for your role in Telehealth.
    - How was this different from any formal training that you received?
    - How did you benefit, if at all, from this informal training?
  - After completing this training, did you feel prepared to use Telehealth? Please explain.
  - What recommendations, if any, would you offer to improve this training?

7. What groups or individuals do you interact with as a technician? (Think about the central offices, individuals or groups at the network or regional level, and individuals or groups at the facility level.)
  - How do you interact with these groups or individuals?
  - How frequently do you interact with them?
  - What is the purpose of these interactions?
  - How do these interactions impact Telehealth implementation and use of Telehealth at your facility, if at all?
8. I am now interested in hearing about how feedback on Telehealth is given and received.
   - How do you provide feedback regarding Telehealth, if any?
   - Who receives your Telehealth feedback, if anyone?
   - Do you know if this feedback is incorporated into Telehealth implementation processes? Please explain.
   - What kind feedback regarding Telehealth do you receive, if any?
   - How, if at all, is this feedback that you receive incorporated into Telehealth implementation?

9. I am now interested in hearing about other implementation roll-outs that you may have experienced while working at the VA. For example, I have talked to individuals about the PACT model or secure messaging. Can you think of any new policies or directives that have impacted your role in the VA?
   - If so, please describe these roll-outs.
   - How information about these changes were communicated to you.
   - Is there anything that could have been done differently to make this transition easier for you, or others who were impacted by these changes?
   - Do you feel do these roll-outs compare to the way Telehealth is being rolled-out? If so, how? (I.e. what is similar? What is different?)

10. If you were king/queen for a day, what would you like to see done to improve health care delivery to Veterans in the VHA?

11. Would it be ok with you if I contacted you with any follow up questions I may have?
    - If so, how do you prefer I contact you by phone or email?
(5) VISN Telehealth Lead

1. We will begin the interview a little background information:
   - What is your position in the VA?
   - How long have you been working at the VA?
   - Have you held any other positions while at the VA? (If so, what were these positions?)

2. Before we discuss the details of the Telehealth expansion, I would like to get a picture of how Telehealth fits into the mission of the Veterans Health Administration.
   - Please describe the primary objectives of the VHA mission.
   - How does Telehealth support the VHA mission, if at all?
   - How does Telehealth hinder the VHA mission, if at all?

3. I would like to hear about how you were first introduced to Telehealth.
   - How did you get involved with Telehealth?
     - What were you first told about Telehealth?
     - Did you seek any information on your own?
     - What was your initial opinion about Telehealth? (favorable/unfavorable)
   - Do you have any previous experience with Telehealth? (If so, please explain.)

4. I would now like to learn about what Telehealth looks like throughout VISN 1.
   - How has Telehealth impacted the way the VA provides health care to patients?
     - E.g. cost, quality, access, satisfaction
   - How do you feel these changes impact the Veterans receiving care from the VHA? Please consider both how the VHA is using Telehealth to provide health care, as well as how Telehealth is being incorporated into the VHA’s health care delivery system.
   - What are the key differences between Telehealth and traditional health care delivery, if any?
     - Think about employee-patient interactions, employee-employee interactions, the health care delivery processes, procedures that occur before/during/after an encounter.
     - In what ways do you see Telehealth augmenting (e.g. enhancing or supplementing) traditional health care methods?
   - What are the similarities between Telehealth and traditional health care delivery, if any?
     - Think about employee-patient interactions, employee-employee interactions, the health care delivery processes, procedures that occur before/during/after an encounter.
     - In what ways do you see Telehealth replacing traditional methods in health care delivery?
   - Please describe how health care delivery benefited from the use of Telehealth, if at all.
   - Please describe any barriers that currently hinder the use of Telehealth. (Are these being addressed? If so, how?)
   - Do you feel the benefits of Telehealth outweigh the challenges?
5. I am interested to know more about the Telehealth Expansion Initiative in your network.
   • What is your role in the expansion of Telehealth throughout VISN 1?
   • Please walk me through what is required to support a facility administering Telehealth. Think about what needs to be done in preparation for Telehealth use, during the implementation, and afterwards to maintain Telehealth programs.
   • Please describe any lessons you have learned during this Telehealth implementation.
   • Have these lessons been incorporated into current implementation practices? If so, please explain.

6. I would now like to ask you about any Telehealth training you may have received. Have you completed any Telehealth specific training?
   • If so, please describe any formal training you received in preparation for your role in Telehealth.
     - What were the main components of this training? (I.e. what did you learn?)
     - How did you benefit, if at all, from this training?
   • Please describe any informal training you have received in preparation for your role in Telehealth.
     - How was this different from any formal training that you received?
     - How did you benefit, if at all, from this informal training?
   • After completing this training, did you feel prepared to head Telehealth implementation at a network level? Please explain.
   • What recommendations, if any, would you offer to improve this training?

7. What groups or individuals do you interact with as the VISN 1 Telehealth Lead? (Think about the central offices, individuals or groups at the network or regional level, and individuals or groups at the facility level.)
   • How do you interact with these groups or individuals?
   • How frequently do you interact with them?
   • What is the purpose of these interactions?
   • Please describe how Telehealth has impacted these interactions, if at all.
     - Was this change anticipated?
   • How do these interactions impact Telehealth implementation and use throughout your network, if at all?

8. Are there any metrics are being used to track the Telehealth expansion in your VISN?
   • If so, please describe these metrics.
     - E.g. cost, quality, access, satisfaction.
   • How is this information used to improve Telehealth implementation, if at all?
   • What is being done to ensure the sustainability of Telehealth?
   • How does the VHA measure / track sustainability?
   • What do you see are the major effects of large Telehealth expansion on the network?
9. I am now interested in hearing about how feedback on Telehealth is given and received.
   • How do you provide feedback regarding Telehealth, if any?
   • Who receives your Telehealth feedback, if anyone?
   • Do you know if this feedback is incorporated into Telehealth implementation processes? Please explain.
   • What kind feedback regarding Telehealth do you receive, if any?
   • How, if at all, is this feedback that you receive incorporated into Telehealth implementation?

10. I am now interested in hearing about other implementation roll-outs that you may have experienced while working at the VA. For example, I have talked to individuals about the PACT model or secure messaging. Can you think of any new policies or directives that have impacted your role in the VA?
   • If so, please describe these roll-outs.
   • How information about these changes were communicated to you.
   • Is there anything that could have been done differently to make this transition easier for you, or others who were impacted by these changes?
   • Do you feel do these roll-outs compare to the way Telehealth is being rolled-out? If so, how? (I.e. what is similar? What is different?)

11. If you were king/queen for a day, what would you like to see done to improve health care delivery to Veterans in the VHA?

12. Would it be ok with you if I contacted you with any follow up questions I may have?
   • If so, how do you prefer I contact you by phone or email?
(6) Supporting Offices

1. We will begin the interview a little background information:
   - What is your position in the VA?
   - How long have you been working at the VA?
   - Have you held any other positions while at the VA?
     - If so, what were these positions?

2. Before we discuss the details of the Telehealth expansion, I would like to get a picture of how Telehealth fits into the mission of the Veterans Health Administration.
   - Please describe the primary objectives of the VHA mission.
   - How does Telehealth support the VHA mission, if at all?
   - How does Telehealth hinder the VHA mission, if at all?
   - How has Telehealth impacted the way the VA provides health care to patients?
     - E.g. cost, quality, access, satisfaction
   - How do you feel these changes impact the Veterans receiving care from the VHA?
     Please consider both how the VHA is using Telehealth to provide health care, as well as how Telehealth is being incorporated into the VHA's health care delivery system.

3. What groups or individuals do you interact with regarding Telehealth? (Think about central offices, individuals or groups at the network or regional level, and individuals or groups at the facility level.)
   - How do you interact with these groups or individuals?
   - How frequently do you interact with them?
   - What is the purpose of these interactions?
   - How do these interactions impact Telehealth implementation and use of Telehealth at your facility, if at all?

4. The next few questions will be looking at the Telehealth expansion and any impact it may have on the [OFFICE NAME].
   - First, what is the mission of your office?
   - How does the Telehealth expansion align with the objectives of this office, if at all?
   - How does the Telehealth expansion conflict with the objectives of this office, if at all?
   - Please describe the support, if any, that your office provides for Telehealth at the network level.
   - Please describe the support, if any, that your office provides for Telehealth at the facility level.
   - How has your office been involved with the Telehealth expansion?

5. I am interested in hearing about other implementation rolls-outs that you may have experienced while working at the VA. For example, I have talked to individuals about the PACT model or secure messaging. Can you think of any new policies or directives that have impacted your role in the VA?
(6) Supporting Offices (cont.)

- If so, please describe these roll-outs.
- How information about these changes were communicated to you.
- Is there anything that could have been done differently to make this transition easier for you, or others who were impacted by these changes?
- Do you feel do these roll-outs compare to the way Telehealth is being rolled-out? If so, how? (I.e. what is similar? What is different?)

6. If you were king/queen for a day, what would you like to see done to improve health care delivery to Veterans in the VHA?

7. Would it be ok with you if I contacted you with any follow up questions I may have?
   - If so, how do you prefer I contact you by phone or email?