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Exploration of EHR Implementation Strategies: A Qualitative Study

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Walden University
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Abstract

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Abstract

Electronic health record system implementations have a high failure rate when properly developed strategies are not used. These implementation failures affect healthcare workers' and practitioners' core roles through a lack of documentation practices, which decreases the quality of the care of the patients. Grounded in the technology acceptance model, the purpose of this qualitative multiple case study was to explore the strategies information technology systems engineers use for the implementation of Health Information Management Systems. The participants were 10 information technology systems engineers from three healthcare organizations in the greater Tennessee area. The data were collected through recorded participant interviews and document collection. Thematic analysis was used to analyze, and report patterns, and develop emerging themes in the data. Key findings included (1) implementation strategies encompassing communication, system development lifecycle practices, and stakeholder buy-in; (2) technology acceptance encompassing the importance of health information management systems, future implementation strategy trends, perceived ease of use and perceived usefulness of the system, and stakeholder buy-in. A key recommendation is that information technology system engineers develop and follow system development lifecycle practices that provide enhanced technology adoption rates through uniform structured implementation processes. The implications for positive social change include the potential for improved patient care and cost reductions for patients due to healthcare charting practices' automation.

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Dedication

I want to dedicate this doctoral research process and eventual finality to my wonderful wife and family who provided an environment conducive to my successful progression through this research process. I also want to dedicate this to God, for he is the one who has provided me with unwavering confidence in my abilities to complete this doctoral research.

Acknowledgments

I want to acknowledge several individuals who were integral in the successful completion of my DIT doctoral research process. My wife, family, and God are the three main points of acknowledgment, but other individuals including Dr. Charlie Shao, Dr. Steven Case, and Dr. Jon McKeeby who played a central role in my understanding and inevitable completion of the doctoral research process. I have learned and attained a better understanding of the process of scholarly inquiry and the importance of continuing the conversation along these lines. Please know of my sincere gratitude for every one of your contributions to my success.

Table of Contents

List of Tables

List of Figures

Section 1: Foundation of the Study

Background of the Problem

Electronic Health Records (EHR) are the predominant form of patient documentation used in the clinical setting. The times when everything regarding patient health information (PHI) were documented using pen and paper are being replaced with the use of Health Information Technology (HIT). These advances have proven worthy through the increase in quality of patient-centered care and the efficiency gains garnered using EHR technologies. These gains within the healthcare setting have been marginal due to the lack of stakeholder interest in these technologies. The process of implementing an enterprise-grade EHR system is no small task and requires multiple stages of planning among numerous stakeholders. These processes, if not thought through properly, are destined for failure, and failure is a bitter pill for organizations to swallow, considering the financial risks involved in a systemic crash of this size.

Change control processes are a required component for organizations undertaking an implementation project of this magnitude. Change control is the process of alerting all affected stakeholders on the potential downtime and impacts to workflow regarding an applicable event. The ability to successfully implement EHR systems requires a multi-faceted approach to planning and staging of people and resources. It is these dynamics being investigated within this doctoral study. The literature discussed multiple reasons for why stakeholders have a passive or negative view on the adoption of EHR technologies stemming from the failure of these systems to either be adequately implemented or the perception that these systems are convoluted and hard to use. This study was conducted through use of the Technology Acceptance Model (TAM) and its measuring metrics,

including perceived ease of use (PEOU) and perceived usefulness (PU). These two sub-components helped form the interview protocol and allow for a thorough investigation into the successful strategies used during EHR implementation.

Problem Statement

Healthcare organizations have difficulty understanding how best to implement healthcare information management systems (HIMS), which leads to reduced performance, demoralized staff, and increased costs (Ross, Stevenson, Lau, & Murray, 2016). Although corporations invest heavily in information systems (IS), nearly 60-70% of IT implementation projects fail in the healthcare setting (Gursel, Yasar, & Husamettin, 2016). The general IT problem is the lack of strategies for implementing HIMS, which leads to negative impacts on patient-centered care or leads to a deficient patient care experience. The specific IT problem is that some IT systems engineers lack strategies for implementing HIMS that govern EHR.

Purpose Statement

The purpose of this qualitative multiple case study was to explore the strategies used by IT systems engineers for the implementation of HIMS that govern EHR. The specific population for this study included IT systems engineers from three independently owned and operated hospitals or three independently owned and operated regional medical clinics in the greater Tennessee area. The proper implementation of HIMS contributed to positive social change through improved healthcare practices for patients in a clinical setting, allowing for quicker diagnosis, enhanced treatments, and faster recoveries. These improvements may also lead to lower health care costs for patients.

Patient centered care is a primary mission of most healthcare entities. The process of providing enhanced care through automation of electronic charting practices using EHR systems is one of the ways to accomplish this goal. Efficiency gains in charting medical data leads to quicker response time for treatments for diagnostic outcomes of patients, which leads to earlier discharge times. All of these benefits culminate into cost savings for the healthcare provider through shorter hospital stays, allowing for quicker turnaround times for patients. Synchronicity of data allows for all providers of a patient to be on the same page when treating them, and these steps provide a better perception from the patients' point of view. Heightened confidence in your provider allows for word to spread of how well this provider has their processes automated and workflows efficient. These perceptions allow for increased revenue streams as new patients gravitate to the healthcare provider. All of these aspects provide positive social change.

Nature of the Study

I used a qualitative method to conduct this study, which provides thoughtful, in-depth insights into real-world problems from a holistic point of view (Moser & Korstjen, 2017). Qualitative research runs counter to quantitative analysis in that qualitative research is associated with constructivist and naturalistic worldviews, whereas quantitative research ties in with a positivistic paradigm and is more numbers- and hypothesis-driven (Moser & Korstjen, 2017). Quantitative approaches do not fit with this research study because this research method investigates strategies that are successful in training informatics personnel on newly implemented health IS. The data that will be gleaned from this doctoral study will not be numerically driven due to the nature of this study. Mixed method studies offer approaches for assessing and addressing different

processes that affect the implementation of evidence-based interventions (Green, Duan, Gibbons, Hoagwood, & Palinkas, 2015). Mixed method approaches do not fit the framework for my doctoral study due to the qualitative approach used and the fact that no open processes are employed during the collection and analysis of numerical data.

Case study design concepts fit my doctoral study by affording me the ability to research real-life problems in the context of the environment they inhabit (Ridder, 2017). Health information systems provide a lifeline to patients and provide an understanding of successful strategies that help informatics personnel function adequately in their health care roles when interfacing with this technology. The other qualitative research designs, including ethnographic, phenomenological, and narrative research, do not fit my study. Ethnography is used to research a topic from a cultural or ethnic perspective, which focuses on patterns of behavior and attitudes within that culture (Kruth, 2015). Ethnographic research does not fit the scope of my research because nothing is being studied from a cultural perspective. Phenomenological designs are used to study a situation or experience. There are many different variants of this mode of inquiry, but they all focus on one aspect: the essence of the experience under study (Kruth, 2015). This form of question does not fit this scope due to the nature of the topic of research and its focus on real-world problems. Narrative research designs deal with researching a topic through storytelling by identifying significant events and placing them in a chronological relation (Kruth, 2015). This form of inquiry does not fit this scope of study because my intent is not to tell a story but to research strategies used for successful training of informatics personnel on newly implemented health information systems.

Research Question

What are the strategies used by IT systems engineers when implementing HIMS that govern EHR?

Initial Probing Questions:

1. What can you tell me about yourself?
2. What major of study is your degree in, and what certifications relevant to your field of work do currently hold?
3. What are your current roles and responsibilities at your current place of employment?
4. What experience have you developed regarding the implementation of EHR systems?
5. Please describe your interest in Health Information Management Systems and their importance to you?
6. Based on your degree and work experience, what types of HIMS training in the healthcare field should be offered?
7. What are the reasons you chose these types of HIMS training from the previous question?

Targeted Concept Questions:

1. Based on your remarks to question four, can you describe precisely what role you played in the current EHR implementation?
2. In your professional opinion, what strategies were utilized to implement and maintain the current EHR environment successfully?

3. In your professional opinion, at what level of the organization (i.e., management, operational, or technical decision-makers) do the strategies for implementing successful EHR systems take hold?

4. What were the design methodologies used for the current implementation of the EHR system?

5. What obstacles were faced when these design methodologies were utilized for the current EHR system?

6. How could these design methods have been altered to increase the success and efficiency of the current EHR system?

7. What strategies have you found more success in their application then you did others relating to the implementation of the current EHR system?

8. How were these identified strategies utilized during the implementation of the current EHR system?

9. What are some additional insights gained through the use of these identified strategies asked in question 7?

Targeted Follow-up Questions:

1. In your professional opinion, once the EHR system was successfully implemented, what strategies were utilized for successful maintenance and daily usage?

2. What types of policies would you recommend, which would solidify the successful continuation of the current EHR system relative to future system upgrades?

3. To help promote a positive social change in healthcare, what do you see as beneficial with strategies for training healthcare personnel on the new EHR system and enhancing the perceived usefulness and PEOU of the current EHR system?

4. How do you see the landscape of Healthcare Technology as it relates to strategies going forward pertinent to future EHR implementations?

Wrap-up Question:

What additional thoughts or input do you have, which might be beneficial to this study?

Theoretical or Conceptual Framework

This study used TAM as a foundational basis of inquiry for this doctoral research. TAM is a conceptual framework used for explaining the acceptance of IT or IS (Weerasinghe & Hindagolla, 2017). The underlying aspects about the implementation of EHR systems grounded on the successful adoption and acceptance for the need of such systems are the basic tenets for why TAM is a uniquely qualified fit as my conceptual framework. TAM was developed in the early 1980s following concerns that workers and other personnel were not using IT available to them (Holden & Karsh, 2010). The TAM theory is derived from the Theory of Reasoned Action (TRA), which is a general psychology/behavioral theory (Holden & Karsh, 2010). This theory proved useful for understanding behaviors like voting and exercise (Holden & Karsh, 2010). The theorists that developed TAM included Richard P. Bagozzi, Fred D. Davis, and Paul R. Warshaw. This theory is the preeminent model for understanding beliefs, attitudes, and intentions, which are essential factors in the adoption of computer technologies (Bagozzi, Davis, & Warshaw, 1992). TAM theorizes that two belief variables, PEOU and PU, are the main behavioral intentions behind the use of new technology (Weerasinghe & Hindagolla, 2017). The flowchart in Figure 1 provides a detailed depiction of the latest revision of the TAM model.

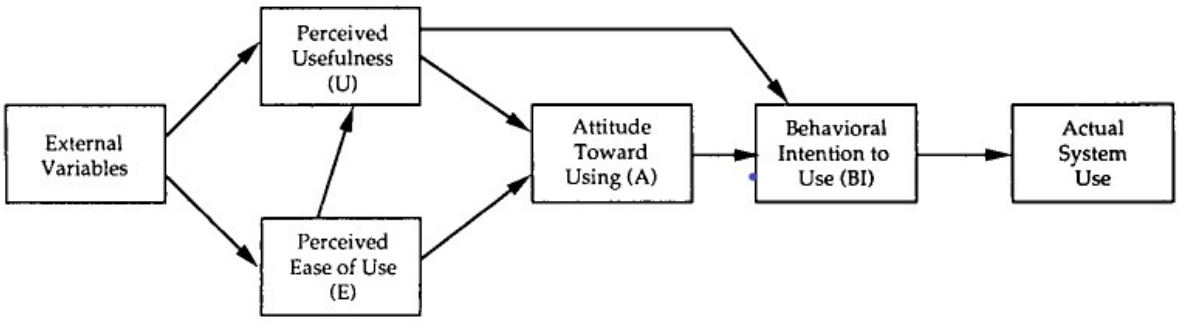

Figure 1. Final revision of technology acceptance model in 1989. Reprinted from User Acceptance of Computer Technology: A Comparison of Two Theoretical Models* by R. Bagozzi, F. Davis, & P. Warshaw, 1989, Management Science, p. 985. Copyright 1989, by INFORMS, all rights reserved. Permission to use Figure was granted by R. Bagozzi.

TAM is used in healthcare studies to gauge physicians' acceptance and use of IT-centric technologies in the clinical setting (Holden & Karsh, 2010). EHR implementations require a significant commitment, both in resources and workforce. Implementation is challenging to accomplish due to the lack of understanding of how best to adopt these systems, which leads to reduced performance, demoralized staff, and increased costs (Ross et al., 2016). The ability to implement EHR systems in a clinical setting must include a thorough understanding of why these systems are viable and how they are fully implemented. TAM provides the guidelines for researching these parameters in a clinical setting with PEOU and PU, respectively. PEOU stipulates that the ability to perform and appropriately use technology in healthcare and relies on the clinical staffs understanding of the system and how it works. PU stipulates the usability of the healthcare system and provides metrics which help in gauging clinical staffs' mindsets relative to PU. The PEOU and PU guidelines used in TAM allowed for the formulation of interview questions which would provide relevant data to draw proper conclusions. These interview questions were posited through individual interviews. TAM

delivers the framework for question development while PEOU and PU are the influencers of how the questions were developed under TAM. These metrics offer a sound basis for how and why TAM is an acceptable model for this study's conceptual framework.

Definition of Terms

Health Information Management (HIM): This system is defined as the management of the acquisition, organization, retrieval, and dissemination of health-based information (Mouton Dorey, 2016). This system would be equivalent to a centralized management console, governs patient data.

Electronic Health Record: Electronic Health Records (EHR) have been described as medical information systems that provide legibly, current, and organized patient health records, which improve coordination and care among healthcare providers (Hawley, Hepworth, Jackson, & Wilkinson, 2017). EHR are a collective repository of patient health data that encapsulates labs, appointments, prescriptions, medical billing, and any other patient-relevant marker.

Technology Acceptance Model: The Technology Acceptance Model (TAM) is used for developing theoretical frameworks and is composed of four constructs, including PEOU, PU, attitudes, and actual behaviors (Deslonde & Becerra, 2018). This methodology provides the foundation for numerous studies about what motivates the user to adopt certain technologies.

Health Information Technology: Health Information Technology (HIT) is designed to support information sharing between providers, navigators, and patients to improve patient care (Haque, Ebron, Bailey, & Blumenfeld, 2019). HIT are systems that

integrate technologies that provide the foundation for healthcare information dissemination.

Perceived Ease of Use: Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) are essential factors that contribute to a user's acceptance of mobile learning systems (Almasri, 2018). PEOU is one of the two main determinates within the TAM protocol.

Perceived Usefulness: The benefits and sustainable advantage of shopping online are characterized as perceived usefulness (PU; Moslehpour, Pham, Wing-Keung, & Bilgicli, 2018). PU is one of the two main determinates within the TAM protocol.

Electronic Medical Record: Electronic Medical Records (EMR) are used for purposes that facilitate information from within the EMR to promote an automated process for learning high-quality knowledge bases linking diseases and symptoms (Rotmensch, Halpern, Tlimat, Horng, & Sontag, 2017). An EMR is a subset of an electronic health record that provides details about PHI.

Patient-Centered Care: Patient-Centered Care (PCC) is referred to as healthcare, which can cater to patient needs (Zhou, Bai, Gao, Zhou, & Ma, 2018). PCC is the process of putting the patient's care and needs first and foremost within the clinical setting.

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions are required components in doctoral research, and often are beliefs within the proposed study that is necessary, but cannot be proven (Simon & Goes, 2013). This study's assumptions include: EHR systems continue to be relevant to the ongoing improvements in the healthcare field, patient-centered care has become higher quality and more streamlined with the implementation of EHR systems, and user acceptance of this technology has vastly improved as time and innovations progress.

Limitations

Limitations within doctoral research focus commonly on internal and external validity. Internal validity addresses the study's rigor, and external validity focuses on the applicability of the findings (Connelly, 2013). This study's limitations included a narrow scope of resources to pull from for participant recruitment, time constraints for scheduling access to participants, scheduling issues regarding study progress completion around daily requirements like work and home life, and the inability to add participants after the fact once the study starts due to limitation of participant pools.

Delimitations

Delimitations are characteristics that limit the study's scope and define the boundaries for doctoral research (Simon, 2011). This study's delimitations restricted the survey to three independently owned and operated hospitals and/or three independently owned and operated regional medical clinics in the greater Tennessee area, drawing participants from within the perspective hospitals' IT departments with specific knowledge about EHR implementations, using data triangulation methods to ensure study

rigor, and providing open-ended questions and transcript review analysis for data saturation purposes.

Significance of the Study

The importance of this study provided needed data and outcomes to the ongoing conversation related to the implementations of EHRs. Exploring the strategies behind EHR systems that were implemented and worked enhanced the value of the system and gave credence to the strategy employed for proper functioning and adoption. This study provided added evidence promoting value to IT practice including improved patient care, increased patient participation, improved care coordination, enhanced diagnostics and patient outcomes, and improved efficiency and cost factors in healthcare practices (“ Benefits of EHRs” , 2017).

The social impacts provided by this study’s outcomes included improved patient care experiences, enhanced patient treatment and diagnostic tracking, and perceived and realized cost reductions due to the automation of healthcare charting practices. These factors provided improved efficiencies in healthcare workflow practices, which allowed healthcare personnel more flexibilities for providing added services and benefits to patients due to streamlined system processes. Seventy-one percent of physicians state, they would be more inclined to use HIT if the EHRs could provide additional insights unique to their patients (James, 2017).

A Review of the Professional and Academic Literature

There are three main areas covered in this literature review including the challenges facing organizations with design and implementation of EHR systems, the roles individuals filled concerning the design and implementation process, and the use of

TAM as the conceptual framework as it relates to technology adoption relative to the PEOU and PU constructs within EHR design and implementation processes.

The search for sources used in this review of the academic literature included journal articles and other scholarly articles from multiple digital repositories. I used Google Scholar, ProQuest Central, and EBSCOHost as the primary sources for references utilized within this literature review. The criteria used for cataloging research references for this review of the academic literature included using Boolean search techniques with terms like electronic health records, implementation, strategies, TAM, limitations, benefits, and HIT. There is a master index in the form of an Excel spreadsheet that houses this data.

The scope of my reference searches relied heavily on the requirements for meeting the minimum constraints of 85 percent of articles being within five years, and peer reviewed. 76 out of 141 sources were used as material for the literature review. 74 of those 76 sources were within five years old and peer-reviewed articles. One source was outside the 5-year window and was peer-reviewed, and the ultimate source had no date code and was not peer-reviewed. 53.9 percent of the total sources were utilized for this literature review, and the predominant reasons for the remaining sources not being used included duplication issues, and topics were not relevant to the topic being discussed. 97.3 percent of the utilized articles met the requirements of being peer-reviewed and within five years published. The strategies used for searching for articles evolved over time and initially started with searches on EHR implementations and proceeded to searches on strategies and motivations related to EHR implementation. The focus shifted

to looking for TAM related articles to provide needed breadth to the research design and conceptual framework.

The goal of the review of the academic literature is to synthesize multiple sources into cohesive writing that provides the reader with the needed breadth to further understand the dynamics used to promote the importance of doctoral research. This review of the academic and professional literature will provide the details required to drive home two principles, including the understanding of scholarly inquiry and the importance TAM has on future implications surrounding the EHR adoption process.

The primary focus in the first part of this literature review involves setting the context on the processes involved in EHR design and implementation. The ability to clarify to the reader the challenges and obstacles involved when implementing an EHR system of this size will help in their understanding of the importance of the TAM models' components with how they relate to user adoption and acceptance of this technology. The first section will illustrate the idea of what EHR systems are about and the technology that corresponds with this system to ensure proper functionality. The understanding of the purpose of the study is mentioned below for clarity of meaning behind the review of the academic literature.

The purpose of this qualitative multiple case study is to explore the strategies used by IT systems engineers for the implementation of HIMS that govern EHR. The specific population for this study will include IT systems engineers from three hospitals or three regional medical clinics in the greater Tennessee area. The proper implementation of HIMS may contribute to social change through improved healthcare practices for patients in a clinical setting allowing for quicker diagnosis, enhanced treatments, and faster

recoveries. These improvements may also lead to lower health care costs for patients. This purpose statement sets the groundwork for understanding the importance of HIT adoption.

Technology Acceptance Model

The TAM framework is based on theories that state if a device is useful and once implemented, provides a user-friendly interface then most end-users will embrace that resource. Acceptance of technology is an essential indicator of the successful implementation of technology (Hariwibowo, 2017). The fundamental aspects surrounding TAM allow for PEOU and PU to be the primary gauge used in scholarly inquiry as it pertains to technology acceptance. These metrics highlight the importance of the organizational environment, stakeholder interest, and work practices for Information Systems (IS) implementation efforts (Klecun, 2017). The different aspects related to TAM require further clarification allowing the reader further comprehension of the importance of TAM theory.

Technology has become the predominant link to how the world operates and business is conducted globally through Information Technology (IT) infrastructure. The different aspects of technology have definitive benefits and drawbacks, and these are the metrics end-users gauge to make decisions on the use of this technology. The Technology Acceptance Model (TAM) dated to 1986 when the concept was initially proposed, and TAM has proven to be the theoretical model of choice for predicting and explaining user behavior of IT (Ibrahim, 2018). The TAM concept is designed to utilize PEOU and PU constructs for gauging user acceptance of technology-centric systems. PEOU is the process used by end-users to assess whether a piece of technology is worth the effort

based on the ease of use. PU is the end-user's perception regarding a specific piece of technology based on the technology's usefulness. TAM appears to account for 40 to 50 percent of user acceptance (Ibrahim, 2018). TAM is one of the influential extensions governing the Theory of Reasoned Actions (TRA) which completes the third piece to the technology acceptance framework. The predominant elements of TAM provide researchers a flexible course of action to accurately assess and catalog study findings for a better understanding surrounding technology adoption.

TAM elements. The TAM model is a concept used in a scholarly inquiry that provides the tools needed to gauge user acceptance of different technologies accurately. The use of the subsets of this model allows for a multi-faceted approach to measuring the acceptance of technologies dependent on the variables in play relating to the newly implemented technology. PEOU and PU of technology are the essential elements of TAM that influence the intentions to use different technology (Young, Park, & Lim, 2018). TAM was derived from other concepts within scholarly inquiry that relate to technology adoption. TAM was developed on the foundations of the TRA framework and reflected the fact that the actual use of new technologies is entirely dependent on the user's attitude of the latest technologies (Matikiti, Mpinganjira, & Roberts-Lombard, 2018). This concept is the primary construct that defines the two components derived from PEOU and PU, respectively.

The fact PEOU and PU are the two primary elements of TAM does not mean that TAM theory is not an evolving framework. Multiple individuals feel that TAM should be enhanced by introducing additional variables in the context of Information Communication Technology (ICT) related to transformation (Siegel, Acharya, & Silvo,

2017). The use of motivation modeling is a premise that carefully ties into the elements related to TAM. A user's motivations provide a useful metric for gauging one's attitudes to the use of new technologies. Motivational measurements and strategies were used to adapt and overcome initial resistance within an organization to more modern techniques (Siegel et al., 2017).

The elements discussed related to TAM including PEOU and PU provide the foundational aspects that govern the TAM framework, but there are supporting theories that are included within the TAM umbrella including Diffusion of Innovation (DOI) theory and TRA. These two theories, along with TAM principles, provide a broad-based understanding of the whole technology adoption concept. These supporting theories are discussed in the following section.

TAM theory application in various fields. TAM is not exclusive to the healthcare field and provides needed research tools for other areas of industry. Education and library sciences are also domains where TAM theory is applied, allowing for a diverse set of criteria that helps hone the study of technology adoption (Weerasinghe & Hindagolla, 2017). Healthcare, education, and library information systems/sciences provide the predominant areas where TAM principles are widely used because information technology (IT) is centric to daily workflow processes in these fields. The application of TAM theory across multiple domains helps to supplant the idea that it is a fundamental tool required to adequately gauge the adoption of different technologies according to the strategies used to implement those technologies. Education provides an example where TAM principles are used to measure the acceptance of technology as it pertains to student testing and other educational processes like school computer labs.

These labs provide course-related technologies which help with student retention of core curriculum taught within the given school system. The ability to gauge the student's interest and assess the faculty and staff's acceptance of these technologies helps to home in on the best working technologies that increase student learning and workflow efficiencies for faculty and staff. There are other areas where TAM is being applied and measured like online shopping. Mobile technologies are becoming central to grocery delivery to residential areas in parts of India (Shukla & Sharma, 2018). The ability to shop online through mobile technologies provides the consumer with convenient and flexible means to procure groceries, but the backend processes and infrastructure must be appropriately implemented, and these metrics have various impacts on TAM principles related to these technologies supporting this area of business. The application of TAM and TRA within the field of e-commerce will provide essential data regarding consumer sentiment towards the use of this conduit for ordering groceries online and the applicable delivery mechanisms (Shukla & Sharma, 2018). The various industries require the use of information technologies to help meet the daily needs of the respective mission statements governing the different business models. The application of TAM principles allows for researchers to help provide data from studies that form themes giving the separate workforce tools to use to increase financial, operational, and organizational outcomes.

Technology adoption practices among healthcare personnel vary based on the systems in use supporting patientcare and other health-based activities. The predominant system used in the current healthcare setting is electronic health records and the systems that support the storage, security, and dissemination of patient health information (PHI).

How these EHR systems are implemented directly relates to how the technology is seen and adopted by the end users of the applicable systems. PEOU and actual system usage (SU) are two predominant constructs tied to TAM that translate into metrics used for determining end-user adoption practices. A study that uses TAM as its primary guide for research states that PEOU and SU were moderately strong in their correlation within the adoption of electronic advance directives (AD) forms in the EHR (Folarinde, Alexander, Galambos, Wakefield, & Vogelsmeier, 2019). These constructs including PEOU, PU, SU, and behavioral intention (BI) all provide metrics researchers can use to determine why adoption rates for EHR systems are low and how these results are tied into poorly developed EHR implementation strategies. The other study that directly relates to EHR adoption rates pertains to an EHR-based community health measures using PU as the primary construct that is independent of the broader TAM framework as it relates to EHR integration as a community-based measure (Comer, Gibson, Zou, Rosenman, & Dixon, 2018). The TAM determinants listed above are the foundational pieces that govern this research study and will be the sole metrics used for driving the conceptual framework of this study.

TAM supporting theories. Numerous studies have been conducted that link behavioral intent to actual system use (Mardiana, Tjakraatmadja, & Aprianingsih, 2015). These concepts that underpin the framework of the TAM theory involves multiple components and requires a definitive explanation to provide clarity to the reader of the use of TAM and the nuances that surround the whole framework. The TAM framework includes the Diffusion of Innovation Model, the Technology Acceptance Model, and the Theory of Reasoned Actions (Mugo, Njagi, Chemwei, & Motanya, 2017). These three

theories are the primary constructs that drive to search for knowledge of what drives end-users to adopt certain technologies and to shy away from other technologies.

Diffusion of innovation theory. DOI theory dated to 1903 when it was introduced by a French sociologist named Gabriel Tarde (Kaminski, 2011). The s-curve for diffusion was designed and presented as the underpinning of this theory. This theory is based on the process by which people adopt new technologies, ideas, products, practice, and philosophy (Kaminski, 2011). The concept that surrounds the diffusion of innovation theory states the s curve translates different human behaviors into actionable responses of end-users that can be plotted on a chart giving rise to the s curve concept. Five groupings are part of the diffusion of innovation theory which includes innovators, early adopters, early majority, late majority, and laggards (Kaminski, 2011). Innovators are individuals who are technology enthusiasts that fuel their drive with all things new from a technology perspective. Early adopters are known to lead the opinions of new concepts and are trendsetters in their respective fields. Old majority of individuals are very opinionated relating to current trends and ideas and are known to seek out direct contact deliberately. Late majority of individuals shy away from technology and only respond when pressured by their peers. Laggards are individuals that are suspicious of innovations and supplant their reasoning in the aspects of the past. These groups are the foundational aspects related to the diffusion of innovation theory and comprise one part of the Technology Acceptance framework.

Theory of reasoned action. The TRA is a concept that encapsulates numerous related ideas and hypothesis postulated by social psychologists to understand and predict human behavior (Otieno, Liyayla, & Odongo, 2015). These behavioral judgments are

guided by constructs that also help create the frameworks relative to the other two theories diffusion of innovation and the technology acceptance model. These three concepts are intertwined and overlap in their design and implementation throughout the research process. TRA assumes that human beings behave sensibly, and this process entails the taking in of information and framing the narrative based on the data for humans to consider the implications of their actions (Otieno et al., 2015). The predominant take away is that there are human behavioral patterns that have immediate impacts based on the decision's human make in a moment notice. These decisions are founded in the intake of information from a litany of sources, including visual, auditory, and printed materials.

TAM theory comparisons. DOI theory is designed to explain how the spread of new concepts and ideas about technology development. The prospect of the diffusion or spread of technical innovations throughout an organization can enhance end-user adoption rates of technology if the dissemination of information regarding the tech is appropriately described and clarified. Three variables within DOI explain diffusion processes or the lack thereof, including the attributes of the given innovation, the characteristics of adopters, the broader political or social context (Dearing & Cox, 2018). These three constructs are the descriptors for the equipment, the user, and the environment for which they operate. The attributes the technology holds, and the characteristics of the end-user provide a direct correlation with the constructs within TAM. TAM postulates that end-users base the adoption of technology on two primary components PEOU and PU which relate directly to the technology's attributes and the end user's perception of the usefulness of said technology. TAM is comprised of four

constructs PEOU, PU, attitudes, and actual behavior, and these constructs provide the foundational underpinnings for research related to technology adoption (Deslonde & Becerra, 2018). TAM is known as the influential extension for TRA. TRA states that attitude and subjective norms are what affect the constructs of performed behavior (Elahe, 2018). All three of these theories have related components and provide overlaps on attitudes towards technology adoption. Each method does provide a definitive research tool that looks at technology adoption through a slightly different lens.

TAM criticisms. TAM is widely accepted as a defacto standard for gauging technology adoption throughout organizations and the world. This does not mean that this theory is without concerns and critiques on sub-components within the structure of the TAM concepts. TAM is proclaimed to predominantly use PEOU and PU for mediating all external variables central to technology adoptions (Brandon-Jones & Kauppi, 2018). These two metrics are only half of the sub-components central to the TAM theory but are the two primary metrics TAM is judged on. The other two variables that are tied to TAM are Behavioral Intentions (BI) and Behavior (B), respectively. BI and B attributes play a support role within the TAM framework relating to PEOU and PU. One of the most enduring criticisms of the TAM theory focuses on the failure to incorporate the various antecedents adequately and explicitly to the higher-order constructs surrounding PEOU and PU, respectively (Brandon-Jones & Kauppi, 2018). There are other critiques relative to TAM stating that the framework relies too much on self-reported data which is prone to misreported information regarding participants attitudes, beliefs, and the scope of their technology use (Gyamfi, 2017).

The TAM framework provides numerous benefits for scholars looking to understand better the motivations of end-users surrounding technology adoption, but there are also concerns that the TAM framework is not a theory that can be used in a lot of environments. According to one article, TAM is not practically applicable to firms, companies, and most organizations like libraries where rules and regulations are the mainstream (Ajibade, 2018). The predominance of the views states that individual use and adoption of technology is better suited for TAM principles (Ajibade, 2018). Other criticisms about the TAM framework abound, as scholars try to assess the excellent points about the TAM theory. Numerous studies base their measurements of TAM findings on users' self-reported amounts of use and short exposures with the applicable technology (Salovaara & Tamminen, n.d.). The concept that end-users are providing details that are not accurate and prone to inaccuracies provides a lack of validity in study findings that one could surmise from the argument stated in the prior statement. The other predominant limitation to the TAM theory is the tendency to examine just one Information System (IS) with a homogenous group relative to one single task at a single point in time (Lee, Kozar, & Larsen, 2003). These are the two most noted criticisms within TAM theory. These provide an excellent base for extrapolating the built-in biases that come with TAM. These are four of the most common critiques regarding the TAM theory framework and give a decent insight into what some of the proposed drawbacks are, and these have given the researcher/reader a holistic view and understanding of the opposite side of the coin concerning TAM. TAM being widely used and accepted for statistically valid data goes a long way in proving its worth, but as with all theory constructs, there are pitfalls and benefits.

Future of TAM. The current landscape of the technology acceptance model provides metrics used to gauge user interest in the adoption of new technology based on two primary principles. These principles are PEOU and PU. Perceived ease of use and perceived usefulness provide enough flexibility to be able to conform to multiple domains of technological application. These metrics, however, pliable and use worthy do factor in the future development of TAM principles. The future development of TAM must include additional variables and exploring boundary conditions where applicable (Marangunic & Granic, 2015). The addition of variables provides added breadth to the validity of the TAM framework and helps construct more complex use cases for added research opportunities. The exploration of boundary conditions points to the need for a holistic approach to the application of TAM principles as it relates to forthcoming technological advances. The other avenues where TAM is showing promise of future use is through the development of additional elements and protocols governing the application of TAM principles. These advances within the TAM framework are also known as extensions. The extension of TAM principles and features makes for a far more robust framework that fits a broader, more diverse technical genre. One extension relates to the CANE model encompassing the user's true motivations surrounding technology acceptance, including importance, interest, and utility (Siegel et al., 2017). These motivations govern the interest level towards technology, the importance of the technology to the individual's daily workflow, and the technologies utility or usefulness. These constructs are some examples of the inner workings of extensions on the existing version of TAM. There will be further manipulations of the TAM principles are newer technologies and uses are invented and utilized.

Health Information Technology Adoption

The inception of EHR has provided healthcare with the necessary tools to improve patient care outcomes and increase profit and efficiency standards throughout the clinical setting. The landscape before the inception of Health Information Technology (HIT) was predominantly paper-based record keeping and lacked efficiency and was prone to errors in the patient medical records. The need for a more efficient system became more evident in the early adoption of HIT. HIT adoption specific to healthcare is imperative to improve patient-centered care and efficient patient charting practices which provide the needed foundation for the importance of EHR systems. The effort of forming a basis for understanding why EHR system implementation is necessary derives from understanding the clinician-patient interaction. The primary concern for any healthcare professional is the health and wellbeing of their patient. Engaged healthcare professionals/consumers are actively engaged in improved healthcare outcomes through care and treatment practices (Murphy-Abdouch, Dolezel, & Mcleod, 2017). These practices need to align with increased patient engagement to improve the quality of patient-centered care. The patient engagement came to be defined as an active partnership between patients, their families, and caregivers working together to improve the delivery of healthcare (Sharma, Knox, Mleczko, & Olayiwola, 2017). The methods for treatment and care practices nowadays differs significantly from earlier times when the clinician/patient dynamic became first introduced to technology-based support. The 1980s provided a rapid increase in the capabilities of computers, which provided a promise for clinical information system development (Frank, 2016). These increased capabilities allowed for the development of new systems capable of storing more

extensive data sets with tools to extrapolate data needed for improved clinical decision-making. These early pioneering efforts of electronic records development were the precursor to bigger and more efficient systems yet to be developed. The concept of HIT was starting to take root, and the realization among clinicians regarding the importance of the development of this term was coming to fruition. The idea of a national health management system which is well organized is recognized as sources of information to inform decision-making about the population's health (Ahuja, Mirzoev, Lund, & Ofori-Atta, 2016). These initial terms are what formed the basis for the systems we have come to use today.

The main drivers for this transition were provided through legislation that earmarked incentivized processes to help with the approval of EHR systems. Besides additional financial efforts for increasing the quality of patient care, another approach utilized was the encouragement of the use of HIT (Cocosila & Archer, 2018). These are some mitigating factors that underscore the importance of migration in the implementation of HIT offerings. The application of Information Systems became realized by the governance process and based on measurable value and benefits as defined by the specific entity (Gotham, Le, Sottolano, & Schmit, 2015). These entities are the federal government and significant healthcare conglomerates that understand the status quo in patient charting and care are no longer acceptable. Over the 25 years, the need for EHR system usage became emphasized within the medical circles, with federal regulations actively recognizing the need for their use (Odom & Willeumier, 2018). These regulations and legislative markers were essential milestones in the creation of and

migration to EHR systems. The principles of technology adoption underscore the importance of EHR system integration in the medical setting.

The core tenets of this discussion revolve around TAM and its sub-components that allow different stakeholders the ability to accept or denounce the applicable technology under consideration. These components within TAM include that PU and PEOU of the given technology predict the intention to use the technology, which subsequently aligns with its actual use (Campbell et al., 2017). The need for a TAM framework allows researchers the infrastructure to gain needed metrics for their proposed study explicitly relating to technology adoption practices. If researchers can hone in on the intrinsic nuances, stakeholders have about the usefulness of a given technology and correlate that with the real ease of use, then the bridge can be built that helps support successful implementation practices. The theoretical viewpoints that IT use being widely researched still tend to catch organizations by surprise who continue to struggle with insufficiently utilizing their IT assets (Ferratt, Pracad, & Dunn, 2018). The idea for the previous statement is to explain the mindset that IT use being widely researched does not necessarily mean that organizations are tapping into that research to help bridge the technological divide encompassing them. The concepts of technology adoption must consider the mindsets of the stakeholders that use the given technology, and the use of technology largely influences their roles.

Health information technology role. Healthcare personnel continuously adapt to the ever-changing clinical landscape. Online health systems are becoming more tailored and diverse in the current healthcare setting; Telecare uses technology with clinical-based protocols for remotely monitoring and supervising patient health statistics enabling

patients to remain at home (Shahrabani & Mizrachi, 2016). This realm of informatics encompasses the roles of nurses, doctors, and HIT to provide streamlined care for patients. HIT is described as information systems, including electronic medical records (EMR), and these systems show improvements for healthcare outcomes (Jawhari, Ludwick, Keenan, Zakus, & Hayward, 2016). The use of informatics is seen in a multitude of practices and processes within the clinical setting, whether inpatient or outpatient, and clinicians and patients utilize online portals, EMR, data collections services, and personal data devices along with email (Sweeney, 2017). These collected tools help to substantiate the need for further technological design and implementation. The implementation of successful healthcare interventions relies on stakeholder engagement at all stages, ranging from assisting and improving acceptability standards towards innovations to the sustainability of those implemented interventions (Salloum, Shenkman, Louviere, & Chambers, 2017). The process of evaluating Health Information Systems (HIS) differ based on the country or region of the globe these healthcare entities reside. Examples of approaches for assessing HIS encompass frameworks and standards for country-based information systems proposals by the health metrics network of the World Health Organization (WHO) which distinguishes six different components: HIS resources, indicators, data sources, data management, information products, and information and use (Flora, Kaseje, & Kaseje, 2017). The central theme of these six components relies on the storage and dissemination of information. Information, also known as data, is a primary component in an implemented EHR system. The criticality of understanding the importance of the migration to EHR systems in healthcare is discussed in the following section, which gives the benefits and criticisms of the use of HIT.

HIT criticisms and benefits. HIT is fundamental to the efficient delivery of high-quality health care; however, many legal and practical constraints impede or otherwise influence the design and implementation of such systems (Otieno, Kaseje, & Kaseje, 2017). These impediments are often regional due to the global geopolitical landscape. The premise here dictates the comprehensive understanding of how these dilemmas influence the development and implementation of EHR systems over time but must encompass the indicators of adoption relative to the TAM. The general approach in the stream of thinking is to invoke an acceptance structure that enhances the effect that user's beliefs have on the use and behavioral mindsets (Doleck, Bazelais, & Lemay, 2018). The prescription of technology acceptance is predominantly made through increases in patient engagement. EHR helps engage patients through patient portals, which negates the filling out of new forms during the clinical visit and allows the patient the ability to view their medical record and lab reports anytime (Aldosari, 2017). These two metrics are cornerstones in the deployment of EHR systems and provide the appropriate justification for the improvements in implementation and design practices of such systems.

In 2010, with the passage of the Affordable Care Act, HIT was identified as an integral part for improving patient care and lowering healthcare cost (Brewster, Scully, Saeed, Chhetri, & Irigoyen, 2016). The primary tenets for the progression towards lower healthcare costs and improved efficient patient-centered care include stakeholder buy-in to the proposed technology implementation, end-user acceptance to systemic technological change, and practical policy development governing pre- and post-implementation practices that help influence technology adoption processes. These

metrics are ones that have a global effect, but when not adequately realized and practiced have negative consequences on adoption rates. An example of this outcome comes from Germany where public health authorities conducted a survey that found that the lack of intersectional communication is a significant obstacle to the delivery of high-quality care for asylum seekers in the fragmented and heterogeneous setting they were in (Jahn et al., 2018). The continuity of communication is one of the fundamental must-haves in any clinical environment that allows for the proper articulation of policy discussion with all applicable entities involved in an EHR implementation. A study conducted in 2014 of approximately 1,000 physicians found that nearly 70 percent stated that implementing an EHR system was not worth doing, even though the government offered up to 27 billion dollars to digitize patient records (Coustasse, Andresen, Schussler, Sowards, & Kimble, 2018). The implementation process for any large-scale project must adhere to some form of framework that encompasses program-based lifecycles. Sustainability is crucial to a program's life cycle, and metrics must include questions like do activities and benefits continue after the first support ends, and what aspects of the design of a program and activities help ensure program support longevity (Moucheraud et al., 2017).

The idea of large-scale implementation projects being unsuccessful provide pause for many in the healthcare arena. The primary issue being with the loss of revenue due to improperly implemented IT resources. Physicians and nurses, along with higher-level decision-makers within a given organization, count on documented successes to use as a framework for potential future implementation projects. The IS literature in this area tends to outline macro-level ideas of IT-led healthcare transformation, or produce macro-level empirical, often qualitative accounts about the implementation and use of IS

(Klecun, 2017). There are fundamental differences relating to IS adoption based on the geographical region where they are taking place. These differences are driven mainly by geopolitical reasons and legislation that the applicable governments write and pass. These mitigating factors lend credence to the importance of proper strategic planning regarding implementation practices.

EHR Implementation Strategies

Strategies for implementing and maintaining a comprehensive EHR system are diverse and eclectic. These strategies are often specific to the area of healthcare that the order is being fulfilled. However, research conducted in primary healthcare settings has brought to light numerous challenges experienced by end-users integrating EHR systems into routine daily use (Matthews, 2017). These challenges are also synonymous with end-user lack of adoption and general hesitancy for these EHR systems. EHR systems can be utilized in multiple areas within healthcare including in individual organizations, as interoperating systems in affiliated healthcare units, and on a regional or national level (Boonstra, Versluis, & Vos, 2014). The importance of using strategies for implementing and maintaining EHR systems that align with core business practices can't be understated. The strategy creation process for EHR implementation must include input and regular updates to stakeholders and end-users to help promote an inclusive environment. This type of close-knit setting allows for a vested interest to grow due to the full transparency of the strategies being developed. One example of a policy that is discussed entails environmental policies tied to EHR implementation and integration and relies on staff manipulating of the workplace environment to facilitate EHR integration supporting the deployment of relational techniques (Matthews, 2017).

The use of implementation strategies, in general, is designed to help enhance the successful outcome of current and future projects. These projects are guided by core principles that are fundamental to the continued success of integration and maintenance of enterprise-level EHR systems. Implementation strategies are defined as methods or techniques that help enhance the adoption, implementation, and sustainability of a clinical program or practice (Rogal, Yakovchenko, Waltz, Powell, & Kirchner, 2017). These clinical programs are the cornerstones for the need for EHR systems and the properly developed strategies which help guide their implementation. These EHR systems that are correctly implemented provide needed records management and other healthcare management functions that promote increased workplace efficiencies, translating into improved patient-centered care. The most important criterion that judges the ultimate success of an IT project is not time-related on time constraints or budget, but whether the system meets the needs of the patients (Collier, 2009). The overarching understanding to take from this is the need for adequately developed strategies and an innate understanding of the pitfalls that come with improperly designed implementation strategies. Understanding the process of EHR strategy development comes from full clarification of the frameworks that underpin strategy development discussed in the following section.

EHR implementation strategy importance. These health delivery networks are becoming commonplace and are mainly due to the passing of federal legislation passed which incentivizes the implementation of EHR systems. There was an increase in EHR adoption due to the 2009 passage of the Health Information Technology for Economic and Clinical Health (HITECH) Act (Miegs & Solomon, 2016). There are guidelines

outlined in this legislation that earmark specific metrics that must be met, and clarification of terms surrounding EHR systems. The Center for Medicare and Medicaid defines EHR systems as electronic versions of a patient's medical history that are maintained by the provider over time and includes all critical administrative, clinical data about the patients care under an advisor (Clemens, Smith, Vanderlinden, & Nealand, 2017). The prospect of having all your health-relevant data in a single location does provide an added benefit for efficient access to patient data. EHR systems are repositories which store patient information accessible by healthcare providers through information and communication technologies and are used for several health-relevant functions (Strudwick, Booth, Bjarnadottir, Collins, & Srivastava, 2017). These health-based functions include patient records, lab results, internal communication with the patient's doctor, and the ability to pay doctor bills through the EHR system. These systems are not industry standard and come with their present functions, so there are no preferred EHR vendors that can be utilized. Physicians employ many factors when deciding to choose or switch EHR vendors, and the reason for change include system functionality, high cost, poor customer service, company reputation, a platform of software, and meaningful use certification (Coustasse et al., 2018). Meaningful use certification is one of the stipulations outlined in the HITECH legislation and has multiple stages to the level of certification.

Any enterprise-grade system provides numerous functionalities but requires substantial infrastructure upgrades or additions to an environment to be able to operate seamlessly. Seamless operations are a misnomer due to system downtimes caused by systemic failures that occur within the suitable operating environment. Downtimes are

often inevitable, and lengthy ones are often catastrophic, so it is essential to have policies, processes, and procedures in place both for the IT staff to recover from the downtime and to ensure the clinical staff continue to provide critical care during these downtimes (Coffey, Postal, Houston, & McKeeby, 2016). The importance of EHR systems has become mainstream over the last several years. Federal mandates have governed the need for centralized management of patient health information (PHI). Compliance with Medicare and Medicaid policies has proliferated the use of EHR systems, but multiple benefits outside of reimbursement and avoidance of penalties also exist for their use (McDowell, Wu, Ehrenfeld, & Urman, 2017). Access and privacy of PHI are governed under the Health Insurance Portability and Accountability Act (HIPAA). The literature shows that patients and physicians are mainly satisfied with the use of EHR systems; however, some patients worry about the loss of confidentiality while some physicians express concerns of the negative connotations of EHR on the patient-physician interaction (Lanier, Dao, Hudelson, Cerutti, & Perron, 2017). The efforts organizations go to provide the mitigation process to help leverage security and privacy to patient data are not surprising due to the numerous federal stipulations encompassed in HIPAA. Ensuring data security and privacy, while overcoming the challenges aligned with linking multiple diverse systems and maintaining infrastructure for repeat use of high-quality data are a few of the difficulties associated with using EHR in a clinical setting (Cowie et al., 2016). The reporting of concerns related to patients' issues surrounding confidentiality of data in EHR systems has increased and the literature states that these concerns about privacy of EHR use in the United States (US) have increased; additionally, where the data in an EHR regarding a patient is currently owned by the

practitioner gathering the information and/or the insurance payer covering the patient (Tavares, 2017).

The literature thus far has stated the basic constructs related to EHR system description and driving forces behind the adoption and use of these systems in a clinical setting. There are, however, other factors that speak to the importance of successfully implemented EHR systems. Decisions are made wholly on the premise of data being gathered and analyzed, so there needs to be a framework in place that improves the efficiency of decision-makers. Such a system is known as a computerized clinical decision support system (CCDSS) which is based on IT principles helping clinicians and patients in making healthcare-based decisions based on patient-specific data (Van de Velde et al., 2016). These decisions are made with financial motives in mind, and this thought process detracts from the overall goal of decision making. Despite apparent support of EHR implementations, there have been steep opposition in the application and perception of EHR by healthcare providers (Wormer, Colavita, Yokeley, Bradley, & Williams, 2015). This type of resistance from clinicians is primarily due to poor decision making during the implementation process.

The critical factors underlying the need for proper implementation practices are directly tied in to support services for the newly implemented EHR systems that are in place throughout the healthcare environment. The main idea is that EHR systems, unlike most business applications require instructional designers, train the trainers, super-users, end-user classroom training, at-the-elbow support, sandboxes or playgrounds, tip sheets, and pocket guides, and clinical help desks (Pope, 2017). These support services must encompass the needed programs and policy dictates that warrant the ability for the

longevity of system processes and practice. The knowledge gained through proper EHR implementation strategies is garnered through the modeled analysis of information leading to the discovery or identification of patterns between different forms of data (Cerra, Pacala, Brandt, & Lutfiyya, 2015). Innate knowledge that is gathered through successful implementation processes provides the needed framework for future system implementation projects. The ability to study these processes and document these findings helps supplant the importance of scholarly inquiry. The understanding of the need for this documentation process is seen as essential through the eyes of doctors and nursing staff. These individuals state there is a need for studying and understanding communication among physicians and nurses in a clinical setting, and identifying the barriers that include poor organizational support, lack of training, and the inadequate provision of ICT for nurses (Cetin, Ergun, Tekindal, Tekindal, & Tekindal, 2015).

The previous discussion relating to knowledge gathering and transfer forms the basis of the understanding for the importance of HIT. The world is notably at a technological crossroads with the central backbone of the global economy being IT centric. Healthcare is no exception to this rule, as all patient-centered processes are evolving to include IT-related resources as the underpinnings for efficient patient-care processes. People may see a system as patient-centered if the policy offers courtesies to participating patients, like sharing progress reports about discoveries made based on the patient's data or submitting a return of the individual research results (Evans, 2017). However, several studies indicate the adoption of HIT remains limited, and healthcare entities that are looking into the adoption of HIT resources face numerous financial, technical, and cultural barriers (Sun & Qu, 2015). These barriers, in some instances, can

be insurmountable, and the study of successful implementation strategies should shed light on ways to navigate these challenging scenarios.

The number of studies that have taken place over the years relating to the unsuccessful efforts for the reformation of policies towards implementation practices of ICT abounds. However, the use of computers from a global perspective is rising exponentially as recognition of the applications for this resource is realized. An example of this trend lies in Ghana where the use of computers is becoming widespread in the Ghanaian educational setting, while the students, especially those in the junior and senior high school, seem ready to embrace this mode of learning, it is not easy to see the similar readiness in teachers (Gyamfi, 2016). The process of technology adoption must be systemic to ensure proper implementation and utilization occur of the identified resources. This metric is not fully realized in the Ghanaian educational setting as depicted in the previous section. The ability to teach our children the need for these types of resources help provide informed decision-makers in future endeavors. The global conglomerates require continuous growth in employee competencies in the modern economy (Kuciapski, 2017). This concept is further realized when high school students see the importance of HIT resources in the workforce. The ability to embrace technology in high schoolers promotes the importance of understanding TAM principles relating to technology adoption. These technology adoption principles correlate with the theories used for EHR strategy creation and are touched on in the following section.

Regardless of the fact, data monitoring and evaluation vastly improved through IT use, data demand and information use for decisions have been mostly negligible among organizational stakeholders (Shiferaw, Zegeye, Assefa, & Yenit, 2017). These trends are

primarily due to the lack of direction and clarity of purpose about the applicable healthcare information system setup. The current systems for administering documentation are fragmented which leads to errors or omissions, lapses in communication, missed nursing care, and inaccuracies in data entry (Citty, Kamel, Garvan, Marlowe, & Westhoff, 2017). All these problems can and will lead to potential issues to organizations both from a legal and reputation standpoint. There is a fine line between successful implementations and failed ones, and these failed projects cost organizations copious amounts of money. That is why a cost-benefit analysis and a feasibility study would be encouraged before implementing a system of this size. The balance between benefit and risk of IT use in healthcare in the coming years is not clear; therefore, improved planning and successful implementation of these technologies, the use of technology forecasting methods are recommended (Hemmat, Ayatollahi, Maleki, & Saghafi, 2017).

Healthcare information systems are considered a fundamental tool for the effective delivery of high-quality healthcare; however, many legal and practical constraints influence the design and implementation of such systems (Flora et al., 2017). These obstacles take finesse and a certain amount of negotiation among stakeholders to move the planning of enterprise-level system implementations along. EHR system implementations involve changes to core organizational processes, and management of these changes is critical to the success of such implementation efforts (Deokar & Sarnikar, 2016). Research studies into implementation processes have been conducted over the last few years, but little is realized regarding successful strategies used in EHR implementations. These strategies are integral to proper implementation practices.

Research into how EMRs are diffused are scarce, and the few earlier studies are mostly descriptive and under-theorized; therefore, giving us opportunities for identifying influential agents that lead to the successful implementation and diffusion of a given innovation (Nath, Hu, & Budge, 2016). EMRs are a subset of EHRs, meaning they are a component within the comprehensive electronic health record which encompasses numerous elements about patient health. A more seamless flow of information within digital-based healthcare infrastructure, created by EHR, incorporate, and leverage digital progress and can transform the way care is delivered and compensated (Aziz & Alsharabasi, 2015). These metrics provide the needed incentives to promote the creation of EHR implementation strategies.

Framework for EHR strategy development. The importance of EHR strategies was discussed in the previous sections, but to be able to fully comprehend the need for adequately developed EHR implementation strategies a comparison across multiple interventions would provide needed clarity to the discussion. The need for an active and purposive approach is required for the translation of research findings into routine clinical care (Perry, Damschroder, Hemler, Woodson, & Ono, 2019). A proactive approach to implementation strategy development that allows for the migration of research finding to the practical application provides for improved performance metrics and increased chances for technology adoption. There are numerous strategies referenced throughout the different interventions including the Consolidated Framework for Implementation Research (CFIR), Promoting Action on Research in Health Services (PARIHS), and Normalization Process Theory (NPT) (Perry et al., 2019). These frameworks provide theoretical structures and are indispensable for developing testable models (Perry et al.,

2019). These processes for implementation strategy development allow for a flexible development process and help healthcare environments adapt to the everchanging clinical landscape.

Consolidated framework for implementation research. CFIR provides a cross-sectional approach to implementation of strategy development in healthcare. CFIR is used to organize data sets per and across time points and assess their influence on the implementation process which results in implementation and service outcomes (Breimaier, Heckermann, Halfens, & Lohrmann, 2015). These assessments help gauge the need for further development of implementation strategies going forward in a clinical setting. CFIR could be demonstrated as a comprehensive framework for guideline implementation in hospital-based nursing practice; however, CFIR does not account for some factors important during the planning phase of an implementation process (Breimaier et al., 2015). The overarching take away is that CFIR has some value in the development of implementation strategies but does not exclusively handle these development processes. The use of CFIR in a project in New Zealand had practical outcomes by allowing for the unpacking and comprehension of the reasons why the implementation of the HealthPathways system was so challenging (Stokes, Tumilty, Doolan-Noble, & Gauld, 2018). This framework allows for research to be conducted for the development of more robust quality improvement interventions for healthcare systems that are being implemented or in the planning stage of implementation.

Promoting action on research in health services. PARIHS is a useful model for examining implementation processes in a healthcare setting about quality improvement interventions and is comprised of three elements including evidence, context, and

facilitation (Ward, Baloh, Zhu, & Stewart, 2017). The three sub-components help in promoting successful implementation processes across the healthcare spectrum. Evidence within this framework provides the needed context for determining successful implementations based on the type of evidence, the receptiveness of the context of the applied proof, and the method of facilitation used in the implementation process (Hutchinson, Wilkinson, Kent, & Harrison, 2012). The entire premise regarding this framework states that the evidence and how it is seen and understood relates to the facilitation of implementation processes leading to successful outcomes. Integrating PARIHS in the clinical or practice setting helps promote the ability to facilitate evidence use at the practice level while integrating four constructs including context, innovation features, individual characteristics, and implementation processes (Laycock, Harvey, Percival, Cunningham, & Bailie, 2018). The attributes of the appropriate intervention are the markers that dictate how these implementation strategies are going to be designed using this framework. The predominant take away from this implementation framework is that the types and amounts of information learned help organizations plan for further refining processes based on the evidence collected through research based on this framework.

Normalization process theory. Developing and evaluating complex interventions within healthcare is integral for improving health and healthcare (Murray et al., 2010). These interventions are designed in part through NPT, which addresses many factors. These factors are needed for successful implementation and integration of the proposed interventions into routine work (Murray et al., 2010). The NPT framework comes comprised of four components: coherence, cognitive participation, collective action, and

reflexive monitoring (West, Brincat, Mercieca, Fsadni, & Rapa, 2018). These four constructs provide the foundational aspects surrounding NPT. Coherence pertains to making sense of the intervention by the people utilizing it, and cognitive participation shows the engagement of a response by the people using it (West et al., 2018). Coherence and cognitive cooperation are related due to the interactive nature of people towards the appropriate intervention.

Collective data is the work undertaken by people to make the intervention function, and reflexive monitoring is the appraisal process people use regarding the response in question (West et al., 2018). The last two components are related to process management and post-assessment processes. NPT is developed around the concept that implementation processes are designed through individuals interacting with interventions through collective behavior marked as necessary through data from empirical studies of implementation processes (May, Cummings, Girling, Bracher, & Mair, 2018). These studies provide needed guidance for the development of stronger implementation strategies through the data used from these same empirical studies.

Strategies for EHR implementation practices. Plans for EHR implementation practices include implementing policies and procedures, communication protocols among groups tied to the implementation process, and proper conforming to some level of a System Development Lifecycle (SDLC). The implementation of an integrated EHR system across the national health service sector remains a key priority due to the potential benefits of improving quality and efficiency of healthcare provision and added support for personalized healthcare (White, Gillgrass, Wood, & Peckham, 2016). The benefits borne out of the EHR movement provide added breadth as to why sound EHR

implementation strategies are required. There are six themes important to proper EHR implementation: communication, system migration, technical equipment, support and training, patient privacy, efficiency, and financial considerations (Calvo-Amodio, Patterson, Smith, & Burns, 2015). The creation of sound strategies are what provide those potential metrics regarding EHR implementations. The four strategies discussed in the following section provides further clarity of their importance.

Implementation policies. Implementation strategies of EHR systems must go through a design process and need to be thoroughly scrutinized to ensure that the effectiveness and accuracy of these policies promote successful outcomes. Thorough vetting of strategy development should take place at all stages within the creation process, including the pre-policy stage, formulation stage, implementation, and post-implementation or evaluation stage (Khan & Rahman, 2017). All these stages are integral to successful strategy creation and when followed to the letter reduced unneeded errors. The nature of effective implementations strategies must align with core business principles and often run astray when those core principles are not fully realized. The advocation for EHR technologies in the healthcare setting becomes imperative due to the innate lack of acceptance towards the implementation of these types of technologies. The fundamental causes for these lapses include the lack of system structures (e.g., integration of e-health systems), which present barriers to the adoption of new technology while in other cases it can cause harm (De Grood, Raissi, Kwon, & Santana, 2016). The implementation process requires a certain level of governance guided by coherent and cohesive policies which provide the framework necessary to move forward with EHR system integration. These policies offer the tenets for how the perception of the viability

of this system will be taken regarding end-user acceptance. This principle proves additional alignment within TAM theory principles.

The use of strategy workshops is one way to enlist multiple stakeholders in the implementation strategy context. Strategy workshops are essential types of strategic episodes designed to suspend the typical structures to reflect on current policies and engage in new strategic conversations (Kryger, 2018). These workshops provide the proper platform for brainstorming among stakeholders on the proper protocols and plans to incorporate into implementation strategy development. The overarching aspect to take from these points is the methodical process needed to formulate implementation strategies that promote successful EHR implementations processes properly. The creation of these processes must integrate the usability and sustainability factors when working with project teams who implement EHR in a healthcare setting. Usability in technological aspects is necessary for optimal interactions with clinicians when interacting with EHR systems as it contributes to better patient outcomes by providing efficient, accurate, complete, and responsive experiences allowing for the clinicians focus to more on the patient and less on the management of technology (Schultz & Hand, 2017). Usability aspects with the EHR are directly aligned with TAM theory principles through PU and PEOU constructs embedded with this theory.

EHR systems in the healthcare setting are extensive and diverse and provide numerous areas where end-users can form opinions on the use of the technology and that can be a good or bad prospect. The predominant concept here is that the perception end-users have towards technology coincides with how well the implementation of the EHR system was planned and executed and is where principles of TAM theory tie into the

aspects of implementation policies. The Canadian government invested 2.1 billion towards the implementation of e-health technologies encompassing Patient Health Records (PHR) in 2001, which drove the expansion in the management of health information (Razmak & Belanger, 2018). Health information has continued to grow in volume and complexity as healthcare organizations move towards efficient patient care processes which integrate technology with daily activities improving healthcare outcomes of patients. These advances in technology require proper implementation policies governing the implementation of these systems into the healthcare infrastructure. Improperly executed implementation policies result in subpar performance metrics of the technology and provide end-users opportunities to form acceptance or rejection of the noted technology.

There are three components involved with implementation policies: people, processes, and technology (Bird, 2017). People are the wildcard in the implementation process due to the individualistic ideals presented with regards to technology acceptance. TAM provides the needed framework to study individual preconceptions towards technology acceptance and how implementation processes play a role in forming that preconception. These preconceptions are the foundation for the PU and PEOU constructs which are embedded within TAM theory.

The prospect of successful EHR implementation strategy creation comes from the foundational principles applied through the utilization of three strategy creation frameworks: CFIR, PARIHS, and NPT. These three methodologies for strategy creation provide different ideologies for creating EHR implementation strategies. CFIR is designed for data organization across time points and provides a multi-faceted approach

which assesses the influence of data on the actual implementation process providing needed clarifications on implementation and service-oriented results. CFIR is recognized as one of the most well operationalized and widely used determinant frameworks, explicitly designed to systematically assess potential determinants in a local setting (Waltz, Powell, Fernandez, Abadie, & Damschroder, 2019). Regional assessments of policies and procedures governing EHR implementation strategies that are existing weighed against the CFIR metric additional honing of failed policies and creation of new more efficient implementation strategies.

A second framework that works in conjunction with implementation policies is PARIHS. Implementation science methods like PARIHS assist organizations in integrating research findings into practice systematically (Hebert, Hancock, & McConnell, 2018). This process allows results regarding implementation strategy to guide the creation process of said policies and procedures. The third framework NPT provides tools to aid in the successful implementation and integration of interventions into routine work (West et al., 2018). NPT ties into implementation policies through the formulation of processes that enhance the successful implementation of interventions that impact routine work like EHR systems. The following sections provide information regarding information and IT governance and why these areas are essential to EHR implementations practices.

Information governance. The need for information is ever expanding in this digital age and requires vast amounts of data storage and security parameters to help secure the access and dissemination of this information to required parties. Healthcare is no exception with regards to the need for this conduit. EHR systems require expansive

amounts of data storage and must be secured properly to adhere to HIPAA standards for information dissemination to patients and other healthcare providers. The prospect of an information lifecycle has governed the creation, use, and maintenance of data since before the proliferation of digital information systems and this aspect ties into information governance which assigns business, legal, and IT specialist the task of developing and maintaining information systems that meet the consumers control needs regarding information (Coyne, Coyne, & Walker, 2018). The concepts surrounding information governance provides those individuals tasked with the storage and securing of mission critical data the guidance necessary to perform their jobs optimally. There are challenges that go along with the governance of information and these are ever changing which results in the need for additional tools and methods being learned and practiced in a low risk environment providing additional protections to health-based data (McLoed, Hewitt, Gibbs, & Kristof, 2017). These individuals would encompass IT System Engineers, Database Engineers, and Network Security Analysts and would be part of a Health Information Management/IT Department. The types of governance one would see entails policies and procedures clearly documenting the following mechanisms including multi-factor authentication, fault tolerant data arrays for data storage, Database Management Systems, VPN services for remote viewing of health-based data, and other services in support of EHR systems.

IT Governance. The process of information governance includes the storage of health-based data, the securing of this data, and the protocols for proper dissemination of this data. The groups charged with applying these principles are the sub-departments within the larger IT Department. Data Services, Network Security, Server

Administration, Management within these areas, and IT Systems Engineers. The process of developing, testing, approving, and implementing the policies that governs daily operations in support of EHR systems in known as IT Governance. IT Governance is seen as a subset of corporate governance and IT governance helps organizations manage their IT assets (Heroux & Fortin, 2017). Data or information governance fits nicely within IT Governance because it is the framework that dictates who holds the decision rights and accountability regarding an enterprise's data assets (Alhassan, Sammon, & Daly, 2018). Decision making on this scale requires the executives and board members charged with these tasks to be informed and educated by individuals in their employ with the knowledge necessary to properly impart the information needed to make sounds, rational, and informed decisions regarding EHR implementations. These decisions are the foundational markers that make up the whole IT governance framework.

***Communication protocols*.** EHR strategy creation can only come to fruition when proper communication parameters are adhered to by all stakeholders involved in the strategy design process. The implementation of an EHR system provides an infrastructure that promotes communication among healthcare professionals through integrated subsystems that add inter-office communicative channels. The importance and understanding of the need for clearly defined communication protocols should be stipulated to all parties involved in the evolution of implementation strategy creation. This process is ever-present in need to improve care coordination for patients, prescribers, and pharmacists practicing in different settings where communication and collaboration must be valid and efficient (Chelsea, Ferrari, Tiffany, & Foley, 2018). The holistic yet granular approach to effective communication protocols gives a top-down

methodical vetting of communication policy development while still looking at the bigger picture. Organization communication is an area within healthcare entities where the importance of communication standards is ever-present. Organizational communication is essential in forming working relationships in connection with employees and enabling organizations to achieve their core mission and purpose (Musah, Zulkipli, & Ahmad, 2017). The prospect of implementing an EHR system comes with numerous challenges, including lapses in communication among stakeholders and clearly defined protocols that govern channels of communication during the EHR implementation process.

EHR systems are often diverse due to the complex subsystems that must be tied together to integrate the vast areas of a healthcare setting into one cohesive system. This integration process poses barriers strictly related to interoperability issues and the primary conduit to this failure is the lack of stakeholder buy-in due to lack of communication clearly defining the need for such system integration. Appropriation through technological workarounds (AST) is a theory that surmises that through effective communication a shared interpretation of technology emerges thus allowing employers technology behaviors and attitudes to reflect the need for essential communication partners (Barrett, 2018). Effective communication is the foundational aspect which must be strictly followed to heighten the chance of successful implementation strategy creation. EHR implementations that are successful required systemic communication standards and policies that require a top-down approach to utilization. These concepts are foundational regarding communicative processes by which all stakeholders utilize ensuring clarity of mission and purpose for the implementation of the applicable project. A breakdown in communication among crucial individuals from within the project team

leads to inaccuracies in implementation processes. Implementation failures cost the corporation valued time and resources for having to double back to correct these inaccuracies. The predominant communicative process or strategy to use is that of leadership as it is looked upon in a positive light by the end-user (Schoville, 2017). Effective leadership styles are central to any effective communication platform. The implementation of enterprise-level EHR systems requires the leadership to be integral in the decision-making process allowing for stakeholders the understanding that clear communicative channels through leadership apply a top-down approach to decision making.

The use of structured communication protocols falls in line with TAM principles through the failure of EHR implementation processes due to end-user perception of the failed system in question. Communication gaps are one of the primary reasons for these failures, so clear communications among all stakeholders and team members of the objectives, costs, and changes in process are critical to implementation successes (Bakheet, 2017). These gaps in communication are what lead to systemic failures in the project team dynamic forming weak links in the setup of the team, which leads to a reduced level of technology acceptance. These prospect of how technology impacts the behavior of consumers is a critical component leading to sustainable marketing communication standards and strategies (Wulandari, 2017). The principles that make up the TAM framework, including PU and PEOU, directly tied to proper communication protocols or the lack of these communicative principles through the dissemination of success factors or barriers within the implementation process.

The CFIR framework for strategy creation ties in directly with organizational communication protocols that help with implementation policy creation processes. The utilization of the CFIR framework provides strategy creators with data collection and assessment tools necessary to finely tune communication parameters helping to alleviate potential bottlenecks and barriers to effective and efficient dissemination of project steps for implementation completion promoting heightened success rates of applicable EHR implementations within the healthcare landscape. The CFIR framework is often chosen because it is a relatively new framework that has synthesized prior research evidence into a consolidated framework having multiple constructs creating numerous topologies of what is affecting the successful implementation of an intervention (Warner, Lawson, Sampalli, Burge, & Gibson, 2018). This a multi-modal framework can be applied to diverse subsets of strategy creation. Communication protocols can be created and implemented through the PARIHS framework as this process provides the research backbone to find new and efficient methods for strategy creation beckoning in sound communication practices. Effective communication strategies for clinicians can be accomplished through established implementation theories, models, or frameworks helping implementation researchers through contributing to new knowledge about how and why implementations succeed or fail (Lynch, Mudge, Knowles, Kitson, & Hunter, 2018). NPT provides metrics for formulating implementation protocols of interventions, and these processes must integrate well with communication protocols; otherwise, the project is doomed for failure. NPT is an established middle-range implementation theory that explains the normalization of change in practice about complex and collaborative works (Rapley, Girling, Mair, Murray, & Treweek, 2018). The implementation of an

enterprise-level EHR system is the definition of complex and diverse work and requires continuous bi-directional communication among stakeholders to ensure a successful outcome.

SDLC compliance protocols. The prospect of implementing an enterprise-level system must be coupled with the constructs of the SDLC process. The aspects related to the SDLC process include multiple stages where stakeholders provide input into the pre-planning of the implementation of specific systems. This process entails seven stages, including planning, analysis, design, development, testing, application, and maintenance (Usman & Nonyelum, 2018). These seven steps provide the needed structure to ensure the implementation process for an EHR system will be successful and provide the required documentation to an archive for future projects that need this type of framework. The additional insight provided for SDLC principles relates to a system concept which provides for the iterative use of generic lifecycle models at all levels of system development (Viljoen & Holm, 2017). Planning for a given project encompasses the foundational aspects of the project from start to finish. The analysis provides the tools necessary to accurately assess the goals of the given system and how to achieve those goals accurately and efficiently. Design and development are synonymous with one another in that designing the process for system implementation provides the constructs for development of the actual operations. The event takes design one step further and adds the prospect of on the fly adjustments to the plan to serve the overall goal of successful implementation better. Once the system is developed, then the testing of the system should take place in a controlled environment to document and fix any bugs found during this phase of the SDLC process. Implementation is the process of instituting the

actual system into a production environment for practical use, and maintenance is the extension of application where monitoring and system tweaks and fixes take place to keep the given system running optimally.

The process utilized to conduct this includes giving a background to the issues surrounding EHR implementation and how the TAM framework relates to user adoption practices of the newly implemented systems. TAM framework is the conceptual framework being utilized and provides the context on the motivations used by users relating to EHR implementation strategies. Technological context, organizational context, and environmental context, as well as variables of TAM, are determinants that are important when considering comprehensive EMR implementations (Abdekhoda, Dehnad, & Zarei, 2019). The four implementation strategies that were mentioned would be significantly enhanced to promote optimal success when PEOU and PU are fully realized by end-users having to conform to new technology. TAM allows for this comprehension to take place when these two metrics are fully realized and will help hone these strategies to promote higher adoption rates of technology. User acceptance in information systems is vital for understanding how to design and implement policies to ensure success (Robinson, 2019). The professional and academic literature has provided the needed clarifications for the context into the world of EHR implementation strategies. The strategies mentioned come with their intrinsic drawbacks and are better understood through learning the importance of EHR systems.

The accumulation of implementation data sets helps provide required participants within the strategy creation process the added benefit of resources to pull from, which allows for structured strategy creation that aligns with the SDLC process. The SDLC

provides fundamental steps to follow when implementing an EHR system. These steps allow for a closely monitored iterative implementation process but require sound EHR strategy creation through the utilization of the CFIR framework. CFIR is a conceptual framework used to explain either graphically or in narrative form, the main things needing to be studied like crucial factors, constructs, or variables that influence the implementation process or area of interest (Keith, Crosson, OMalley, Cromp, & Erin, 2017). The PARIHS framework provides research metrics used for the study of the implementation process in a healthcare setting, and the evidence collected provides needed constructs imperative to the formulation of proper SDLC principles. PARIHS is a framework used to design and implement changes in evidence-based interventions or practice (Arney, Thurman, Jones, Kiefer, & Hundt, 2018). EHR implementations are a cornerstone for evidence-based interventions requiring the constructs within PARIHS for documentation of potential changes for future implementation projects. NPT accounts for the changes impacting routine work meaning that work conducted daily by invested individuals regarding a specific intervention can be measured by utilizing the NPT framework. The SDLC process, as it relates to EHR implementation planning, can use the NPT framework for gauging the workflow outcomes of a successful implementation done from within the SDLC process. NPT is concerned with the social organization of work and making practices routine elements of everyday life (Sutton, Herbert, Burden, Lewis, & Thomas, 2018). Incorporating implementation processes governed by the SDLC workflow into everyday life is imperative in healthcare, specifically regarding EHR systems as these systems are continuously utilized daily to improve patient-centered care.

EHR implementation technical steps. EHR strategies must entail technical aspects describing the actions taken to implement an enterprise-level EHR system. These steps include technical assessment of existing infrastructure, evaluation of primary considerations for functionality of the proposed EHR system, evaluation of technology needed to upgrade the existing infrastructure to accommodate the newer EHR system and running a cost/benefit analysis to determine the best path forward for enacting the organization's vision in the most efficient and cost-effective manner. There organizational characteristics associated with EHR implementations encompass overall budget costs, devoting three percent of operating budget to health IT, being an early adopter, and receiving community block grant funds (Larrison, Xiang, Gustafson, Lardiere, & Jordon, 2018). There is an understanding for most healthcare entities that the cost incurred for an upgrade or complete replacement of the current EHR system is necessary to improve patient care outcomes and improve charting protocols which provide improvements in workflow efficiencies. There are two paths forward for accomplishing the implementation of an EHR system, including an on-premise solution, and a hosted cloud-based solution. On-premise EHR solutions cost exponentially more than their cloud-based counterparts. The cost structure for providing the server hardware, networking infrastructure, and software development required to tie-in all the different subsystems for a cohesive system would be a monumental undertaking. The effective barrier for justifying the cost of on-premise EHR solutions relies on the difficulty in using EHR technologies requiring for a simplified interface (Sines & Griffin, 2017). Cloud-based solutions would provide developers a haven for developing safer, cheaper, and better applications by using cloud computing capabilities which provides better economic

scalability (Ahmadi & Aslani, 2018). The cost-effective nature of cloud based EHR systems is based on subscription services where you pay as you go for what is specifically needed. The commitment for equipment for this form of implementation is minimal because the servers and databases necessary to house the software required to run this system are governed and updated by a third-party vendor. The cost savings in the workforce needed in this type of solution gives organizations added incentive to move over to this arena.

The process for implementing an EHR system requires a thorough understanding of the core functions this system provides healthcare providers and patients. These functional requirements include data management, collection, storage, processing, and exchange (Farzandipour, Meidani, Gilasi, & Dehghan, 2017). The primary determinant for the type of hardware needed for this type of implementation relies entirely on the dissemination, storage, manipulation, and presentation of patient data. Servers that house the base operating system, database management capabilities and web-centric technologies that provide clinician tools and patient portals for looking up medical information are the foundation of any enterprise-level EHR system. Backend hardware requirements would include data storage arrays that are fault-tolerant, and server farms that are in a balanced load cluster for optimal performance, and robust network infrastructure. The networking infrastructure required would include industry-leading switches with gigabit uplinks, fiber optic backbone between closets, and cat6 ethernet or higher for wired workstations, and the latest in secured wireless technologies providing secure connections with industry-leading bandwidth allocation capabilities. The hardware and software requirements for a fully implemented EHR system are needed to meet

regulatory guidelines governing meaningful use standards to ensure the incentives offered by the government are levied properly to the health care organizations (Noah & Thomas, 2017). These incentives come with stipulations on specific criterion governing how EHR systems must be implemented regarding hardware and software requirements. The technical steps involved in an implementation of this magnitude must also include a change control process which provides notifications to affected end users of impending changes or additions to systems integral to daily operations. These change control processes should be effective, which means it is user-friendly, simple, and with minimal cycle time for decision making (Schmitt, 2017).

TAM principles governing technology adoption directly relate to the process and policies governing EHR implementation. The hardware and software requirements for EHR implementations vary based on the organizational environment and the core mission that the EHR system is supposed to accomplish. PU and PEOU constructs are influenced directly by the type and resilience of the hardware and software chosen and implemented. These two constructs are what provide the end-user the tools to make judgment calls on whether to adopt the technology in question. User acceptance of technology is influenced by how well they support, and improvement metrics governing a given implementation are utilized (Ahad, Saad, Hoque, & Chowdhury, 2018). Every implementation strategy discussed is directly tied to TAM theory through the PEOU and PU constructs due to the essential manner these four strategies provide the implementation process. The outcome of any given implementation is based on how well planned and executed the project is and how well invested in the implementation process the team members are with the strategic mission. TAM theory was designed for use in task-driven work settings not

unlike schools, and an individual's perception of the relevance of technology to their specific task is central to their decision to use the technology (Okumus, Lewis, Wiebe, & Hollebrands, 2016).

The whole concept of EHR implementation is a multi-pronged approach requiring implementation strategy creation and guidance, sound communication strategies among stakeholders, proper SDLC compliance, and steps regarding the technical aspects of the EHR implementation process. The assessment of the existing hardware, software, networking, and structural infrastructure requirements for an EHR implementation must utilize the CFIR framework precisely due to the collection and organization of data. The data collected regarding those metrics allows the project team the needed information to properly design and implement the EHR system. The CFIR framework addresses intervention delivery through five domains including intervention characteristics, outer setting, private setting, characteristics of the individuals involved, and the process of implementation (Stokes et al., 2018). These domains touch on every single strategy mentioned on some level. PARIHS provides the tools necessary to document change with technology implementations within a healthcare setting, and this is especially central to the technical application of the implementation process of an EHR system. Implementation scientists have begun to realize healthcare disparities as a particular case of implementation failure (Woodward, Matthieu, Uchendu, Rogal, & Kirchner, 2019). All the strategy creation frameworks provide a subset of the needed tools to properly formulate an applicable strategy for a successful EHR implementation. The NPT directly aligns with the technical aspects surrounding implementation policies for EHR systems. Hardware, software, networking, and physical infrastructure requirements directly

depend on routine workflows providing sustainable results for both clinicians and other affected stakeholders. NPT is a healthcare centric framework which hypothesizes that practices become routine or normalized as a result of people trying to enact them (Ziegler, Valatis, Yost, Carter, & Risdon, 2019). This enactment is accomplished through project management activities specific to technical implementation processes related to EHR implementation.

EHR Implementation Strategy Considerations

The implementation of any enterprise-level systems comes with a multitude of questions that need to be answered before a plan to implement said system could take place. Some considerations must be looked at before a project is developed for implementation of any enterprise system. EHR systems are no exception to this rule, and due to the diverse nature of the sub-systems being integrated with today's enterprise-level systems, the scope of planning is much broader and requires more precise planning. One such example of this complexity comes through the preparation of a National Electronic Health Record (NEHR) system. The operational and organizational considerations are profound with an order on this size and complexity (Fragidis & Chatzoglou, 2018). Understanding that EHR systems globally come in different formats that must meet geographical and geopolitical constraints make implementing an enterprise-level EHR system challenging to navigate.

The United States is a prime example of this narrative. The 50 states with the state guidelines must be meshed with federal statutes to help bridge the gap to make creating a NEHR system more attainable. The ability to be successful with the implementation of a NEHR system comes from the development and application of cohesive strategies that

govern the implementation process. This process begins with successes and failures, and one must navigate this carefully to ensure the success of their applicable implementation practices. The primary success indicator with any implementation is with full engagement of all stakeholders impacted by the implementation process (Fragidis & Chatzoglou, 2018). Along with success factors, some barriers prohibit proper implementation of a given system, and these include the lack of support or adverse reaction to any changes from the medical community (Fragidis & Chatzoglou, 2018). These include administrators, nurses, and other medical personnel impacted by the implementation of a new critical system.

EHR strategy success factors. One success factor critical to the implementation of an enterprise-level EHR system is the complete stakeholder buy-in, as stated in the previous section. One study found that user involvement in the development of EHR systems led to the creation of a sense of ownership of the project and an increasing commitment to the success of the plan (Katurura & Cilliers, 2018). The predominant aspects at play in this narrative involve creating a cohesive approach to the clarity of project principles that will resonate with all stakeholders at the onset of the project guideline development. These guidelines will be the structure that governs the implementation process going forward and requires all stakeholders to have complete clarity of purpose and commitment to mission success. The selection of EHR vendors and implementation strategies can significantly influence the success of EHR adoption (Ford, Silvera, Kazley, Diana, & Huerta, 2016). The idea for success regarding implementation practices is to understand what the organization is getting out of the vendor selection process in terms of Return on Investment (ROI). The ROI is not strictly monetary, but

also encompasses core functionality of the applicable system, ease of use, and usefulness within the given organization. The ability to find a solution that promotes organizational growth and gains helps improve patient safety and increased workflow, which aligns with stakeholder buy-in. Implementation strategies once the vendor has been selected is the second component that has to be adequately developed through careful considerations of all stakeholders. The cohesiveness of communications and thorough mitigation of design principles relating to strategy creation throughout all stakeholders increases interest in the long-term success of the implementation project.

EHR strategy failure factors. Naturally, the number of barriers to successful EHR implementation are numerous and multiply as the countries implementing these systems fight with environmental, technical, geographical, geopolitical, and social factors that inhibit any successful outcomes. The primary barriers being infrastructure, allowing for an ample power grid providing continuous electrical support for these diverse systems (Katurura & Cilliers, 2018). The other predominant restrictions are the regulations and bureaucracy that come with governmental oversight of these implementation processes. Decentralized management and administration functions along with language barriers, provide additional barriers inhibiting successful outcomes of EHR implementation processes (Dornan, Pinyopornpanish, Jiraporncharoen, Hashmi, & Dejkrienkraikul, 2019). These barriers offer difficult but not impossible obstacles to the implementation practices of developing countries.

The predominant takeaway is that global collaborative efforts among countries would go a long way towards stemming these issues and promote frequent successful outcomes. The other aspects to consider in inhibiting barrier creation is to provide a

conduit for open dialogue regarding concerns about a specific intervention or system implementation. The recognition of barriers facilitates constructive change and consensus-building among stakeholders (Lodge, Kaufman, & Stevens Manser, 2017). These exercises are a required metric for building success factors related to implementation practices and minimizing the risk of failure. The risk of failure is an overwhelming prospect when implementation processes and practices are not adequately planned, which stoke added criticisms to the process.

EHR strategy criticisms. The next block of writing will go more in-depth regarding the lack of adoption and the systemic issues that are causing failures of implementation strategies. TAM principles will help gauge the metrics used in measuring the reasons behind the lack of technology adoption. Health IT, through research studies, has been linked to improved quality, efficiency, and patient safety; however, this evolution has been tempered by intended end-users being dissatisfied with implemented IT, do not accept it, use only a small portion of the resource, work around it, and actively resist or abandon it altogether (Holden, Asan, Wozniak, Flynn, & Scanlon, 2016). The reasons for this type of resistance are numerous, and other studies underpin this narrative. Users are continually struggling with new technology, and this is due to the technology constantly changing, and there is increased pressure on employees to develop their skills so that their organizations stay competitive (Siegel et al., 2017). This resistance to change paradigm causes stress on employees who are comfortable with the processes in place and then required to retool as newer technology is designed and implemented. E-Health technology development has been widely discussed in recent decades; E-Health implementations continue to face issues caused by lack of the awareness of the

technologies' importance (Hostgaard, Bertelsen, & Nohr, 2017). This situation was the case in four Danish hospitals which the previous reference noted. Organizational change often dictates the directives that are passed down by the higher-ups, and this includes healthcare-related technologies. These technologies provide numerous benefits to both healthcare entities as well as patients. Past research has shown that employees who are more involved in the implementation process were more likely to cooperate during the organizational change process (Stanzyk, Crutzen, Sewuster, Schotanus, & Mulders, 2017). This result is due to the increased effort by organizations to involve their employees in the overall implementation process. This guideline allows the employees the ability to see the benefits of the new system and understand the concepts of how the system's internals work. The predominance of healthcare organizations that implement EHR systems understand from an organizational level the importance of such systems and the benefits they bring.

Healthcare organizations implement EHR systems to improve healthcare deliverables, reduce cost, and comply with federal mandates; however, there are no guarantees that significant HIT investments are worth the time and money (Mason, Mayer, Chien, & Monestime, 2017). The number of studies that earmark end-user frustration abounds, and this is mostly an issue with how implementation processes are managed. Numerous studies have revealed widespread clinician frustration with the usability of EHR, and this metric is counter-intuitive to the adoption of EHR systems to meet the goals of healthcare reform (Althea & Marc, 2017). The adoption of EHR technologies are essential metrics to gauge, and it is crucial for healthcare organizations to lay out the benefits for migrating to these technologies. EHR systems are suitable for

handling the quality of data, increasing communication in healthcare organizations, and the deployment of such systems is essential due to the ability of data sharing among diverse organizations and lead to the creation of integrated health delivery networks (Shahmoradi, Darrudi, Goli, & Ahmadreza, 2017). The three EHR implementation strategies mentioned earlier relate to TAM theory in one fundamental way, and it encompasses the user's mindset going into and coming out of an implementation process. Technology acceptance will have a negative outcome if any of the three strategies mentioned are not adhered to properly and thoroughly.

The overarching dynamic related to EHR systems deal with the accessibility, security, and privacy of patient data. The primary infrastructure required to house large data sets in a database management system known as a data warehouse. Metadata is defined as data about the data and is integral in providing deep-rooted information regarding patients to help inform decision-makers on how best to treat the patients. Having rich metadata and giving context to each discrete data point as it fits within EHR can help deliver meaningful PGx into the healthcare setting (Alanazi, 2017). This example comes from organizations conducting Genome work within the healthcare field and underscores the use of EHR systems that are diverse in functionality and robust in performance. EHR systems offer varying degrees of interoperability with other software systems that have impacts on patients' outcomes, health information exchange, analytics, and communication (Estes, Kelemen, Liang, & Constanine, 2016). These four areas are foundational to the success of successful EHR implementations. Implementation strategies are the most important of all aspects of successful project completion. In the minds of most people, implementation support conjures visions of a busy go-live

command center filled with vendors, IT staff, and clinical support staff working on issues, taking calls from support troops on the floor, and dealing with disgruntled providers (Bird, 2017). These illusions of what EHR implementations encompass are easily dissuaded when proper protocols and planning are enacted. Other areas where EHR systems play a vital role are in Schools of Medicine and Nursing. These students must grasp the concepts relating to EHR and become comfortable with the environment as it is a critical part of the curriculum and clinical training. The introduction of EHR to graduate medical students has the potential to aid residency programs in complying with the competencies required by the accreditation council for graduate medical education (Torres et al., 2017). Once these competencies are taught and practiced, the medical professional will have the tools necessary to mitigate barriers posed to the implementation of EHR systems.

Mitigating EHR strategy barriers. EHR systems that have tested well in pilot programs where the environment is more controlled and guarded do not often achieve the same outcomes when widely implemented and utilized. The potential for failure of implementation strategies used in the EHR system setups is due to obstacles that either is currently in place or develop overtime during the implementation process. These obstacles include infrastructure, organizational, operational, geographical, and social and can play havoc on any implementation team who undertakes an enterprise-level project. A similar project called MGH I-PASS initiative illustrated potential challenges to system implementation relating to changeover processes (Shahian, McEachern, Rossi, Roger, & Mort, 2017). Changeover processes are processes where medical staff refer to the onboarding staff the status of the patients in their respective charge and any potential

pitfalls those patients may have regarding their procedures and health issues. The barrier in this instance that needs mitigating is the lack of a standardized method regarding changeover practices during shift change among medical professionals. Standardizing on one centralized process, that all stakeholders can buy into, helps with system continuity and improves the likelihood of reduced harm to patients and lower risk of medical liabilities.

There are other barriers to successful EHR implementations, including the misalignment of business process and practices with their IT counterparts. The understanding that linking the internal EHR system with the core business initiatives helped garner a successful implementation outcome in Saudi Arabia (Bakheet & Alanazi, 2018). Project alignment in any realm or industry is essential, but nowhere more critical than in a healthcare setting. Lives are at stake when strategies regarding EHR implementation are not developed in a granular and specific manner. Thinking through the development of these strategies can be the difference between a saved life and a liable suit. These processes involve many stakeholders, and it is paramount that all parties involved are fully vetted and provided with the proper documentation and knowledge to help promote the successful implementation of an enterprise-level EHR system.

Gap in the Literature

TAM theory, in its current form, provides needed tools for the researcher to collect, analyze, and code study data for postulating study outcomes. The ability to provide TAM related tools for future studies will come from identifying gaps in the current literature and research relative to TAM theory. The ability to analyze the current state of knowledge and recognize differences in the writing of TAM could be filled by

future research conducted in this area (Weerasinghe & Menaka Bandara, 2018). Theoretical constructs are not static and evolve, and the evolution of these theories helps researchers to form solidified research study foundations for their respective degrees. Scholarly research is guided by the fundamental development of research designs and methodologies, and the subsets within these frameworks require flexibility to promote outside the box thinking while enhancing the validity and reliability of study data.

The adoption practices in the East Asian section of the world argue that IS adoption and implementation literature specifically in Taiwan in terms of theories, methods, and units of analysis are affected by the scope of which the TAM framework is lacking in diversity and conceptual concern (Yang, 2017). The idea presented here is that the interpretation of the TAM framework is often subjective dependent on the area or region of the world; this metric is being used. However, there has been extensive use of the TAM framework in e-health application acceptance research; but not all TAM relationships are borne out in all studies (Chauhan & Jaiswal, 2017). The PEOU and PU are the primary constructs that define the TAM framework; however, environmental, or situational settings can play into the adoption process of health technologies. How health professionals and the public see the use of EHR inside treatment settings can wreak significant havoc on the adaptability of and motivation for new technology (Xiao & Acosta, 2016). These gaps identified in the previous paragraph are just a minute subset of factors which need to be considered and studied relating to TAM.

The review of the professional and academic literature has provided one constant being that not all angles for research have been explored about strategies with EHR implementation. These articles have talked about motivations and incentives behind EHR

implementation, end-user hesitancy to embrace and adopt EHR technologies, the importance of HIT, and conceptual looks at strategies used for EHR implementations. However, there are still gaps in the literature about what policies are explicitly used in EHR implementation practices. Conducting research specific to the study of what strategies are utilized in EHR implementation would provide the foundational aspects for future researchers trying to further the scholarly discussion surrounding this angle of research.

Conclusion

This review of the academic literature provided a detailed layout regarding challenges of HIT, elements of TAM Theory, supporting TAM theories, and the framing for research related to TAM theory. This process was completed through illustrating the topics relevant to EHR motivations for adoption, end-user hesitancy to use implemented EHR systems, historical mapping of the migration from paper-based record keeping to electronic record keeping, and the importance of researching strategies where EHR implementations were successful and end-user adoption of those technologies are higher.

Section 1 provided an outline for the background of the research topic under study, the problem under investigation, the research question central to the completed research, the significance and nature of the completed study, outlines the research design and research methodology of the completed study, and a literature review of the topics relating to the completed research. Section two of the proposal goes into more depth regarding the role of the researcher, sampling methods, and process used to prove data saturation, and triangulation of data. The procedures used to determine the study's rigor is discussed, and the means for storing and securing study data is described in detail.

Section 2: The Project

Section 2 is designed to describe the essential steps that frame the scope and boundaries of the study. This section includes the purpose of the study, the role of the researcher, participants, research method and design, population and sampling, ethical research parameters, data collection techniques and instruments, data organization techniques, data analysis, and study validity. It provides a thorough description as to the processes developed for the completed study, which were fundamental to this study's successful completion.

Purpose Statement

The purpose of this qualitative multiple case study was to explore the strategies used by IT systems engineers for the implementation of HIMS that govern EHR. The specific population for this study included IT systems engineers from three independently owned and operated hospitals and/or three independently owned and operated regional medical clinics in the greater Tennessee area. The proper implementation of HIMS contributed to positive social change through improved healthcare practices for patients in a clinical setting, allowing for quicker diagnosis, enhanced treatments, and faster recovery times. These improvements led to lower health care costs for patients.

Role of the Researcher

The structure of the research in this doctoral study process encompassed the TAM theory, and the researcher helped define the design of the interview questions using two separate influencers PEOU and PU. The role of the researcher as it pertains to qualitative research is to attempt to ascertain the thoughts and feelings of study participants (Austin & Sutton, 2015). These participants provided needed feedback relevant to the study

directives that helped in formulating the study outcomes through data coding and analysis. My roles as the researcher involved designing and administering research-relevant interviews and collecting and analyzing data to form themes.

This study required IT system engineers with core knowledge in EHR implementations to answer research questions relevant to the topic of study, EHR implementation strategies. My primary responsibility was to identify repeated patterns within the data collected through the interview process and provide a proper analysis of those repeated patterns (Schoville, 2017). My experience with EHR started when I was hired as a LAN technician, where I am currently employed. The concept of EHR systems has always intrigued me, and the recent migration from hyperspace (Star Panel) over to the current EPIC EHR system has provided me with some insight into the nuances witnessed by nursing personnel from the hospital who hold teaching appointments at the School of Nursing. These individuals stated that the current system was rushed into production and provided a wealth of information on the dos and don’ts related to EHR implementation.

My role as the researcher was to ensure that all proper ethical protocols were strictly adhered to and to mitigate any potential ethical dilemmas. I conformed to all guidelines and standards set forth by the Institutional Review Board (IRB) and followed the instructions outlined in the Belmont report protocols. The Belmont report guides ethical roles and responsibilities for US-based research of human populations and underscores the importance of factoring in discipline-specific research parameters (Campbell & Morris, 2017). Doctoral students must account for potential bias when researching. The process for mitigating bias in my study included triangulation of data,

which provides for individual interviews and transcript analysis through a third-party solution and review of onsite documentation. This study consisted of document analysis as a form of data collection to help supplant other data collected through the modes mentioned in the previous sentence. The process of document analysis helped validate the data and provided a conduit for data saturation.

The data was viewed to comprehend the themes that developed. The interview process involved personal interviews. The ability to conduct personal interviews and document analysis allowed for data comparison to ensure its validity and integrity. The process of developing an interview protocol included providing interview questions aligned with the research question, designing an inquiry-based conversion, receiving feedback on interview protocols, and piloting the interview protocol (Castillo-Montoya, 2016).

Participants

I established criteria and protocols for gathering potential research participants. Qualitative research practices entail the collection of data from participants from several organizations (Saunders, 2012). The process of selecting participants for this study involved a written survey with questions about the participant's job role, number of years on the job, experience levels with EHR implementations, and specific matters relating to decision-making processes within their job. The criteria that participants met to be part of this doctoral study related to their experience in the implementation of EHR systems, level of participation in the decision-making process, and specific role within the organization. Reflexivity in qualitative research provided the basis for proving rigor and creating strategies to help with the recruitment of research participants (Maramwidze-

Merrison, 2016). Reflexive inquiry allowed for regular interactions with potential participants through discussion of the doctoral study. The ability to clarify the study's goals with potential participants helped provide them with the information needed to make an informed decision. The idea of reflexive processes in qualitative research has gained prominence because it is essential to debates on subjectivity, objectivity, and ultimately, the foundation of social science research and knowledge (Hsiung, 2008). These fundamental aspects are the underpinnings that provided this study with the standards necessary to formulate processes for recruitment of future participants. The strategies that are needed for gaining access to participants included obtaining permission through human resources (HR) to contact the participants (IT System Engineers), contacting IT Directors for obtaining permission for contact with those employees, and communicating to individual participants (IT System Engineers) through written correspondence. The written communication included a brief description of the study purpose and parameters to gain more recognition through clearly defined objectives and expectations.

Challenges to recruitment processes in research studies are frequently reported in healthcare literature and are regarded as the most challenging part of the research process (Kenton, Martins, Ferns, Gibson, & Lea, 2017). In this study, I aimed to cultivate a working relationship and build trust and comradery with the participants. The validity of data was enhanced due to the participants' comfort level with me. These steps also improved the integrity of the data gathered, providing an enriched data set to pull more outcomes. I aligned the interests and experience based on study parameters to those of the potential participants to enhance their interest level, which provided higher level answers

to interview questions due to common likes. Building relationships with participants is a fluid process requiring a bi-directional communicative process for building mutual trust (Passmore, Fryer, Butler, Garza, & Thomas, 2016). The strategies for establishing a working relationship with study participants included being open to any questions pertaining to the study, clearly defining the no-pressure approach of this study, clearly establishing the participants' ability to quit the study without any repercussions, and setting clear objectives. These criteria allowed me to tailor my approaches to study participants to serve the data collection process better. I created processes and frameworks that advocated participant engagement, which included establishing governance protocols and structures that listened to the voices of all stakeholders (Young, Kaminstein, Olivos, Burroughs, & Castillo-Lee, 2019). Ensuring that participants' voices are heard is paramount to successful data collection and analysis.

The process of locating and placing participants in this study included getting written permission from HR and IT Directors from the three independently owned and operated hospitals and/or three independently owned and operated regional medical clinics in the greater Tennessee area. The purpose of contacting HR was to obtain consent to contact the applicable IT Directors to conform to their respective institutional guidelines pertaining to external research practices. The second step was emailing request forms to IT systems engineers at the three independently owned and operated hospitals and/or three independently owned and operated regional medical clinics in the greater Tennessee area. These forms included a detailed outline and purpose of the study and gave direction to potential IT system engineers on how to respond to the invitation. They also provided guidance for logistical parameters regarding the study location and

interview set up. The selection of study participants was randomly accomplished and enhanced the validity of study findings. This study took place in the greater Tennessee area. The three independently owned and operated hospitals and/or regional medical clinics were notified upon final IRB approval that they fit the scope of this study.

Research Method and Design

This doctoral research study's chosen research method was qualitative, and the chosen design was case study driven. The process for investigating implementation strategies for EHR systems required the extraction of data through interview questions of participants which lent to the qualitative method of scholarly inquiry. The chosen design is grounded in case study logic, which provided a holistic lens to analyze the data once collected. This research study was multiple case study driven, which provided a platform for data triangulation which heightened data validity.

Research Approach

This doctoral study was conducted with a qualitative research method because the purpose of this type of scholarly inquiry is to provide the researcher with a better understanding of the problem under study. The benefits of academic inquiry include supporting the researcher to understand the nature and complexity of the phenomenon being considered, enabling investigation into new areas of research, and supporting the study of the event in its natural environment (Basias & Pollalis, 2018). Each one of these benefits underpinned the reasoning for choosing this research method.

Qualitative research participants were chosen due to their understanding of the problem under study. The qualitative research method conformed better with the direction of this study due to its focus on a real-world problem. Qualitative research

methods are beneficial in describing different phenomena and assessing their meaning, which is harder to accomplish through quantitative research methods (Petrescu & Lauer, 2017). Qualitative research can involve numerical data, but the process for analyzing this data is entirely different from the quantitative approach. Quantitative research studies the hypothesis of some research topic being developed by a given researcher wherein qualitative research; hypothesis formulation is not needed to be based on this approach's core tenets for research design. The quantitative analysis does not apply to this study because no numerical values are being looked at, and no experimentation of hypothesis is being considered. Mixed methods research involves quantitative principles that are traceable to the quantitative versus qualitative debate, specific to the meaning assigned to the term qualitative (Gobo, 2016). Mixed method research could potentially be applied to this topic, but this study requires a qualitative approach to inquiry. Mixed methods research is a hybrid approach that melds quantitative and qualitative research methods, giving a heightened clarity to the study outcomes. The mixed-method approach cannot be used in a doctoral research study for two reasons, including time constraint issues relating to collegiate research processes and the fact that Walden University does not allow the use of mixed-method studies in their doctoral programs.

Research Design

Case study driven research allowed for the examination of real-world problems that afford the researcher the ability to present outcomes holistically. Research founded in case study concepts scientifically investigates real-life phenomena in-depth and within the environmental context (Ridder, 2017). The chosen research design for my doctoral study was case study due to the type of data being collected relying on the investigation

of strategies regarding the implementation of EHR systems. The general mindset for the use of case study relates to the ability to capture unique cases versus the use for broader generalization (Ang, Embi, & Yunis, 2016). The capacity to use document analysis, data triangulation, and personal interviews gave this research design added breadth to hone in on thematic outcomes extrapolated from that data to provide the reader with specific findings of EHR implementation strategies. Document analysis encompassed the reading and analyzation of records and project notes kept from previous implementations of EHR systems. Case study research is a methodology founded in empirical inquiry with qualitative overtones from real context, where multiple sources of evidence are used with an inductive and partially deductive scientific approach (Larrinaga, 2017). This process divulged information pertinent to the historical perspective of strategies tied to successful EHR implementations.

Ethnography, as a research design looks to explore a topic based on the cultural aspects of the consideration under study. Ethnography is defined as a first-hand experience and the exploration of a specific social or cultural setting based on participant observation (Sinead Ryan, 2017). Ethnographic research provides a social construct by which researchers form relationships with individuals who are already entwined in complex webs of relations, processes, and groupings (Werth & Ballestero, 2017). Ethnography does not conform to my doctoral study because my topic of study relates to a real-world problem that is not being looked at through a cultural lens. Ethnographic approaches to research are formed out of attempts to answer life events that are affected by the uncertainties of everyday life (Da Col, 2017).

Phenomenological research explores the human existence through subjective experiences while providing a holistic lens which looks at social, cultural, environmental, and politico-economic factors of a given topic of research (Picton, Moxham, & Patterson, 2017). The practice of phenomenology investigates a given phenomenon based on human experiences. The method of phenomenological analysis is the philosophy-based form of scholarly inquiry that can confuse or disorient academics and clinical practitioners due to their interest in understanding and doing research in professional fields such as nursing, medicine, clinical psychology, pedagogy, psychotherapy, and education (Van Manen, 2017). These core tenets of phenomenological research are the aim to reveal the essence of a phenomenon of interest (Assarroudi & Heyderi, 2016). My research study was designed to investigate real-world problems relating to EHR implementation strategies, and phenomenology does not conform to this concept due to the type of content under investigation.

Narrative research designs in qualitative research prepared to tell a story relating to a topic of study. In narrative inquiry, this approach can be suitable when trying to draw out information about personal experiences and an individual's personal list of events allowing those who have been silenced, unheard, or unseen a voice (Murphy, Peters, Wilkes, & Jackson, 2016). This form of inquiry does fit this scope of study because the intent of my research is not to tell a story but to research strategies used for successful training of informatics personnel on newly implemented health information systems.

The ability to capture multiple forms of evidence within this study provided the ability for further rigor and validity of the study outcomes. One of the key strengths to case study research is the opportunity to use multiple sources of evidence which can

provide an in-depth and multifaceted exploration of the given phenomena (Houghton, Casey, & Smyth, 2017). Numerous case studies within research processes will further enhance the findings by drawing on a logic of replication while analyzing a series of cases to elaborate on theoretical relationships between the instances (Wrona & Gunnesch, 2016).

Ensuring data saturation was completed through multiple personal interviews with the participants within the study. The concept of data saturation was defined as the point in data coding when no new patterns emerge, and further data collection becomes unnecessary. Data saturation comes in four primary categories, including theoretical saturation, inductive thematic saturation, a priori thematic saturation, and data saturation (Saunders et al., 2018). The robustness of the interview questions provided added depth to the answers given by the participants giving further chances to achieve data saturation. The insurance of data saturation within this study was obtained through transcript reviews of collected data, and thorough follow-up interviews with participants until data saturation was reached. Data saturation is enhanced through the number of interviews conducted in a research study process until no further useful information is identified due to congestion (Hayashi, Abib, & Hoppen, 2019). The size of the participant pool and the open natured design of the interview questions were the two metrics used to ensure that data saturation was achieved within the doctoral study process.

Population and Sampling

The exploration of EHR implementation strategies provided a specific framework to garner qualified participants who gave real data during the doctoral research process. The process of recruiting participants must be guided with intentional selection processes.

The use of this purposive sampling technique is best used when the identification of a specific participant pool is needed, and the process of selecting relevant information is limited (Alkahtani, 2017). The participants must exhibit characteristics intrinsic to the research study. The attributes included but not limited to some years in IT, specific experiences about EHR implementation processes, willingness to participate in the study, and specific job role within the hospital.

The primary element for an adequately conducted doctoral research project is to ensure that the researcher obtains data saturation. Data saturation is achieved when the interviews no longer provide additional data like new codes and information (Cajayon, Macabasag, Limchanco, Umali, & Blas, 2017). The interview process gave open-ended questions along with probing questions to ensure the data was rich in content and had the depth necessary to achieve data saturation. The interview settings for the interviews of participants were conducted through remote conferencing means using Zoom where the environment was conducive to providing a backdrop where EHR implementation strategies were discussed and investigated. The process of proofing coded data was conducted on random participants to validate existing data and to capture additional details if needed for clarification purposes through transcript reviews.

The process of participant selection included the creation of a checklist of characteristics the researcher deemed necessary for the selected participants. Criterion sampling is an example of purposive sampling and a preferred method for selecting both the institutions and the potential participants whereby selecting a sample that emphasizes reviewing and examining all cases which meet the preset criterion outlined in the participant selection for doctoral research purposes (Papatga & Ersoy, 2016). This

process was integral to my study because all selected participants met pre-defined criteria to be accepted into the study. Multiple factors determined the number of participants needed for my research to reach data saturation. The following required considerations for applying an appropriate sample size include but are not limited to the scope of the study, the nature of the topic, and study design (Morse, 2000). This study was based on three cases and was a qualitatively driven research project, and the three cases were three large hospitals which were independently owned and operated with EHR implementations, or a mixture of regional medical clinics and hospitals totaling three that were independently owned and operated which utilized EHR systems. These three environments differed in both size and methods for providing care and provided a diverse data set to compare study outcomes. This study was conducted using three cases in three independently owned and operated hospitals or three independently owned and operated regional medical clinics in the greater Tennessee, and the number of participants was gauged based on the point when data saturation was accomplished. Criterion sampling was the mode used for selecting the participants for this study, because these individuals met certain metrics to be deemed qualified for this study. This process provided my study with enough data to achieve data saturation through personal interviews as well as document analysis processes. Qualitative research dictates that sample sizes are inherently small to support the depth of case-based analysis that is fundamental to this mode of inquiry (Vasileiou, Barnett, Thorpe, & Young, 2018). The original sample size for a case study driven qualitative research project ranges from a minimum of 15 participant interviews up to 30 participant interviews (Boddy, 2016). However, sample size in qualitative research is ambiguous in terms of specificity of the number of

participants needed to provide meaningful data. Samples in qualitative research tends to be small to support meaningful outcomes in the depth of case-oriented research (Konstantina, Barnett, Thorpe, & Young, 2018). The statement above states that in order to achieve rich and meaningful data the researcher needs to keep the number of participants per case low as it relates to case-oriented research. In qualitative circles experts argue that there is no straightforward answer relating to how many participants are needed to justify case-based research because of the number of factors to consider including epistemological, methodological, and practical issues (Konstantina et al., 2018). This completed study being straight forward in its data collection practices and study design along with the type of study topic translated into a requirement for a smaller case study use size which provided a sample size of a minimum of three participants per use case to provide for data saturation based on the interview protocol and the collection of documents for document analysis purposes. The primary participant population for choosing the individuals for this study was more significant to be capable of selecting the most qualified participants for this qualitative research study. According to the Tennessee Board of Labor Statistics (TBLS), the number of positions encompassing decision-makers and stakeholders relevant to this study is approximately 5,610 (“TOES”, 2018). The name for healthcare-relevant jobs is 1,890, and this number is based on statewide reporting from the TBLS (“OES” , 2018). These numbers promoted more than an ample size to pull potential participants for this research study. This number is representative of standard IT employment numbers industry-wide but does not reflect a fixed number specific to IT system engineers; however, with the naming conventions of these position types being proprietary to the kind of industry the position resides in these numbers

should be a good approximation towards a population size. These numbers provided ample amounts to pull the appropriate participant pool size. The number of personal interviews spanned over three organizations with at least 3 participants per organization hitting the upper end of the participant pool and when data saturation is met. The statistics above provided the population size for projected numbers based on the study during the proposal phase. This study's ending population size was updated to reflect the number of potential participants across the three partnering organizations used within this study.

The population for this study encompassed individuals who worked within their respective IT departments across the three partnering organizations. These individuals worked in varying capacities in support of the three EHR implementations within those environments. There was a population of 58 individuals spanned across the three partnering organizations of which, 10 participants were chosen who fit the eligibility metrics for this doctoral study.

Ethical Research

Doctoral research requires the researcher to ensure the integrity of the data collected, and that proper protocols are followed when obtaining consent from potential participants, including from the institutions they work for. The overarching principle regarding doctoral research processes is called research ethics. Research ethics is the process of applying ethical principles to the doctoral research process as a means of reflecting moral values and rules (Legewie & Nassauer, 2018). The method of ethical research encompassed the following principles, including data privacy/retention protocols, informed consent procedures, withdrawal processes, clearly defined

parameters for the research process, and potential incentivized methods impacting recruitment processes.

Informed consent is defined as the process whereby a participant either agrees to or declines from a research process after the process of clarifying the benefits, risks, and potential outcomes of the research study (Tarp, Sanderson, & Fore, 2017). The informed consent process provided essential information regarding the research process under investigation to potential research participants allowing them to make an informed decision about participation (Kadam, 2017). My doctoral study included two written consent forms outlining the research process, the purpose of the research, and an outline of any incentives offered for recruitment purposes. I did not use incentives to garner participant involvement in my research study. One written consent form was emailed to the three hospitals HR departments, and once approved the following consent form was emailed to the individuals who qualified for participation in my research study. Please see Appendix A for consent form that will be utilized for recruitment purposes.

Written on the participant consent forms was a clause stating individuals have the distinct right to withdrawal from the research study at any time for any reason. This statement clearly defined those parameters and clarified that no adverse impacts were weighed against those individuals who choose to withdrawal from the study. Part of the participant withdrawal process included Food and Drug Administration (FDA) guidelines stipulating if a participant requests to be discontinued in the study that the data collected from that participant will need to be maintained as part of the study (Gabriel & Mercado, 2011). These were the steps that completed the participant withdrawal process.

Incentive management within a research study is a definitive option when trying to recruit participants to take part in scholarly inquiry. The use of incentives to drive recruitment of participants is generally acknowledged to enhance recruitment rates, and this has also been proven correct with individuals who are less likely to participate in the study (Rockliffe, Chorley, Marlow, & Forster, 2018). There was no use of incentives as a means for recruitment of participants. The individuals that were involved in this study were already in a working capacity and provided the needed data for study completion.

The process for participant protections within a study were implemented through the guidance of the principles and guidelines offered through the Office of Research Integrity (ORI) and the Office of Human Research Protections (OHRP). These two entities provided full online training that was utilized before participant selections for my study. This process gave me the proper guidance to ensure the integrity of each participant by using the following protections which included the appropriate data protection protocols, the right to informed consent, the right to withdrawal from the study, and the right for the privacy of the participant (Yanow & Schwartz-Shea, 2016). The protection of study participants was governed through the IRB, which was charged with upholding federal statutes that outlined the specific criteria relevant to security compliance with the study. The primary insurance for participant protections encompassed the assurance that all data collected from all participants was securely stored with adequate data security parameters ensuring the integrity and privacy of participant data for a minimum of five years. The collected data is stored on a server with fault-tolerant protection from a raided drive array. This server is housed in an interior room that is climate-controlled and protected from power surges and will be secured

using a locked door that is keyed. The primary undertaking when discussing participant protections is the need for participant confidentiality. The process of ensuring anonymity for both the participant and their respective organization was paramount for a successful study that fits the ethical thresholds needed to ensure the integrity of study findings. Coded processes shielded participant names and their associated demographical data. These processes included naming participants participant A, participant B, and so on. These individuals' places of work were not made public and were named organization A, organization B, and so on. This naming convention, along with strict data collection and privacy standards, provided the needed protections afforded research subjects.

Data Collection

Data collection techniques vary based on the type and scope of the study undertaken, and the depth of the research question being presented often guides the researcher in choosing the right data collection methods. There are numerous data collection methods at my disposal that were specific to qualitative research which included one-on-one interviews, observation/field notes, documents, extensive questionnaires, and a series of one-on-one meetings (Berkovich & Eyal, 2017). I was the primary data collection tool by utilizing the techniques described in the following section. The data collection methods that I implemented within my study included one-on-one interviews and document analysis of existing documents that relate to the in-place implementation of the most recent EHR implementation. The type of data collection that was conducted encompassed two different data points or sets. One data set was collected through recorded interviews of the 10 participants across the three partnering organizations. The other data set was obtained through representatives of the three

partnering organizations which were collected documents in support of the last successful EHR implementation. The type of data triangulation that this data collection process is describing is known as methodological triangulation which encompasses the collection of different data sets within the same study design. Methodological triangulation is by far the most commonly used form of data triangulation by students and is most important when utilizing qualitative designs (Fusch, Fusch, & Ness, 2018). This form of triangulation was used exclusively within this study allowing for enhancing the data validity and reliability. Data analysis and interpretation technique choices rely on the performed data collection technique (Kusumawardhani, Gundersen, & Tore, 2017). The one-on-one interviews were recorded, and the data from those interviews was transcribed and stored in a secure location. In the third phase of research, the coding and the content analysis of the interview transcripts was processed through NVivo software (Roy, Battacharya, & Mukherjee, 2018). This data was processed through NVivo analysis software to discern emerging patterns within the data. The document analysis took place in conjunction with the interview process and was documented and stored securely. The collected data will be stored on a server with fault-tolerant protection from a raided drive array. This server is housed in an interior room that is climate-controlled and protected from power surges and is secured using a locked door that is keyed. Collected data was extrapolated and ran through NVivo to add to the emerging patterns gained through the interview process.

Data Collection Instruments

Data collection instruments for this study was utilized solely by the researcher through one-on-one interviews conducted remotely using video conferencing resources

through Zoom, and the researcher instructed the participant of all essential aspects of the interview process including the purpose of the discussion, the importance of their participation within the study, and withdrawal options open to the participant if they choose to leave for any reason, and the researcher will gain permission from the appropriate authorities pertaining to relevant documents that were in support of the most recent EHR implementation. Once proper consent was obtained, the researcher properly analyzed these documents for any data pertinent to the study and recorded the data in a secure location for further transcription and analysis.

The reliability and validity of study data was authenticated and validated through transcript review and data triangulation. These two processes provided adequate measures ensuring the reliability and validity of data. Reliability and validity methods start with the identification and selection of different instruments through selected readings specific to a specific research study and applying those to the given research (Van Hoeven, De Bruijne, Kemper, Koopman, & Rondeel, 2017). The concept of transcript review enabled the researcher to validate the findings after the data had been transcribed with the applicable participants thus enhancing the reliability and validity of the research data. The process of transcript review included follow-up meetings on random participants that will allow for checking the accuracy of the data that was gathered during the initial interview process to capture additional details if needed for clarification purposes and proofing transcribed data on random participants to validate existing data. My doctoral study was case study based, so data triangulation was integral in the validation process. Data triangulation provided a full, detailed, and contextual description of the data collected and analyzed within the research study, and this process

is enhanced when data from varying sources increases the credibility of the study (Smith, 2018). Transcription of data is the process of sifting through recorded interviews and written data word by word to grasp the specificity of the responses and written information relevant to the given study. Transcription of evidence is an essential step in qualitative studies and carefully after the coding of the transcribed data takes place (Suleiman, Bt Hanafi, & Bin Taslikhan, 2018). These two processes within my study formed the fundamental framework for ensuring the reliability and validity of my study data.

Data Collection Technique

Data collection techniques generally encompass open-ended inquiry, which underpins interviews, document analysis, and observations providing a topology of pattern development and identification (Berkovich & Eyal, 2017). Data collection within my study was collected through written logs, voice recordings, and assessment of participants during one on one interviews. The data that was collected was stored online through Microsoft OneDrive and managed by me where the information was secured and fault tolerant. Data collection processes work best when the collection mechanism and storage environment share a single IT tool for dissemination of the collected data (Ramic, 2017). The security protocols in place include password required access controls and biometric authentication. The first two data collection techniques was accomplished concurrently and provided the bulk of the collected data, and these are the one-on-one interviews and the collection and analysis of study relevant documents from each site. The final data collection technique was conducted upon the finalization of the individual meetings. The one-on-one sessions were recorded via a video conferencing software

called Zoom and then transcribed once all participants within the study's data was collected.

All data collection techniques come with advantages and disadvantages, and the outcome tilts more positively or negatively depending on the design and scope of the study. The benefits of one-on-one interviews include the ability to ask complex questions; visual aids can be used, and generally a higher Response rate (Jones, Baxter, & Khanuja, 2013). This method of data collection comes with the following disadvantages, including being cost-prohibitive, time inefficient, and the need for additional training to avoid bias (Jones et al., 2013). Once the data was collected then the process of reviewing other forms of evidentiary data started like performing document analysis.

Document analysis within a research context allows the researcher to comb through existing documents to glean additional information relevant to the topic under study. The use of document analysis in qualitative research uses systematic procedures for analyzing documentary evidence and helps answer specific research questions (Frey, 2018). The analyzation of documents can provide a wealth of information relating to the topic under study and comes with definitive advantages including being cost effective, efficient, readily available, stable data retrieval, and lack of obtrusiveness and reactivity (Bowen, 2009). These benefits provided the researcher with tools that increased the validity and reliability of the study data. The process of document analysis in qualitative inquiry comes with some intrinsic disadvantages like low retrievability, biased selectivity, and insufficient details (Bowen, 2009). These disadvantages provided additional challenges to the researcher through efforts of trying to minimize these obstacles.

The process of transcript review was conducted by contacting the research participants to have them review the results to either amend or approve the findings based on the data collected. The transcription process was tedious but provided word by word transcription heightening the accuracy of the data collected. The software I used was called Inscribe and provided an easy to follow interface to upload the audio file and the text editor to document what was heard.

Data Organization Techniques

Organization of study data was accomplished using detailed MS-Excel spreadsheets where the interviews were logged, and date stamped. The use of fault-tolerant storage on servers with multi-factor authentication was utilized to ensure study data is kept in a secure, fault-tolerant location. This data will be maintained for five years to ensure data privacy. The collected data is stored on a server with fault-tolerant protection from a raided drive array. This server is housed in an interior room that is climate-controlled and protected from power surges and is secured using a locked door that is keyed. Qualitative research requires more reflective thought. As a researcher, the reflexive process must be critically looked at through examining the researcher's role in the study process to earmark potential biases and ideas that might affect the study data (Orange, 2016). The study process required written logs that provided a daily summary of the research process and the addition of journals for reflection on the study process and data collection and analysis. Any written forms of data are secured in a safe for five years that is stored in a secure location under lock and key. The recorded data from interviews is cataloged into a database and labeled based on a preset labeling/naming scheme

specific to this research study. The database is password protected to ensure the security of the database is sufficient.

Data Analysis Technique

Once all study data is collected and adequately logged and stored, then the systematic process of data analysis begins. Data triangulation is the official tool used when conducting data analysis processes, and there are multiple types. Triangulation of data can combine methods and collection of data, both qualitative and quantitative, as well as different ways of data analysis (Abdalla, Oliviera, Azevedo, & Gonzalez, 2018). The four types of data triangulation include: method triangulation, investigator triangulation, theory triangulation, and data source triangulation (Carter, Bryant-Lukosius, DiCenso, Blythe, & Neville, 2014). Methodical triangulation references the use of multiple methods of data triangulation to obtain complete and detailed data about a phenomenon (Abdalla et al., 2018). Investigator triangulation is the process of using more than one researcher to collect and analyze study data (Moon, 2019). Theory triangulation is the process of validating study data using multiple theories (Moon, 2019). The investigator, theory, and data source forms of triangulation are not a good fit for my study due to their only being one researcher, this study is using only one theory, and there is only one method in use within this study. The type of data collection that was conducted encompassed two different data points or sets. One data set was collected through recorded interviews of the 10 participants across the three partnering organizations. The other data set was obtained through representatives of the three partnering organizations which were collected documents in support of the last successful EHR implementation. The type of data triangulation that this data collection process is

describing is known as methodological triangulation which encompasses the collection of different data sets with the same study design. Methodological triangulation is by far the most commonly used form of data triangulation by students and is most important when utilizing qualitative designs (Fusch, Fusch, & Ness, 2018). This form of triangulation was used exclusively within this study allowing for enhancing the data validity and reliability. Data source triangulation focuses primarily on obtaining data from multiple sources within a single data collection process to ensure a more comprehensive perspective is achieved (Moon, 2019). Data source triangulation for this study encompassed data collected from one-on-one interviews and data extracted through document analysis processes related to existing EHR implementations. The types of documents that were researched pertained to the existing EHR implementations include: project management plans, meeting notes, relevant change control logs, migration logs pertaining to how data was transposed and migrated into the EHR system, existing policies and procedures related to EHR downtime processes, and maintenance logs regarding upgrade processes, and training materials on the existing EHR implementation. The procurement of these documents was accomplished through a written approval process with the participating institutions Human Resources department and IT relevant departmental approvals.

Collected data was cataloged in an MS-Excel spreadsheet with participant labeling, the time stamp, date of the interview, and initial impression from a researcher about the participant. Once all information was collected, then the process of transcribing the data took place using a software titled Inscribe. The interviews were recorded, and the electronic file was uploaded into the Inscribe software for transcription purposes. The Inscribe software is designed to allow the researcher to conduct a minute by minute

dictation from voice to text. Once all collected data was uploaded into the Inscribe software, then the dictation process took place which converts the data from voice to text. The transcribed data was then processed through NVivo data analysis software. I currently have a two-year license for the NVivo data analysis software, which is fully functional. This software was used for coding and thematic analysis purposes. Once all the data is thoroughly analyzed, the process of extrapolating themes from the data took place, and the documenting of study outcomes began. The process for coding the collected data encompassed taking the transcriptions and uploading them into the NVivo Data analysis software, having the software to scan the transcript for patterns and repetitive data, and finally categorizing those finding so the researcher can develop themes from the extrapolated data patterns.

Once the themes were identified through the use of NVivo data analysis software, these themes were weighed against the parallels drawn from the literature review exposing substantiated or contrary patterns in the findings. This process further helped validate and prove the reliability of the study outcomes. The final process involved was to research any journal articles and other readings relating to this study topic since the study began to find additional parallels to the study outcomes. The conceptual framework that is utilized within this study pertains to the TAM framework. This framework used the PEOU and PU as metrics to judge the validity of strategies utilized for implementing EHR systems. The TAMS model is widely considered to be the model of choice when trying to understand user motivations and predicting system usage metrics (Salmona & Kaczynski, 2016). The TAM framework is the metric used to discern whether the themes developed from the analyzed study data reflect the core tenets offered by the primary

research question. The TAM framework, which is a behavioral model for end-user acceptance of technology serves as the foundational conceptual framework for those designing and deploying new technologies (Campbell et al., 2017). This framework provided the core underpinnings for theme development central to my study through the formulation of interview questions integral to the TAM framework's core principles.

Reliability and Validity

Qualitative research requires the researcher to prove that the methodologies used in the course of the study are sound, principled and securely vetted. The process of determining the reliability of study data requires the use of different processes and methods. The concept of study reliability has an embedded notion of stability of the results under scrutiny, which means the results are repeatable over time (Hayashi et al., 2019). The process of proving these metrics involved addressing four concepts: dependability, credibility, transferability, and confirmability. Authors of other research studies have focused on the reliable measurement of qualitative data through the use of decision-theoretic loss function, and they model the loss to the researcher for using wrong judgments along with other quantitative measures that could be transposed in qualitative data (Petrescu & Lauer, 2017). These processes were completed using the following steps, including data triangulation and participant transcript review.

The first step in proving the reliability and validity of study data requires justifying dependability of data. Triangulation of data is commonly utilized in qualitative research to establish three of the four criteria: credibility, dependability, and confirmability (Ang et al., 2016). Triangulation of data is the process of establishing reliability and validity of data through cross-checking study data against each other

through multiple methods during data analysis. The credibility of study data is achieved through developing confidence in the truth of the data and by interpreting it truthfully (McInnes, Peters, Bonney, & Halcomb, 2017). Transcript review processes and triangulating data were the methods used to prove the dependability of the study data.

The second step in proving the reliability and validity of study data involves establishing the credibility of data collected. Demonstrating credibility requires a continual assessment of assumptions by the researcher, forcing revisions of results along with retesting theories and models and reappraising the study limitations (Sumskis & Moxham, 2017). Credibility is all about the validation of external indicators that help prove the credibility of study data such as being published in a peer-reviewed journal. Some factors that are judged as credibility indicators include the publication of findings and the amount of citation of study work (Billot, Rowland, Carnell, Amundsen, & Evans, 2017). The processes for proving credibility in this study involved the same methods as when determining dependability which included transcript review and data triangulation.

The third step in proving the reliability and validity of study data involved demonstrating transferability. The process of establishing transferability relates to whether findings of a given study have more substantial import and application to other settings or studies (Colorafi & Evans, 2016). The basic tenets of transferability refer to the potential for the study data to be utilized outside of the original research for comparison or referral purposes. The researcher must provide adequate thick descriptions and contextual details/argumentations to persuade readers of the transferability of study outcomes (Parker & Northcott, 2016). The steps in proving transferability involved allowing the study findings that are propped up by the study data to stand on its merit.

This process provided the needed platform for delivering the reader the information to discern the importance of the study findings relevant to external situations and applications.

The fourth and final step involved in proving the reliability and validity of study data is to establish the confirmability of study data. Confirmability is the qualitative equivalent of the quantitative counterpart objectivity, where two independent auditors agree on the meaning, relevance, and accuracy of the data presented (Wirihana et al., 2018). The confirmability was proven in my study through transcript review and data triangulation methods.

Proving data saturation is a vital step in ensuring the reliability and validity of study data and outcomes. The researcher must understand that to reach data saturation it is an ongoing and gradual process, versus a time-limited process that leads to thin descriptions (Aldiabat & Le Navenec, 2018). The steps in reaching and ensuring data saturation involved data triangulation methods. The ability to triangulate data, which helps to prove that new data patterns have emerged also helps with data validation. Triangulation of data is the fundamental process in reaching data saturation and will be the primary process for ensuring data saturation within my study.

Transition and Summary

The second section of the doctoral study process entails laying out the case for how the study will be conducted and clarifying the processes in place for implementing the frameworks for participant selection, data collection processes, methods for ensuring data saturation is achieved, data analysis and coding of data including thematic analysis, and ensuring reliability and validity of data within the study. There are multiple sections

specific to each step in the doctoral study process that gives granular details relative to the doctoral completion process.

Section three included getting approval through the institutional IRB, contacting the selected hospitals to begin the vetting of potential study participants, scheduling interviews and document analysis processes, and collecting data, storing data, and analyzing data to formulate the applicable study outcomes. Once all the data is collected, data saturation is achieved, and the information is correctly interpreted including ensuring reliability and validity of the study outcomes, then it will be time to write up the results and complete the final portions of this study.

Section 3: Application to Professional Practice and Implications for Change

Overview of Study

The purpose of this qualitative multiple case study is to explore the strategies used by IT systems engineers for the implementation of HIMS that govern EHR. This study comprises three partnering organizations throughout the greater Tennessee area within the healthcare field. Naming constructs used for the three partnering organizations for confidentiality purposes included organization A, organization B, and organization C. There was a total of 10 participants spread across the three partnering organizations. The breakdown for naming these participants for confidentiality purposes will be based on the organization they were representing, i.e. AP1 = participant 1 representing organization A. Table 1 shows a representation of this example:

Table 1

Representation of Participant Identifiers of Interviews for the Three Partnering Organizations

Study participants	Organization A	Organization B	Organization C
Participant 1*	AP1		
Participant 2*	AP2		
Participant 3*	AP3		
Participant 1**		BP1	
Participant 2**		BP2	
Participant 3**		BP3	
Participant 4**		BP4	
Participant 1***			CP1
Participant 2***			CP2
Participant 3***			CP3

These organizations shared the common goal of implementing an EHR system within their environment which provided the needed efficiency gains to daily workflows, among other aspects. This doctoral study uses the TAM as the conceptual framework, and it is with this in mind that the themes about to be discussed took shape. The process of data collection changed

drastically with the onset of the COVID-19 pandemic in March 2020. The Walden University IRB adjusted how doctoral students could collect their data via remote means due to these challenging times. I chose to use Zoom as my medium for conducting interviews as it allowed for recording interviews for transcription and transcript review purposes.

The document collection phase was done through email correspondence and helped with collection processes for document analysis purposes. These new methods for collecting data helped with logistical challenges due to the pandemic and were instrumental in the completion of the data collection phase of the study. Analysis of the two data sets through NVivo software using methodological triangulation provided the study with robust outcomes through theme development due to having the capacity to draw like patterns from the data extrapolation of the disparate data sets. This process provided richer study findings and enhanced the validity and reliability of the study data. The following two themes were the anticipated theme structure going into the data analysis, and these proved to be accurate interpretations of the data: implementation strategies and technology acceptance. Multiple sub-themes formed through thematic analysis under these two main themes. The sub-themes developed under implementation strategies included communication, SDLC practices, and stakeholder buy-in. Technology acceptance has four sub-themes, including future implementation strategy trends, the importance of HIMS, PEOU and PU, and Stakeholder buy-in. Stakeholder buy-in is listed twice to illustrate the direct link to the acceptance of technology relative to the implementation strategies used and the importance of the stakeholder's self-worth to the implementation process.

Presentation of Findings

The presentation of the study findings must begin with the overarching research question: what are the strategies used by IT systems engineers when implementing HIMS that govern

EHR? This doctoral study centered on three partnering organizations in the greater Tennessee area that worked within the healthcare field and had recently implemented a successful EHR implementation. There were 10 participants from across the three partnering organizations. The total number of documents collected from the three partnering organizations was 16. Transcript reviews were conducted on eight of the 10 participants, ensuring the validity of study data. The premise surrounding this study links the adoption of technology with the successful outcomes related to EHR implementations central to the implementation strategies used.

The primary themes that developed included implementation strategies and technology acceptance. Implementation strategies had communication, SDLC practices, and stakeholder buy-in as its three sub-themes. Technology acceptance had four sub-themes. The four sub-themes for technology acceptance include future implementation strategy trends, the importance of HIMS, PEOU and PU, and stakeholder buy-in.

Theme One: Implementation Strategies

The first of the primary themes involved exploring implementation strategies as they relate to HIMS that govern EHR systems. These strategies either succeed or failed, so I wanted to explore strategies used during the successful implementation of an EHR system. Theme one was the primary focus of this study named implementation strategies and provided the core context for how these implementations provided successful outcomes. Theme one provided the primary constructs for a successful EHR implementation for the three partnering organizations. The findings within theme one used an interview protocol that was designed to use concepts from TAM, which provided a methodology that allowed for questions designed to link implementation strategy to the acceptance of technology within these three environments. PEOU and PU allowed the questions' design to guide the thematic creation in a manner consistent with

this study's conceptual framework. TAM allows for five key concepts, including PU, PEOU, attitude towards using, behavioral intent to use, and actual use (Racero, Bueno, & Gallego, 2020). These concepts governed the development of the interview protocol used for this study and the principles used for analyzing collected documents.

Theme one encompassed three sub-themes that promoted the use of effective communication, SDLC practices for governing the actual implementation, and stakeholder buy-in, which allowed for successful EHR implementation. The study findings provided an innate understanding among stakeholders of the implementation process that successful strategy creation and mitigation allowed for increased technology adoption of those technologies tied to the EHR implementation. Project planning before the implementation process was found to be crucial in the creation of effective strategies. AP3 stated, "having a complete project plan was necessary to complete the implementation, and there were deadlines that were tied to each piece." Effective communication across all organization domains provided the needed protocols for mitigating misunderstanding during the implementation process. BP4 explained, "having a plan of communication around what was the output of these big design sessions and knowing what was going to be implemented versus what isn't made having a communication plan huge." This substantiates the need for effective communication as part of the project plan going into an EHR implementation.

The structured processes encompassed under SDLC Practices allowed for a roadmap that was flexible enough to alter when conditions warranted. CP2 stated, "there needs to be a rigid process by which requests for optimization and enhancements and maintenance are reviewed, approved, resourced, and scheduled." This reference points directly to the importance of having a structured process in place during an implementation process of this magnitude. The disparate

groups throughout these three partnering organizations understood the importance of having a voice during the implementation process, which promoted self-worth. All three of these sub-themes contributed to the acceptance of the newly implemented technologies through increased confidence with the implementation process and increased operational understanding of the technology implemented.

The original research problem became substantiated based on the findings from this study. The literature in the review mentioned the importance of effective communication, the importance of having a framework of structured processes in place fit around SDLC practices, and the importance of the people the implementation impacts having a voice in the design and implementation of the actual EHR. These three components are directly aligned with the review of the academic literature and provide further proof of the validity of the study outcomes main themes tied to theme one and their correlation with this study's conceptual framework. The following table shows the numbers of references divided by interviews and documents for theme one per organization:

Table 2

Number of References for Theme One: Implementation Strategies per Organization

Themes and sub-themes	Organization A		Organization B		Organization C	
	Interviews*	Documents**	Interviews	Documents	Interviews	Documents
Implementation strategies	22	0	48	0	32	0
Communication	4	0	15	0	14	0
SDLC practices	47	6	55	21	50	11
Stakeholder buy-in	43	3	112	1	56	2
Total	116	9	230	22	152	13

Note. * number of interview references per theme per organization.
** number of references extrapolated during document analysis per theme per organization.

The TAM conceptual framework which includes PEOU and PU, as it relates to implementation strategies, provide a direct correlation between the positive or negative perception of the implemented technology based on the strategies used. The constructs of PEOU and PU are the core tenets of the conceptual framework used in this study, which provides the connection between the use of the implemented technologies and corresponding acceptance of that technology. Behavioral intent to use is frequently analyzed through the use of certain constructs to address the acceptance of emergent technologies (Racero, Bueno, & Gallego, 2020). The study outcomes tied to implementation strategies have provided evidence that directly links the successful implementation of all three of these instances of EHRs to the receptiveness of end-user engagement of those systems. Successful strategies for implementing these systems provided the foundational aspects that proved fruitful regarding the end-user acceptance of these technologies. The successful implementation strategies identified in this study provide the context for correlating the conceptual framework with theme one: implementation strategies.

Subtheme one: Communication. The prospect of any EHR implementation failing has to leave the stakeholders and decision-makers with plenty to think about regarding the fall-out of such an endeavor. The success of the implementation strategies used during a given EHR implementation must include a thought-out communication strategy. Communication has to be applied throughout the given organization and is definitively inter-departmental during large enterprise-level implementations. BP2 stated that “They needed to gain the counsel of a broader audience and bring everybody in just to collaborate.” These changes are always systemic and require synchronicity among stakeholders.

Through data analysis processes, the sub-themes teamwork/collaboration and documentation developed. The data from the transcripts of the interviews of the various participants, along with the collected documents, showed acute importance on effective communication between team members within a team and between different teams across the organization. AP2 stated," We would have them go through their workflow, and then the team would go back in, put together what they thought would work. So, we would, you know, put together pieces based on what they said they did. We would create a workflow." These workflows were strategized and created collaboratively through teamwork practices and principles. Communication strategies were integral in discerning loss of continuity between teams across the organizations as it relates to system integration among job roles and specific functionality. Teamwork and collaboration were deemed essential aspects to a successful EHR implementation, and the communication between those teams helped define the integral pieces during collaborative phases of the implementation. The need to have effective communication was apparent in these dynamics and helped push the link between teamwork and collaboration and proper documentation.

The importance of having thorough documentation was evident through the data analysis during this doctoral study. The prospect of a lack of documentation played an essential role in the understanding of the need for an apparatus surrounding project management. BP2 stated," it forced us into documenting things much better than we ever got before." Documentation is essential when practicing project management principles. The practice of adequately documenting the policies, processes, and best practices provides a vital link to successful EHR implementations. All three of the partnering organizations provided data that underscored the importance of proper documentation and how it translates to successes among teams within the

given organization. The other sub-theme SDLC practices provided a structure with concerns about EHR implementations.

The TAM conceptual framework which includes PEOU and PU are directly tied to a proper communication strategy through the use of effective communication protocols among stakeholders. The concept of effective communication has been tied to successful implementation outcomes in numerous projects, and it is through this particular strategy that subtheme one, communication protocols, are directly linked to this study's conceptual framework. The lack of communication among stakeholders often dooms the outcomes of technology implementations. The success of the process of effective change is individuals' active participation in the change implementation, also through adequate communication and training (Molino, Cortese, & Ghislieri, 2020). Communication is one of the core tenets to any successful project management outcome and how well communication protocols are adhered to can and will translate into changes of end-user perception of the implemented technology.

Subtheme two: SDLC practices. The data analysis showed that SDLC practice was essential in promoting a successful EHR implementation. SDLC stands for system development lifecycle and provides dependent on its application five or more stages relating to the design of a given system, implementation of a given system, and the testing and monitoring of the given system once implemented. BP1 stated," there's a lot that goes into when you look at the implementation, you got to be able to train. You got to be able to design it, build it, you got to be able to test it." The next sub-theme, named structured processes, provides the context that SDLC practices are structured and provide the framework for the seven sub-themes mentioned below. BP2 stated," it's, you know, vendor management, change management and, you know, just monitoring the feedback we're getting in taking it and making it something actionable that our

analysts can try to affect change on." This participant is speaking to the need to have a structured process in place among stakeholders to provide constructive changes to systems based on end-user feedback. The seven sub-themes within this section include current state audit, EHR implementation scope, future state audit, governance, standardization including sub-theme customization, system testing, and training.

The planning of any enterprise-grade implementation includes having a firm grasp of what your existing environment looks like, providing a snapshot that they can utilize when planning the implementation of the replacement of the EHR system within the three partnering organizations. The data showed the importance of having an audit of the current system, which provides a blueprint that creates a pathway on how to integrate/change current processes and workflows to align with the implementation of the new EHR system. BP3 stated," we went through and said strategically, here's all the stuff that we have, um, we need to replace that and then when we were looking at vendors, we said, which vendor has the best broad overall infrastructure to not only help us replace what we have but with our long term vision, um, there's ah, we would set a foundation to build on." This participant was speaking to the importance of grasping what the current environment looked like and comparing that to the list of applicable vendors to find the best fit for their needs, which shows the importance of conducting a current state audit.

The process of implementing an EHR system can be daunting by the extreme magnitude of the project. This component of SDLC practices developed from analysis of the study data shows that across all three partnering organizations, the scope of an EHR implementation was central to achieving a successful outcome. Project scope had to include a current audit of the security levels and access rights of end-users in the current system. CP2 stated," So the way

security is set up is you're given a job or template, and your access is based on what you need. So, everybody needs access to look at the patient. But what within that patient do you need to see and do?" This particular component showed the importance of well-defined project management principles and how these principles helped mitigated project scope creep and other factors that allow for resource hemorrhaging when properly defined boundaries are not utilized and set before the implementation of the given system.

The following component developed through analysis of study data shows the importance of ongoing audits as it relates to maintenance and upkeep of the newly implemented EHR systems regarding new features and system builds. AP3 stated," one of the things we did after implementation is you go back, and you do assessments 30 90 120 days out. What's working well? What's not? um, and that is another strategy that worked." The ongoing system audits play directly into future state audits due to the continual assessments needed for future upgrades and maintenance cycles. The prospect of not having the framework in place to conduct periodic audits to ensure system stability and translating that into actionable intel for the implementation of feature packs and other system enhancements does not bode well for long term success of the given EHR system. Ongoing monitoring and auditing of the system to promote the evolution of future adjustments to the system, allowing for increased efficiency gains of workflows were some of the findings of this doctoral study.

Project management processes within the context of EHR implementations require some level of governance as a final destination for decision making relating to system implementation. The data that was analyzed showed that governance played a vital role across all three partnering organizations in how disputes on design matters resolved among the different stakeholders. AP3 stated," One of the things that we put in place before we even got into it was, we had what we

call a governance structure." A governance structure was central to all three of the partnering organizations relating to final decision making surrounding their specific implementations of EHR systems. The governance structure was comprised of stakeholders across multiple disciplines to allow for accountability and level decision making processes. BP1 stated," So, it was essential when I talked about that governance structure before, that was just not within the IT team. That was across eight different hospitals with eight different medical staff with eight different nursing staff. And so, you've got to be able to maintain that collaboration and that allegiance because that's going to be critical to maintaining your cost basis or reducing your cost basis." The participant references mentioned earlier specific to the need for a governance structure explains the importance of having an apparatus in place where conflict resolution is central and helps promote continuity among stakeholders.

The need for system integration and standardization based on the analysis of the data was a finding in this doctoral study. AP3 stated," they did a type of security matrix." This matrix allowed for standardizing their security apparatus for the newly implemented EHR system. Each organization did vary in their interpretation regarding the extent that standardization is needed. BP2 stated," They wanted to implement one system across the system." This participant worked for organization B, who had disparate EHR systems across the various hospitals and medical clinics within their environment, and they were standardizing the interface across all entities. These variations specifically point to their understanding of their specific environment and how best to apply these standardizations. Organization A and Organization C implemented the same type of EHR system and had similar design methods for how the implementation was going to play out. Organization B went with a different EHR supplier/vendor and had to integrate dissimilar environments into one cohesive, integrated unit across all healthcare landscapes.

The next component within standardization is customization discussed below. This subset was developed and added below the standardization component as an extension of the standardizing of the environments across all three partnering organizations. Customizations are necessary on a granular level to promote efficiency gains and role-based metrics for different users within the system. BP4 stated," you know, for us, uh, you know, there's the security piece, obviously, passwords and access. Uh, we based off of HIMS staging and implemented role-based access." The differing job roles and other work functions specific to a job class or type require further tailoring of the system to enhance the efficiency gains and security needs gleaned through the analysis of the study data.

System testing is a component of SDLC practices that developed during data analysis that was uniform across all three partnering organizations. The prospects for the failure of the system increased without a proper framework for conducting testing of the systems with the EHR before the go-live date. CP2 stated," I was also the designated interfaces person. So, any time there was a specific interface, there had to be different testing for that system to interface to this and, you know, and to map out all the fields from that system to this system." System stability was an integral piece to the strategic mission for all three partnering organizations, and their mindset was that system testing was central to that outcome.

The training of stakeholders within the given EHR system was deemed an essential strategy among all three of the partnering organizations and tied directly to the buy-in of stakeholders and the acceptance of this technology once implemented. AP3 stated," one of the key things with our training is that the big part of the, um of the implementation is you adopt folks, we have vital trainers on our IT team." These stakeholders often were actual users of the system, and it afforded the partnering organizations the ability to gauge the receptiveness of

these individuals and allow them the opportunity to become familiar with the system before the go-live date providing valued resources for training future users of the system.

The TAM conceptual framework which includes PEOU and PU were integral in the implementation processes surrounding SDLC practices through the perception that the more structure that was used in the implementation, the better perceived the outcomes were going to be by the end-users. The SDLC practices provided a rigid guideline for processing through the multiple stages of the implementation process, providing a path for end-users to be a part of the implementation phase through testing the EHR system before it goes live. This process allowed the end users to get familiar with the new system and to provide feedback to the implementation team for changes that would better promote acceptance of the implemented technology. Implementation strategies that employ SDLC practices allow for molding the perception of stakeholders by giving the appearance of well thought out implementation processes, and this directly steers the attitude towards the future use of the purported technology. Perceived usefulness of the system, social influence, PEOU of the system, and top managers' support had the most impact of the actual end-user intent to use the newly implemented technology (Alipour, Mehdipour, & Karimi, 2020). The constructs noted in the preceding reference show the innate link between implementation strategies created surrounding subtheme two: SDLC practices and this study's conceptual framework.

Subtheme three: Stakeholder buy-in. One of the most prevalent themes that developed was the importance of stakeholders within the three partnering organizations. These individuals not only had a voice during all facets of the implementation process, but they also had a sense of being heard and of self-worth. AP1 stated," It was group decision making, so we make decisions together, and that was a very different approach. Um, I mentioned earlier about the guiding

principles." These aspects are the sole reason stakeholder buy-in is directly linked to technology acceptance. The rates individuals adopt or accept the technology in their presence links to the strategies used for implementing those technologies. AP2 stated," I think the most significant change was we owned it, in the initial rollout, we didn't own it. The team who came to help us from the EHR company owned it and led it, and we just kind of assist. So, moving forward as we started owning it, we made it more specific to our organization." This participant discusses the idea of the sense of ownership needed for moving forward on subsequent upgrades and maintenance cycles. One of the main goals that the data showed was an innate understanding of bringing the different stakeholder groups on board to provide a more inclusive implementation experience. The subsets developed within Stakeholder buy-in include core stakeholder responsibilities and ownership of implementation.

One of the driving forces for stakeholder buy-in is a sense of responsibility the end-user of the applicable EHR system has with regards to their stake in ensuring the system they interface with is reliable and stable. All participants had central roles specific to the current EHR and the impending implementation of the new system. These roles varied based on the organization and the stake these participants had in the strategy creation and implementation process. CP2 stated," she had a background in clinical research, mainly in budgeting and billing and that type of thing. So, I was brought onto the team to sort of be the specialist in clinical research billing." The example shown in the preceding reference proves that these participants are integral to the implementation process due to their wealth of knowledge and experience related to the sub-systems within the EHR systems. These aspects of their duties in the job within the context of the EHR implementation are what drive the participants' need for adequately

assessing and directing the processes and decision making relative to the EHR implementations at all three of the partnering organizations.

This component links directly to core stakeholder responsibilities due to the stakeholders' understanding of the workflows that happen daily regarding their respective EHR implementations. The sense of ownership for the stakes in all three of the respective EHR implementations across all three partnering organizations was prominent from the analysis of the study data. BP1 states," Because we had people with ownership and people with perspective. We did a lot of implementation early on that ounce of prevention is worth a pound of cure." This participant is stating that showing a sense of ownership and urgency helped with problem mitigation and prevented problems in the near term.

The accountability of the different EHR vendors was showcased by the three partnering organizations through extensive meetings and back and forth with the vendor to make sure they understood that these implementations were not going to be cookie-cutter in nature. CP1 stated," I would say that the strategy of involving hundreds of subject matter experts, um, allowed the institution to um, get a taste of the product before it was implemented. Um and so I think you know, and that's kind of how we sold recruiting people to be subject matter experts for testing as well as conversion testing." Buy-in from numerous groups of people across the entire healthcare domain ensures that the sense of ownership is ever-present as the other reference stipulates.

The TAM conceptual framework which includes PEOU and PU are tied directly to stakeholder buy-in as the two components correlate directly with one another. Stakeholder's perception that their experiences and input into the process matters promotes both self-worth to the process and self-efficacy. Stakeholder theory provides strong statements regarding how firms should implement a business management directive focusing on a stakeholder approach that

considers the roles and concerns of the stakeholder into their organizational policies because they impact the outcome and survival of the firm (Priego-de-la-Cruz, Alfaro-Cortes, & Manzaneque-Lizano, 2020). The other reference underscores the importance the stakeholders have on the implementation process relating to the three EHR implementations performed across the three partnering organizations. Subtheme three: Stakeholder Buy-in and this study's conceptual framework are directly tied to one another through the understanding that the buy-in process of stakeholders enhances the perception of the outcomes of the implementation process and how that translates into the adoption of the implemented technology.

Theme Two: Technology Acceptance

The implementation strategies described above laid the groundwork for the implementations conducted at all three partnering organizations. The success of these implementations were the driving metrics used to gauge end-user acceptance of the applicable systems and provided needed data for decision-makers on what steps to take going forward on system maintenance and future upgrades.

The concepts surrounding theme two are directly aligned with TAM. The five key concepts of TAM include perceived usefulness, perceived ease of use, attitude towards using, behavioral intent to use, and actual use (Racero et al., 2020). All five of these concepts directly correlate with the four sub-themes tied to theme two, including the future trends related to implementation strategies, the importance of HIMS, the PEOU and perceived PU of the implemented technology, and importance of stakeholder buy-in.

The importance of future trends related to EHR implementation strategies helps substantiate how the acceptance of technology will be directly impacted in future endeavors among organizations within healthcare. AP1 stated," How we can integrate technology into the

needs of the users to deliver on whatever those goals are and how to get everything mobile. How did you find voice assistance? Things like that. Free uptime. Make them more efficient." This participant clarifies the importance of keeping cutting edge technologies at the forefront as they make systems and workflows more efficient.

The PEOU and PU among stakeholders encompass behavioral intent to use and the actual usage patterns of the technology. CP3 stated," But in terms of the training that they received, I think, um, there was an emphasis on how to do things. But how to do things the most efficient way to help with the ease of use perception. Um, you know, to help with ease of user perception. So, I think by focusing on the audience for the training and by focusing on how to do things the most efficient way, you set yourself up for success." This participant used the training analogy to underscore the importance of the ease of use perception and shows there is a correlation between strategies for end-user involvement and corresponding end-user acceptance of the technology. These aspects are directly governed by the perception of how well future trends are implemented.

The importance of HIMS was foundational in the understanding of the importance of properly designed and orchestrated strategies used in the EHR implementations and how they play into technology acceptance regarding EHR's. BP1 stated,' Well, operationally, they are critical. Due to the fact, they enable us to provide the care that we need to provide; you would expect that they're going to have the, oh, a clinical best practice, best evidence medicine that's been captured inside the system and that best practice serves the basis as to how we're going to be able to provide care to our patients." This participant is discussing the importance that HIMS plays an integral role in supporting healthcare providers with the tools they need for enhancing patient-centered care. All stakeholder's understood that without HIMS as the foundation, then

the full benefit of EHR systems could not be fully realized. These aspects played into the stakeholders' perceptions regarding technology acceptance.

PEOU and PU bring the primary constructs of TAM together and make them central to technology acceptance and the indirect link they play in the perceptions surrounding implementation strategies. AP2 stated," I think it's essential for a new user who's being trained to understand how to use the system. But I also think it's essential for them to understand how to customize the system because every user is different, and what they do daily is different. So, there's a lot of features in the system that are standard, and everybody gets trained on them. But then there's a lot of things that you can go in as an end-user and customized to meet your needs." This participant is discussing the importance of the ability to customize your environment to support your specific needs, and how this process can play into the PEOU of the system that is being interfaced. The PU of the implemented technologies corresponds to the stakeholder's perception of how well the implementation strategies worked during the implementation process.

Stakeholder buy-in provides the primary link between theme one and theme two. Stakeholders are not only the individuals who help implement the EHR system, but they are end-users of the same system. This role gives these individuals a unique perspective regarding their acceptance of the implemented technologies as it relates to implementation strategies. The acceptance of these technologies by stakeholders is predominantly driven by their understanding of their importance to the implementation process and the promotion of self-worth regarding their say in the process. BP4 stated," You know, I think when you do have that collaboration, and you know, for example, if I went back to barcode med admin, um, you do gain a lot of buy-ins." This participant states that collaboration among stakeholders is essential when instituting or implementing systems that promote heightened buy-in. These components discussed are

substantiated and fall directly in line with those written in the review of the academic literature. There are no variances between any of the study findings and those written about in the existing literature.

The TAM conceptual framework which includes PEOU and PU are tied to technology acceptance through the powerful constructs related to the TAM framework (PEOU and PU). The perception of an implemented technology of whether it is good or bad largely governs the end-users attitude towards the technology's actual use. PEOU relates to the end-users perception of how intuitive the technology is and how easily navigable the interface of the technology is. PU points to the end-users perception of the technologies' actual usefulness within the context it was implemented. Meaning does this technology provided a needed benefit to the operational environment it inhabits. This end-user perception is guided by the implementation process on whether how well or poorly it was designed, installed, and communicated to the stakeholders. The use of systems relies mainly on the perceived ease of use, and not on services or trust of the companies (Ganciu & Niculescu, 2019). Theme two: Technology Acceptance is directly aligned with this study's conceptual framework through PEOU and PU, respectively. The direct correlation of PEOU and PU to the adoption of technology relates to technology acceptance through the perceptions of end-users. To further explain the breakdown of the coded references for the coded themes and sub-themes for theme 2 there is a table on the next page. The following table shows the number of references divided out between interviews and documents for theme two per organization:

Table 3

Number of References for Theme Two: Technology Acceptance per Organization

Themes and sub-themes	Organization A		Organization B		Organization C	
	Interviews*	Documents**	Interviews	Documents	Interviews	Documents
Technology acceptance	0	2	0	1	0	50
Future implementation strategy trends	13	0	14	0	5	0
Importance of HIMS	4	0	9	0	4	0
PEOU and PU	14	0	15	0	13	0
Stakeholder buy-in	43	3	112	1	56	2
Total	74	5	150	2	78	52

Note. * number of interview references per theme per organization.
** number of references extrapolated during document analysis per theme per organization.

Subtheme one: Future implementation strategy trends. One of the key themes for future maintenance and upgrades by stakeholders stated that the implementation of future technologies looked bright and added to the push of technology adoption and acceptance. BP3 stated," some of the insight that we gained is that, um there was a lot more communication that we needed to do with ah, with each one of them, um, the hospitals at the executive level because they were genuinely engaged and wanted to make sure that their areas were being fully covered in that their staff would be ready for this, no matter what." The premise of the preceding reference is things like increased communications are fundamental aspects of future implementation strategy trends. These strategies need to be altered in future implementations to allow for increased chances of successful outcomes.

The forefront of technology provides a birds-eye view into the up and coming strategic trends related to new tools and features that are EHR specific like mobile technologies for order sets and the integration of the dissimilar systems of an EHR into one cohesive system. AP3 stated," what we see when we pull data, we have data that we can pull on users to see how they use the system, what tools they use in the system and how their product is. So, the link is real, because I can take a doctor who has personalized his templates for his notes. He created his smart text. He's got his order sets personalized. He's created favorites and panels, and he spends half the amount of time, making his notes. He's got better information in his notes, and he spends half the amount of time doing order entry, and he's not ordering a whole lot of extra stuff just because it's on the order set." This participant points directly to the importance of the advances in mobile

technologies that integrate with subsets of an EHR system dealing with improved efficiencies of order sets and their processing times. The underlying piece to the other reference relates to the seamless integration among sub-systems and how they intertwine into the more extensive enterprise-level system an EHR encompasses. These are two examples of the technological advances the participants foresee in the next few years.

The TAM conceptual framework which includes PEOU and PU are tied to future implementation strategy trends through the understanding that future trends in healthcare technologies translate into actionable strategy creation for future implementation processes. The upkeep and maintenance of the newly implemented system over time provide the conduit for strategizing future wants and needs for the existing system. These brainstorming sessions among stakeholders are the seeds for future implementation strategy trend development. Implementation strategies are methods or techniques utilized to enhance the adoption, implementation, sustainment, or scaleup of interventions (Nguyen, Chu, Powell, Tran, & Nguyen, 2020). These constructs referenced in the preceding statement provide evidence that strategy development, in general, lends to the creation of actionable items able to be utilized for sustainment and upscaling purposes on the implemented technology. Subtheme one, Future Implementation Strategy Trends, ties into this study's conceptual framework through the understanding that implementation strategy development is vital in the implementation of existing technology leading to innovative strategy creation for the maintenance and upkeep of future technologies. These processes lead to enhanced acceptance of the implemented technologies.

Subtheme two: Importance of HIMS. All participants across the three partnering organizations stated they understood that an end-users understanding of the importance of HIMS was indirectly tied to technology adoption in healthcare as it relates to EHR systems. BP2 stated," The way that we care for patients now, the inability to do that without technology, it's just ultimately, it's impossible." This participant underscores that the older processes that predate EHR systems are virtually impossible to get the same level of care and gains related to patient care and charting practices, and this is directly linked to the importance of HIMS in healthcare. HIMS was understood to be the foundation from which EHR systems reside, and without these systems the ability to tie the multi-faceted systems together would become exponentially more difficult. The comparison of paper-based methods of record-keeping and EHR systems which automate the charting process seems trivial at first glance. Still, the advancements in technology surrounding EHR systems can't go unnoticed. CP3 stated," really is just about transforming, um, operations transforming clinical care translating, um, research discoveries and implementing them in a clinical setting. Either to further validate them or to take them from research to routine care. Um, electronic health records, are integral to everything that happens in health care these days, including even the smaller physician practices in such billing, of course." This participant discusses the transformational aspects of daily workflows and how these are being realized into daily routine care. This reference points directly to the understanding of the importance of HIMS as the foundation of EHR systems today.

The TAM conceptual framework which includes PEOU and PU are directly linked to the importance of HIMS through the participants understanding that without one component (HIMS), there would not be the other (EHR). HIMS is the foundational infrastructure that EHR's are built. The importance of HIMS was seen as integral to the successful implementation of the respective EHR systems across all three of the partnering organizations. These two systems are not mutually exclusive when discussing the EHR system in its entirety. A management information system (MIS), which is one of the six building blocks of a health system, is essential for planning strategically, priority planning, and decision making (Begum, Khan, Adamou, Ferdous, & Muhammad, 2020). The other reference outlines the importance of MIS, which is a subset of HIMS being important to organizations due to planning, prioritizing, and decision making, all of which promote enhanced end-user acceptance of implemented technologies when developed and utilized correctly. This subtheme directly ties to this study's conceptual framework for those reasons.

Subtheme three: PEOU and PU. PEOU and PU are the primary constructs of the TAM, which was the conceptual framework that guided this doctoral study. These two constructs are what provides the link between end-user adoption rates and the success/failure of EHR implementation strategies. AP3 stated," Being able to deliver and being able to, um, communicate, okay. Then they visually see that you're coming and you're working through, your work on the computer, and everything you're visually working you're working within, and they can access building that confidence that everything is going to, um, to be as smooth as possible." These participants speak to the

need for ownership in the system and being able to see the positive outcomes through effective communication and interaction of the system during implementation, tying directly to PEOU and PU, respectively. All three of the respective implementations studied in this doctoral research project provided data that supported the correlation between increased adoption rates of the given technology and the end-users' PEOU of the given system and the PU of the given system. One subset that developed from this category was implementation challenges.

The analysis of the study data stated that with any systemic implementation, there will always be challenges; but, with proper mitigation strategies, they can mitigate the challenges properly, and the outcomes will be even more fruitful and beneficial. BP4 stated," you know documentation is vital when you do put 50 people in a room and get feedback. You know, that's a challenge just in and of itself. How your reporting that feedback." This participant discussed directly that a challenge to implementation is a lack of documentation processes and how it is crucial to assess and correct those practices when dealing with a large group of stakeholders. The implementation of any enterprise-level EHR system will always have pitfalls that become the project as miscommunication among stakeholder groups are common, and missteps take place due to differing visions going forward concerning design plans and various other aspects specifically between EHR vendors and the organizations where the implementation are taking place.

The TAM conceptual framework for this sub-theme are directly tied to PEOU and PU through the correlation of technology acceptance and the perceptions of end-users gleaned using PEOU and PU constructs. PEOU is the end-users perception of how

intuitive the technology is and how easily navigable the interface of the technology is. PU relates to the end-users perception of the technologies' actual usefulness within the context it was implemented. Meaning does this technology provided a needed benefit to the operational environment it inhabits. This end-user perception is guided by the implementation process on whether how well or poorly it was designed, installed, and communicated to the stakeholders. The use of systems relies mostly on the PEOU, and not on services or trust of the companies (Ganciu & Niculescu, 2019). Subtheme three: PEOU and PU is directly aligned with this study's conceptual framework through PEOU and PU constructs, respectively.

Subtheme four: Stakeholder buy-in. One of the most prevalent themes that developed was the importance of stakeholders' buy-in within the three partnering organizations, and this is the predominant reason, it links under the theme of technology acceptance. These individuals not only had a voice during all facets of the implementation process, but they also had a sense of being heard and of self-worth. AP1 stated," Okay, so it was constant meetings of 800 – 1,000 people in huge hotel rooms. Wow. Um, being able to agree on how it was going to impact their work. So, they bought it. And every time they were able to meet with the teams, they got a little more engaged in how the implementation was going to impact our lives." This participant was discussing the understanding that involving 800 to 1000 stakeholders and making their contributions to communication essential increased the buy-in of the product implementation. These aspects are the sole reason this sub-theme links directly to technology acceptance. The rates individuals adopt or accept the technology in their

presence links to the strategies used for implementing those technologies. One of the main goals the data showed was an innate understanding of bringing the different stakeholder groups on board to provide a more inclusive implementation experience.

The subsets developed within Stakeholder buy-in include core stakeholder responsibilities and ownership of implementation. One of the driving forces for stakeholder buy-in is a sense of responsibility the end-user of the applicable EHR system has with regards to their stake in ensuring the system they interface with is reliable and stable. CP1 stated," they have been a quality assurance analyst for the impatient ordering. Ah, the application that was used before her current EMR system. So now I'm a senior application analyst for the actual implementation." This participant answered a question designed to glean information relating to what their role was during the implementation of the current EHR system, and this ties into the importance one's role play into the sense of ownership towards the implementation. These aspects of their duty in the job they have within the context of the EHR implementation are what drive their need for adequately assessing and directing the processes and decision making relative to the EHR implementations at all three of the partnering organizations.

This subset links to core stakeholder responsibilities due to the stakeholders' understanding of the workflows they take daily regarding their respective EHR implementations. CP3 stated," We established project management or a program management office where we, um basically tried to manage the scope of the implementation, try to manage the build and testing and training around the solution that we were implementing and most notably where the issues of the day were." This

participant provided another example where their job role/s directly tied into the implementation of the EHR system, and how that relates to promoting a sense of ownership in the implementation process. The sense of ownership for the stakes in all three of the respective EHR implementations across all three partnering organizations was prominent from the analysis of the study data. The accountability of the different EHR vendors was showcased by the three partnering organizations through extensive meetings and back and forth with the vendor to make sure they understood that these implementations were not going to be cookie-cutter in nature. The implementations had to be specific at a granular level to ensure full system integration across all aspects of these organizations.

The TAM conceptual framework which includes PEOU and PU are tied directly to stakeholder buy-in as the two components correlate directly with one another. Stakeholder's perception that their experiences and input into the process matters promotes both self-worth to the process and self-efficacy. Stakeholder theory provides strong statements regarding how firms should implement a business management directive focusing on a stakeholder approach that considers the roles and concerns of the stakeholder into their organizational policies because they impact the outcome and survival of the firm (Priego-de-la-Cruz, Alfaro-Cortes, & Manzaneque-Lizano, 2020). The other reference underscores the importance the stakeholders have on the implementation process relating to the three EHR implementations performed across the three partnering organizations. Subtheme three, Stakeholder Buy-in, and this study's conceptual framework are directly tied to one another through the understanding that the

buy-in process of stakeholders enhances the perception of the outcomes of the implementation process and how that translates into the adoption of the implemented technology. Stakeholder Buy-in is placed twice in the theme development to show how this subtheme fits both as an implementation strategy and ties directly into the acceptance of technology through increased self-worth and efficacy.

Confirmation of Study Outcomes

The outcomes of this doctoral study provided the needed breadth for why successful implementation strategies are integral to the correlation of the acceptance of the applicable technology being implemented. Implementation of an enterprise-level EHR system must include the components of the themes that were developed out of this study. These themes are tied directly to the conceptual framework used in this study through the importance projected through the answers to the participants' interviews conducted throughout this study.

The TAM framework allowed the interview instrument to be designed for the dissemination of data that showed the relevance of technology acceptance, and it's a direct link to successful implementation strategies utilized during the respective implementation practices of the three partnering organizations. The ways that these study outcomes confirm the extension of knowledge in this discipline include the knowledge that a rigid and systematic process of implementation must be conducted to ensure successful outcomes of any EHR implementation through the use of strategies that support that narrative and the direct link the implementation strategy themes provide to the foundation of the acceptance of that same technology.

These aspects are reported throughout the literature review and are further validated through these findings. The existing literature states that core implementation components should include multi-stage evaluation of barriers and facilitators as it relates to technology, including telemedicine (Bagot et al., 2020). The creation of testing metrics is integral to any successful implementation of EHR technology and ties directly to the acceptance for the use of that technology. Technology acceptance is achieved when the benefits of a successful implementation are fully realized.

The results of a recently published study tied the acceptance of technology to individual variables and important mediators surrounding institutional variables (De Benedictis, Lettieri, Gastaldi, Masella, & Urga, 2020). The critical takeaway here is that without successful implementation strategies, the acceptance of the applicable technology would not be fully realized. The correlation between these two outcomes is indisputable, and the original and current literature substantiate these findings.

Application to Professional Practice

The themes that developed through analysis of the data framed two main themes, including implementation strategies and technology acceptance. The sub-themes that developed provide a granular view of the two main themes. The applicability of these themes to improved IT practices became apparent through the process of interviewing the participants and document analysis across the three partnering organizations. Healthcare is an evolving landscape that provides avenues of opportunity and sea change. Technology is central to that narrative, and the daily use of EHR systems provides the context for healthcare professionals to function in their jobs efficiently and effectively.

These practices provide the foundational aspects for the need for implementation strategies rooted in a structured framework that epitomizes the importance of fully integrated and functioning EHR systems. These study findings clarify the participants' views on what aspects were important to include within these two themes. Implementation strategies processed in a structured manner by using SDLC practices provide heightened chances for successful outcomes, and these aspects include current and future state audits, the scope of the EHR implementation, governance, standardizations, system testing, and training of the end-users or stakeholders. These strategies provide the framework for proving the relevance to improved IT practices and the link to the rate of technology adoption or acceptance.

Implications for Social Change

Healthcare is technology-centric in every facet of daily use and upkeep. The last twenty years have shown a sea change in the healthcare landscape and provided efficiency gains in daily workflows. EHR systems provide a one-stop-shop for all things healthcare. EHR systems bring multiple systems that have worked as stand-alone systems together to help improve patient-centered care by streamlining processes and gains in system processing efficiency. These metrics provide the catalyst for positive social change to healthcare organizations, workers, and patients through improved patient care experiences, enhanced patient treatment, and diagnostic tracking, and perceived and realized cost reductions due to the automation of healthcare charting practices.

Patient centered care is a primary mission of most healthcare entities and the process for providing enhanced care to patients through automation of electronic charting

practices using EHR systems is one of the ways to accomplish this goal. Efficiency gains in charting medical data leads to quicker response time for treatments for diagnostic outcomes of patients which leads to earlier discharge times. All of these benefits culminate into cost savings for the healthcare provider through shorter hospital stays allowing for quicker turnaround times for patients. Synchronicity of data allows for all providers of a patient to be on the same page when treating them, and these steps provide a better perception from the patients point of view towards the healthcare provider. Heightened confidence in your provider allows for word to spread of how well this provider has their processes automated and workflows efficient to realize the holistic benefit to the patient. These perceptions allow for increased revenue streams as new patients gravitate to the healthcare provider due to these positive perceptions. All of these aspects provide an impact to positive social change systemically.

These outcomes provide the patient with increased confidence in their healthcare providers and the organizations that employ them. Positive social change through the successful implementation of updated EHR system tools and offerings providing additional avenues for increased patient engagement and proper diagnosis and tracking of in-house patients is centric to the framing of this study.

Recommendations for Action

The process of document analysis provided themes which showed the importance of having a structured approach to EHR implementation. The analysis also provided a direct link to the rate or level by which the implemented EHR technologies were accepted. There is a correlation between the success of an EHR implementation and the

acceptance or adoption of said technology, which promotes the importance of how successful implementation strategies provide the foundation for successful outcomes of the implemented technology, providing a boost to the adoption of that same technology. The powerful strategies that were shown to be effective were communication, which included the importance of teamwork/collaboration, documentation, and following a structured SDLC process that encompassed seven strategies which provided the framework that the three EHR implementations were founded.

These strategies include conducting a current state audit on their environment to get a handle on the existing processes, understanding the scope of the project by gauging and defining the boundaries of the EHR implementation and providing a framework for future state audits once the implementation is complete, developing a governance framework to promote final decision-making processes through a committee of stakeholders, ensuring standardization is conducted to promote efficiency gains to daily workflow, testing the system before go-live and post-go-live to ensure full system functionality and stability, and ensuring all aspects of stakeholder buy-in are instituted. These strategies are the outcomes of this doctoral study and form the basis for the recommended actions of healthcare entities striving for some level of system automation and improvements in workflow efficiencies in their facilities.

The entities that need to pay specific attention to this doctoral study and its outcomes are healthcare organizations that are looking to implement an EHR system in the future as this allows for a sort of strategic blueprint for how to improve the daily workflows and improve patient-centered care. The results of this doctoral study will be

disseminated to online readers upon successful defense and final approval of the CAO of Walden University and publication in the ProQuest database.

Recommendations for Further Research

The recommendations for further study should include how these strategies can be refined to increase technology adoption further, how these implementation strategies impact the patient specifically from the patients' perspective, and what other strategies might be added in different healthcare scenarios in rural settings. These three topics would help further define the required steps needed to decrease the failure rates of EHR implementations and increase the adoption rates of end-users who interface with these technologies. The limitations outlined in this doctoral study include a narrow scope of resources to pull from for participant recruitment.

Time constraints for scheduling access to participants, scheduling issues regarding study progress completion around daily requirements like work and home life, and the ability to add participants after the fact once the study starts due to limitation of participant pools are other limitations. These limitations should be addressed in future research by reaching out to areas within the healthcare field to routinely check for the receptiveness of the organization to allow participant recruitment in scholarly endeavors. Improving time management processes for scheduling participants through the use of technology to meet and document study findings, improved organizational aspects to ensure scheduling of study participants meshes well with the work/life balance. Lastly, provide a mitigation strategy for enhancing the participant pool to increase the potential for added participants to the study.

Reflections

The doctoral research process has been an evolving chess game encompassing the unknowns surrounding the paper writing process from the prospectus to the proposal and through to the actual oral presentation of the proposal. The next phase of the process was a myriad of obstacles encapsulating the IRB approval process. The aspects of going through the approval process provided an insightful posit into the intricate nature of participant protections and the understanding of the importance of ensuring those protections. The logistics surrounding time constraints due to the COVID-19 pandemic provided its own unique challenges.

Study challenges allowed for alternate forms of resources to be used which enhanced the study completion processes. Time constraints for scheduling access to participants, scheduling issues regarding study progress completion around daily requirements like work and home life, and the ability to add participants after the fact once the study starts due to the limitation of the participant pools were other obstacles which were overcome. The meeting, including video conferencing, to promote social distancing created its own challenges. The idea of personal biases has not escaped me through this doctoral study process. Coming from a healthcare based higher education environment that works closely with a large medical center which is EHR based has provided me with situational insights on some conceptions and form biases and preconceived notions regarding EHR implementations.

The mitigation of personal biases is the primary focus of the researcher and should eliminate any potential impacts negatively on the study participants. The doctoral

study process provided me with a unique and innate understanding of what it takes to fully implement an EHR system and the logistical wizardry required to bring different stakeholders together in a cohesive fashion to help design, implement, test, and train individuals on the new system. These takeaways allowed me to hone my preconceived notions into an accurate understanding of the implementation process which I had not fully grasp before the doctoral study process.

Conclusion

In closing, the predominant takeaway from this doctoral research study is the fact that implementing EHR solutions is no small undertaking. They require logistical planning with multiple stakeholders across all the organizational areas to properly ensure successful outcomes. Implementation strategies must include communication protocols encompassing teamwork and collaborations and documentation processes that are rigid and methodical to ensure no missteps are taken during the implementation phase. A structured process that encompasses SDLC principles includes current and future state audits of the given system and has to be integral to the planning process of any implementation.

Ensuring that the scope of the EHR implementation process is expressly defined to reduce scope creep changes is paramount. Governance is a must when teams within the project phases run into a disagreement about the process or design of the given system being implemented. Standardization with a component of customization is essential in tailoring the system to the specific organization’s needs and customizing components within the system to ensure the effective and efficient functioning of the system based on

the job role. Stakeholder buy-in promotes a successful EHR system integration through individuals having a voice and the promotion of self-worth to end-users understanding relating to system stability and functionality. This theme also promotes technology acceptance of the given EHR system through system testing and training protocols for end-users providing those individuals with a sneak peek into what the newly implemented EHR system as to offer. These same parameters promote a positive PEOU and PU experience among end-users of the EHR systems across all three partnering organizations. The outcome of this study is there is a direct correlation between implementation strategies and the positive or negative adoption rates of those technologies about PEOU and PU. The predominant aspect that ties directly to implementation strategies and technology acceptance is stakeholder buy-in, meaning without substantial buy-in from stakeholders, the potential for failure skyrockets with any EHR implementation and must be included as one of the strategies utilized during the implementation of any given system.

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Appendix A: One-on-one/Focus Group Interview Protocol

Interview/Survey Questions

Initial Probing Questions:

1. What can you tell me about yourself?
2. What major of study is your degree in, and what certifications relevant to your field of work do currently hold?
3. What are your current roles and responsibilities at your current place of employment?
4. What experience have you developed regarding the implementation of EHR systems?
5. Please describe your interest in Health Information Management Systems and their importance to you?
6. Based on your degree and work experience, what types of HIMS training in the healthcare field should be offered?
7. What are the reasons you chose these types of HIMS trainings from the previous question?

Targeted Concept Questions:

8. Based on your remarks to question four, can you describe precisely what role you played in the current EHR implementation?
9. In your professional opinion, what strategies were utilized to successfully implement and maintain the current EHR environment?

10. In your professional opinion, at what level of the organization (i.e., management, operational, or technical decision makers) do the strategies for implementing successful EHR systems take hold?
11. What were the design methodologies used for the current implementation of the EHR system?
12. What obstacles were faced when these design methodologies were utilized for the current EHR system?
13. How could these design methods have been altered to increase success and efficiency of the current EHR system?
14. What strategies have you found more successful in their application then you did others relating to the implementation of the current EHR system?
15. How were these identified strategies utilized during the implementation of the current EHR system?
16. What are some additional insights gained through the use of these identified strategies asked in question 7?

Targeted Follow-up Questions:

17. In your professional opinion, once the EHR system was successfully implemented, what strategies were utilized for successful maintenance and daily usage?
18. What types of policies would you recommend, which would solidify the successful continuation of the current EHR system relative to future system upgrades?

19. To help promote a positive social change in healthcare, what do you see as beneficial with strategies for training healthcare personnel on the new EHR system and enhancing the perceived usefulness and perceived ease of use of the current EHR system?
20. How do you see the landscape of Healthcare Technology as it relates to strategies going forward pertinent to future EHR implementations?

Wrap-up Question:

21. What additional thoughts or input do you have which might be beneficial to this study?

Appendix B: Proof of Permission to Use Figure in Section 1:

From: Richard Bagozzi [redacted]>
Sent: Wednesday, June 12, 2019 4:37 PM
To: Scot Loerch
Subject: Re: need permission to use figure out of research article

Dear Scot,

It would be an honor for you to use our Figure that you mentioned.

Two articles that have gone beyond the article where the figure came from can be found on

https://www.researchgate.net/profile/Richard_Bagozzi/publication/220580454_The_Legacy_of_the_Technology_Acceptance_Model_and_a_Proposal_for_a_Paradigm_Shift/links/57c6c52708ae9d64047e03f2.pdf

https://www.researchgate.net/profile/Richard_Bagozzi/publication/261960872_Contribution_Behavior_in_Virtual_Communities_Cogntiive_Emotional_and_Social_Influences/links/57c6261a08ae6db2cc76abf0/Contribution-Behavior-in-Virtual-Communities-Cogntiive-Emotional-and-Social-Influences.pdf

Best of luck in your program.

Sincerely,

Rick Bagozzi

On Wed, Jun 12, 2019 at 5:17 PM Scot Loerch <[redacted]> wrote:
Dr. Bagozzi,

My name is Scot Loerch and I am currently a Doctoral Candidate through Walden University. I am currently in phase two of my doctoral completion and am seeking your permission to use the following figure out of the attached pdf for use in my doctoral proposal:

Any help in this endeavor is greatly appreciated. I hope your day is well!

Thanks and kind regards,

Scot Loerch, Doctoral Candidate, Walden University

Appendix C: Organizational Permission Forms

Organization A:

Scot Loerch, MIS/M, MCP, A+, N+ Sr. Lan Manager

RE: Exploration of HER Implementation Strategies: A Qualitative Study

Dear Scot Loerch & [redacted]

Subject: QI Determination for IRB # 20-32

The designated IRB reviewer has completed review of your activity titled: Exploration of HER Implementation Strategies: A Qualitative Study, and has determined that, as described, the project is *actually quality improvement*, therefore not under the jurisdiction of the Baptist IRB.

To clarify, the project does not meet the definition of 'research' as specifically defined in the Federal Policy for the Protection of Human Subjects at 45 CFR 46 (one of the regulations to which our IRB is subject).

The federal definition of research at 45 CFR 46.102(1) is: "a systematic investigation, including research development, testing, and evaluation, designed to develop or contribute to generalizable knowledge."

According to the application, the intent of the project involves "The purpose of this qualitative multiple case study is to explore the strategies used by IT systems engineers for the implementation of HIMS that govern EHR. The specific population for this study will include IT systems engineers from two independently owned and operated hospitals or two independently owned and operated regional medical clinics in the greater Tennessee area. The proper implementation of HIMS may contribute to social change through improved healthcare practices for patients in a clinical setting allowing for quicker diagnosis, enhanced treatments, and faster recovery times. These improvements may also lead to lower health care costs for patients.

Based on the information provided, the intent of this project is to evaluate an existing program to determine if it is functioning as intended and will only inform practice within -

Therefore, this activity does not involve 'research' and as such, IRB review is not required.

[redacted]

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Organization B:

[redacted]

Institutional Review Board

FWA: 00003297
IRB Registration: 00002713

IRB Initial Approval

IRB#: 2020-341 INV

PI: Scot Loerch

TITLE: Exploration of EHR Implementation Strategies: A Qualitative Study SPONSOR: PI Initiated

SUBMISSION COMPONENTS:

Initial Review Submission Form, Study Application, Research Packet, Host Facility Agreement, Walden University/ [redacted] IRB Reliance Agreement, CITI Training Completion Reports and Loerch Consent Form Approved by Walden University IRB

Approval by Expedited Review: **04/15/2020**
Expiration: **03/08/2021**
Reporting to IRB: **05/13/2020**

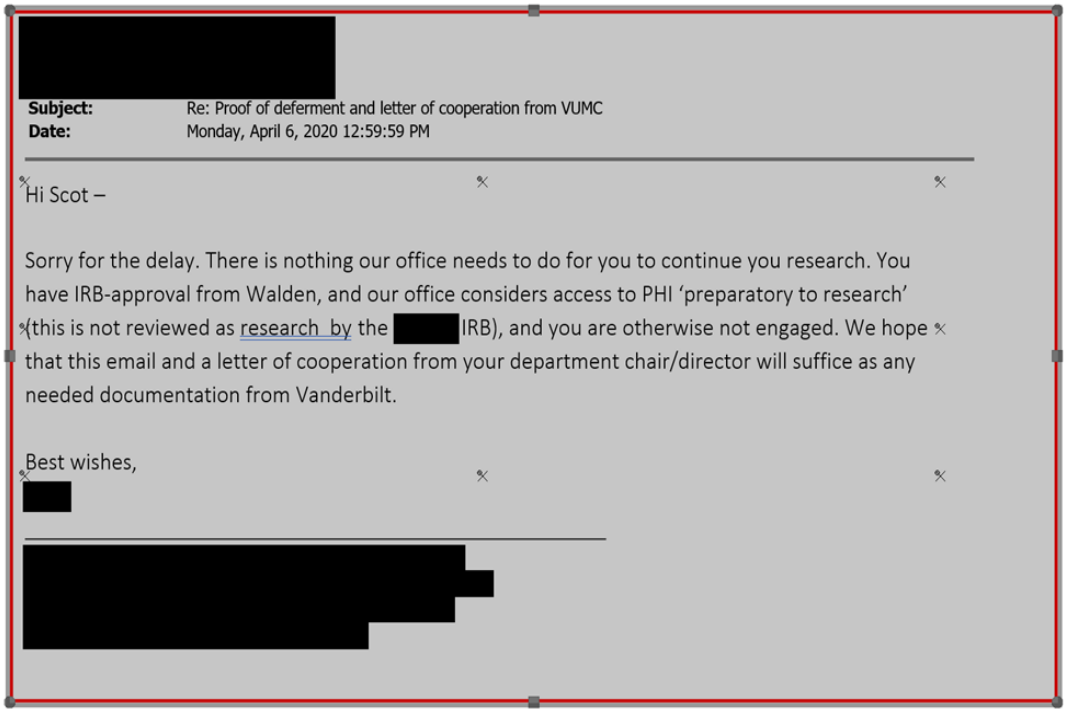
Approved by IRB Chair's Designee.

IRB Chair [redacted]

The Vice Chair of the Institutional Review board reviewed the Application for Initial Submission for the research study identified above and has noted the transition of the IRB of Record to the Walden University IRB.

Please note that t[redacted] will not be serving as the IRB of Record. Walden University IRB will serve in this capacity therefore the informed consent for this study will not contain a CH IRB approval/expiration stamp.

Organization C:



[redacted]

Subject: Re: Proof of deferment and letter of cooperation from VUMC
Date: Monday, April 6, 2020 12:59:59 PM

Hi Scot –

Sorry for the delay. There is nothing our office needs to do for you to continue you research. You have IRB-approval from Walden, and our office considers access to PHI 'preparatory to research' (this is not reviewed as research by the [redacted] IRB), and you are otherwise not engaged. We hope that this email and a letter of cooperation from your department chair/director will suffice as any needed documentation from Vanderbilt.

Best wishes,
[redacted]

[redacted]