

2017

Exploring Strategies for Successful Implementation of Electronic Health Records

Richard Alton Warren
Walden University

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Walden University

College of Management and Technology

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Richard Warren

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Walden University
2017

Abstract

Exploring Strategies for Successful Implementation of Electronic Health Records

by

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MBA, Wayland Baptist University, 1996

MA, Webster University, 1996

BSOE, Wayland Baptist College, 1979

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

October 2017

Abstract

Adoption of electronic health records (EHR) systems in nonfederal acute care hospitals has increased, with adoption rates across the United States reaching as high as 94%. Of the 330 plus acute care hospital EHR implementations in Texas, only 31% have completed attestation to Stage 2 of the meaningful use (MU) criteria. The purpose of this multiple case study was to explore strategies that hospital chief information officers (CIOs) used for the successful implementation of EHR. The target population consists of 3 hospitals CIOs from a multi-county region in North Central Texas who successfully implemented EHRs meeting Stage 2 MU criteria. The conceptual framework, for this research, was the technology acceptance model theory. The data were collected through semistructured interviews, member checking, review of the literature on the topic, and publicly available documents on the respective hospital websites. Using methodological triangulation of the data, 4 themes emerged from data analysis: EHR implementation strategies, overcoming resistance to technology acceptance, strategic alignment, and patient wellbeing. Participants identified implementation teams and informatics teams as a primary strategy for obtaining user engagement, ownership, and establishing a culture of acceptance to the technological changes. The application of the findings may contribute to social change by identifying the strategies hospital CIOs used for successful implementation of EHRs. Successful EHR implementation might provide positive social change by improving the quality of patient care, patient safety, security of personal health information, lowering health care cost, and improvements in the overall health of the general population.

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Dedication

I dedicate this doctoral study to my wife Margaret L. Warren, my most ardent supporter and motivator. I owe much gratitude for the reminders, encouragement, and understanding why the missed family functions, trips, and for locking myself in my computer room. To my mother, Velma O. Warren, I wish I had begun this journey while you were still with us. I know you would be exceptionally proud that your son had endured academic challenges to earn a doctorate. To our daughters, Carrie Harrison, Rebecca Cain, and Laura Whetzel, grandchildren: Megan, Brady, Alexis, Lillian, and Landon. All of you were my motivation to complete my doctorate. Now let me be your motivation to pursue your dreams. Through God's grace, all things are possible.

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Section 1: Foundation of the Study

The United States has the largest health care system in the world, representing as much as 17.8% of the total Gross Domestic Production (GDP) in 2015 (Martin, Hartman, Washinton, Catlin & The National Health Expenditures Team, 2017). American health care expenditures continue to exceed cost inflation and GDP growth each year (Payne et al., 2013). Despite the investment and escalating health care costs, there are shortcomings impacting the quality and efficiency of electronic health care record systems (Zhang et al., 2013). According to Payne, Pressler, Sarker, and Lussier (2013), there is a continuing lack of management alignment of information systems (IS) and knowledge management technologies.

Cognitive alignment of knowledge management systems with existing infrastructure is paramount in the migration to electronic health record (EHR) use and the articulation of the feasibility of EHR implementation for physicians (Dulipovici & Robey, 2013). Although the United States is a highly industrialized nation, the United States remains behind other countries in developing an interoperable EHR infrastructure (Sao, Gupta, & Gantz, 2013). Among the obstacles to the implementation of EHR systems are underdeveloped infrastructure and widespread concerns of consumers and medical professionals about privacy and security safeguards (Noblin et al., 2013).

Technology and information systems abound in the United States, yet standardized, interoperable EHR systems provided by competing proprietary vendors are costly and could undermine patient centeredness (Zhang et al., 2016). Technical experts and technologists are available to help leaders in the United States become the

preeminent leaders of EHR implementation. However, hospital leaders in the United States struggle with implementation timelines of EHRs, with some states significantly behind others in the rates of EHR adoption (Sao et al., 2013). The focus of this study was on exploring strategies hospital CIOs in Texas used for the successful implementation of EHR systems.

Background of the Problem

The history of converting patient medical records into computerized records began in the 1960s (Kannry et al., 2016). In the 1970s, smaller and more powerful computer systems emerged, leading to the more widespread departmental implementation of computer processing functions (Murphy-Abdouch & Biedermann, 2014).

In 1996, Congress enacted the Health Insurance Portability and Accountability Act (HIPAA) extending insurance coverage and security of protected health information (PHI) (Anthony, Appari, & Johnson, 2014). Information Technology (IT) officers modified existing infrastructures in migration from paper to electronic records, emphasizing performance and success (Cho et al., 2015). The results were dissimilar systems within medical facilities (Chen & Benusa, 2017; Downing et al., 2016). Integral data exchange was minimal and increased costs of implementation (Lee, McCollough, & Town, 2013).

The Organization for Economic Co-operation and Development (OECD) countries consists of over thirty-nine countries including the United States, Canada, eighteen European countries, Japan, Korea, Israel, Australia, Chile, Mexico, and others (Lee et al., 2013). Of the thirty-nine countries, Lee et al., (2013) indicated that there was

a higher use of hospital IT in the other OECD countries than in the United States. In 2004, President Bush created the Office of the National Coordinator for Health Information Technology (ONC), which established federal guidelines for EHR implementation across the United States (Charles, King, Patel, & Furukawa, 2013). In 2009, President Obama signed the Health Information Technology for Economic and Clinical Health (HITECH) Act. The HITECH Act provided \$30 billion in Medicare and Medicaid incentives to physicians and hospitals implementing EHRs meeting the 3-stage (MU) criteria (Adler-Milstein, Salzberg, Franz, Orav, & Bates, 2013). My intent in this study was to explore strategies hospital CIOs in Texas used for achieving successful implementation of EHR systems by meeting Stage 2 MU criteria.

Problem Statement

Adoption of EHR systems in nonfederal acute care hospitals has increased since 2012 across the United States, reaching adoption rates as high as 94% (Henry, Pylpchuk, Searcy, & Patel, 2016). Texas lags behind the rest of the country at 80%, and of the 330 plus acute care hospitals in which EHRs were implemented, only 31% have completed attestation to Stage 2 of the MU criteria (Office of the National Coordinator for Health Information Technology, 2016). The general business problem was that the implementation of EHR systems in Texas is below the national levels, with potential penalties for failure in attestation to MU criteria, leading to lost profits and elevated health care costs. The specific business problem was that some hospital chief information officers (CIOs) in Texas lack information about strategies for successful implementation of EHR systems.

Purpose Statement

The purpose of this qualitative multiple case study was to explore strategies hospital CIOs in Texas used for the successful implementation of EHR systems. The population for this study included 10 acute care hospitals where the successful implementation of EHRs occurred in a multicounty region of North Central Texas. The multiple case study included the investigation of three hospitals' CIOs of the 10 acute care hospitals' CIOs having met Stage 2 attestation of the ONC and CMS specifications of the MU certification standards.

Potential benefits of this study to society include the expansion of efficient quality medical practices and reducing medical care costs. The implications for positive social change includes improvements in medical care leading to a healthier society with lower health care costs and higher quality of care (Burns, Dyer, & Bailit, 2014). EHR improvements in medical care include rapid and economical medical diagnoses, less redundancy in diagnostic tests, and the potential reduced medical errors (Bailey et al., 2013). Data mining provides further social benefits through the discovery of new medical treatments, the convergent evolution of health information management, and career opportunities for health informatics specialists and IT professionals in health care settings (Gibson, Dixon, & Abrams, 2015).

Nature of the Study

In this qualitative study, I explored strategies that hospital CIOs in Texas used for the successful implementation of EHR systems. The qualitative research method is appropriate for researchers pursuing the exploration of strategies, such as those used by

hospital CIOs (Mukhopadhyay & Gupta, 2014). A qualitative research design is appropriate when researchers seek data through purposeful selection of a small sample (Marshall, Cadon, Poddar, & Fotenot, 2013).

Quantitative research involves statistical applications on numerical data to test hypotheses and generalize results to broad populations (Edmonds & Kennedy, 2013). Rejection of the quantitative method resulted because the method lacks contextual meaning of the phenomenon. In mixed methods, researchers combine qualitative and quantitative methods to enhance the findings used to answer research questions that may align with both qualitative and quantitative methods (McCusker & Gunaydin, 2015). This multiple case study does not involve a research question that requires the consideration of numerical data or the use of quantitative methods to discover an answer. Therefore, a mixed method was not a viable design for exploring strategies some hospital CIOs in Texas used for the successful implementation of EHR systems.

The design of this qualitative study was a multiple case study design. Qualitative case researchers employing semistructured interview procedures reap the benefit of acquiring contextual data and personal perspectives of the participants (Yin, 2014). Gergen (2014) suggested that respondents are more likely to supply richer and more illuminating data during interviews than through surveys and questionnaires used in a quantitative inquiry. Combining data obtained from multiple informants and data sources is a part of the nature of a qualitative case study, and enhances the trustworthiness of a study when appropriately aligned with qualitative research questions (Hyett, Kenny, & Dickson-Swift, 2014).

To explore common issues and factors affecting organizational interactions, researchers choose case study designs more than phenomenological and ethnographical designs (Gizir, 2014). In phenomenological designs, researchers focus on detailed reports of uniquely lived experiences of a person or several individuals, with the purpose of understanding the essence or meaning of those anomalous experiences (Moustakas, 1994). Understanding the essence and meaning of uniquely lived experiences is beyond the scope of this study. Therefore, a phenomenological design was not appropriate for this research.

An ethnographic study encompasses a focus on groups while researchers share the same values and participate in the group through processes of immersion (Patton, 1990). Ethnographic research deals with an individual and cultural significance, which were not the purpose of this study. The study of groups through the process of immersion did not align with the research questions proposed for this study; therefore, ethnography was not suitable for this research study.

Yin (2014) explained that multiple case design study is preferred over the single case design because of the potential for replicated analytics. With a multiple case study design, in-depth exploration of the phenomenon is attainable while requiring only a small number of participants to obtain in-depth contextual data. Multiple case study design is the optimal approach to explore complex shared events in business settings (Cronin, 2014).

Exploring strategies hospital CIOs in Texas used for the successful implementation of EHRs required direct interaction with CIOs who can describe

successful strategies and the rich contextual details surrounding their EHR systems that may affect their implementation strategies. Case study design was suitable for exploring strategies hospital CIOs in Texas used for the successful implementation of EHR systems.

Research Question

The research question to guide this qualitative case study was as follows: What strategies do hospital CIOs in Texas use for the successful implementation of EHR systems?

Interview Questions

I conducted interviews with the participants of the study using the following set of interview questions.

1. How did your experiences with the hospital information systems infrastructure influence strategies for acceptance of the implementation of hospital clinical applications?
2. What were your long-term strategic phasing plans used during implementation of EHR within the facilities?
3. How were successes of clinical implementations replicated through other clinics concerning strategies for design, acquisition, and implementation of EHR systems?
4. How did you strategize for designing, acquiring, and implementing EHR systems considering the opposition encountered with medical staff's acceptance of EHR implementation?

5. How did you integrate new systems with existing infrastructure assuring successful alignment and implementation of EHR systems?
6. How did federal directives, acts, and laws contribute to the success of your hospital's implementation of information technology and EHR systems, if at all?
7. What did you do to address other obstacles such as financial and personal issues across the spectrum of your medical facilities?
8. What additional comments do you have that might add to assist other CIOs of acute care hospitals in the successful implementation of EHRs?

Conceptual Framework

The technology acceptance model (TAM) was the theory that I used for this qualitative case study. The TAM theory is an information systems theory that models how users come to accept and use new technology (Davis, 1989). Davis used the TAM theory for research in an attempt to understand the underpinnings of resistance to technology acceptance. The TAM theory provides researchers with specific guidelines for exploring why technology acceptance hinders implementation of technologies such as EHR systems (Strudwick & Hall, 2015).

However, EHR systems technology is complex and inherently subject to sociological resistance to acceptance, as explained by Cresswell and Sheikh (2013). Scholars in their research using interviews and surveys identified obstacles to technology acceptance using the TAM theory (Liu & Zhu, 2013; Vessey & Ward, 2013). Boonstra, Versluis, and Vos (2014) argued that overcoming obstacles to acceptance requires

developing a strong supportive culture of acceptance and identifying strategies to overcome those obstacles.

The implementation of EHRs in the North Central Texas multiple-county area has experienced slow progress in attestation of Stage 2 MU. Exploring CIOs' strategies for overcoming obstacles to technology acceptance was pertinent to successful EHR systems implementation. There are many other obstacles contributing to the acceptance of technology. I used the TAM theory lens to view the phenomena of opposition to the acceptance of technology, which helped uncover those obstacles. Employing the strategies CIOs used to identify and overcome obstacles to technology acceptance might result in expedited successful EHR implementation and reduced costs of health care across Texas.

Operational Definitions

Electronic Health Record (EHR): An electronic version of a patient's medical and health care history that may include all of the key administrative and clinical data relevant to that person's care, maintained by providers (Joseph, Sow, Furukawa, Posnack, & Chaffee, 2014).

Electronic Medical Record (EMR): Includes the original content of the paper medical records of patients with the overall medical processes administered, representing the whole medical information of patients (He & Yan, 2014).

Enterprise Architecture (EA): The organizing logic for an organization's IT infrastructure and business processes (Vessey & Ward, 2013).

Health Information Technology (HIT): The use of computer hardware and

software to privately and securely store, retrieve, and share a patient's health and medical information (Health IT, 2015).

Interoperability: Interoperability is the ability of two or more systems to communicate, exchange information, and use the exchanged information (Andrade, Von Wangenheim, Savaris, & Petry, 2013).

Nonfederal acute care hospital: Includes acute care general medical and surgical, general children's and cancer hospitals owned by private/not-for-profit, investor-owned/for-profit, or state/local government and located in the 50 states and District of Columbia (Charles, Gabriel, & Searcy, 2015).

Meaningful use: is using certified electronic health record (EHR) technology to (a) Improve quality, safety, efficiency, and reduce health disparities, (b) Engage patients and family, (c) Improve care coordination, and population and public health, (d) Maintain privacy and security of patient health information achieve to qualify for Centers for Medicare & Medicaid Services (CMS) Incentive Programs (Silverman, 2013).

Assumptions, Limitations, and Delimitations

The assumptions, limitations, and delimitations for this study follow. Included in the subsections are definitions and the concepts germane to this study.

Assumptions

Assumptions are part of research and represent certain factors believed to be true yet remain unproven (Few & Few, 2013). My first assumption was that hospital CIOs who participated in this study had a thorough knowledge of information systems as employed in their facilities, knowledge of the IT infrastructure, and experiences with

strategies used in Texas hospitals for the successful implementation of EHR systems. My second assumption was that participants would provide honest and in-depth responses to the interview questions and would be honest about their experiences that led to their eligibility to participate in the study. My third assumption was that the justifications and rationale for the selection of the conceptual framework and the method and design were appropriate for the goals of this research, based on the previously published recommendations of research experts.

Limitations

Limitations pertain to the elements of the research that are beyond a researcher's direct control (vom Brocke & Liang, 2014). The population included three CIOs of 10 acute care hospitals having attested to completion of CMS Stage 2 criteria in Texas acute care hospitals staffing 14 to 290 beds, which limits the transferability of findings. The diversity of the population and perspectives of the participants may not transfer to a broader population. According to Anney (2015), readers decide the appropriateness of the transferability of findings. I provided detailed elaborations about the rationales for the choices, discussions of the steps, descriptions of the population and sample to improve the likelihood that appropriate decisions about transferability can occur.

Delimitations

Delimitations pertain to the boundaries established and addressed during research studies (Bonet, 2014). The delimitations of this study involved the following nonparticipants and the geographic area under study. The scope of this research encompassed the North Central area of Texas and the participants' knowledge of and

experiences with successful EHR implementation. Hospital administrators, information systems vendors, IT support personnel, and users of the hospital information systems did not participate in interviews. The geographic location of the study was the North Central part of Texas and did not include large metropolitan communities; hence, the study might not be transferable to the larger hospital facilities or other health care settings.

Significance of the Study

The significance of this study was to expand the successful implementation of EHRs in acute care hospital organizations across North Central Texas. Identifying successful and potentially innovative strategies to enhance successful EHR implementations might reduce the costs of planning and accelerate adoption rates in Texas. Exploring the successful strategies hospital CIOs employed contributes to the knowledge base useful for achieving organizational EHR goals, meeting mandated completion dates, and preventing financial losses. Decisions made and strategies employed for successful EHR implementation might create financial savings, cost reductions, and accelerate EHR adoption rates in the state of Texas.

Contribution to Business Practice

Discovery of successful EHR implementation strategies may contribute to the application and generalization of research-driven practices and the integration of EHRs with existing hospital information systems. The implications are the realization of the documented benefits of EHR implementation, including the long-term business cost reductions of implementation, improved efficiency, and adherence to implementation timelines. Financial incentives derived from the HITECH Act for meeting MU criteria

offset some of the implementation costs, as incentives for adoption and enhanced business operations (Health IT-ONC, 2014).

Effective leadership from executives, such as CIOs, depends on successful operational strategies that may contribute to employee motivation and job performance (Carlton, Holsinger, Riddell, & Bush, 2015). Well-developed informatics strategies may lead to the acceptance of new EHR technology and positive enthusiasm about the benefits that can enhance the well-being of health care organizations and employees (Kannry et al., 2016). Additional advantages of successful EHR practices include streamlined documentation of all aspects of patients' medical records, doctors' computerized patient order entries, and transparent billing processes improved through process adherence leading to efficiency that enhances patient satisfaction (Adler-Milstein, Everson, & Lee, 2015).

Implications for Social Change

The results of this study might contribute to positive social change by improving patient health records charting, reducing medical errors, improving patient safety and patient wellbeing, and reducing the costs of health care for patients and providers (Weiner, Yeh, & Blumenthal, 2013). Improving patient care and wellbeing contributes to a healthy society with reduced health risks and longer life expectancy (Jaffe & Frieden, 2014). Additional social change is possible through data mining of EHR for trends, conditions, and successful interventions that can stem from improved data quality, availability, and comparability, leading to the discovery of innovative medical breakthroughs (Scholte et al., 2016). The increasing availability of health care to rural

areas through technological advancements such as EHRs may contribute to a more productive society (He et al., 2014).

Through improved continuity and thoroughness of patients' records, there is the potential for fewer medical errors or redundancy of medical tests and greater preventive medicine and education applications, which could lead to reduced health risks and health care cost containment (Kannry et al., 2016). Less financial drain on the economy from improved EHR practices can lead to a healthier financial outlook for society and improve the quality of life of community members, adding value to the community and culture of our country (De Grood, Raissi, Kwon, & Santana, 2016).

A Review of the Professional and Academic Literature

Performing a literature review helps researchers identify existing research and understand published peer-reviewed literature findings that might help fulfill the purpose of a study. Nabor (2015) argued that the literature review might result in insights that could lead to resolutions or add meaningfully to the envisioned research study. The rigor of qualitative research directed toward knowledge building involves an iterative approach as the research advances (Finfgeld-Connett & Johnson, 2013). Therefore, an extensive review of the literature required different methods to uncover literature relevant to the study, as follows.

Search methodology is imperative to evaluate the quality and quantity of literature revealed to the researcher successfully (Hinde & Spackman, 2015). In-depth exploration of literature for this review occurred through a thematic strategy involving the

consideration and inclusion of various scholarly works, seminal literature, governmental reports, and related books.

Search strategies entailed the use of keyword database searches using combinations of the following words and phrases: EHR background and history; strategic alignment of EHRs; EHR implementation strategies; medical health records law; barriers to EHR adoption; safety and security of PHI; benefits of EHRs; health information technology; CIOs, executives, and leadership approaches to EHR and medical informatics; TAM and theory for technology adoption, use, resistance, and acceptance; medical informatics; barriers, challenges, and obstacles to EHR; health care IT strategies and health information technology (HIT); MU use of EHRs in hospitals and acute care settings; and qualitative case study, quantitative research, and rigorous peer-reviewed methods and designs. Specific resources included in this literature review emerged from U.S. Government web sites, Walden University Library Internet sources from EBSCO Academic Search Complete, ProQuest Central, SAGE Full-Text Collection, Thoreau Multi-Database, Google Scholar, and both online and printed books. I used the Ulrich Periodicals Directory for ensuring verification of peer-reviewed articles.

The evaluation of the quality of the literature was possible through noting the number and currency of citations per research article and reviewing listed references with the purpose of corroborating findings. This strategy involves discovery of converging and diverging relevant resources with parallel topics supportive of the research problem (Hinde & Spackman, 2015). Narrowing the inclusion criteria to relevant peer-reviewed publications between 2013 and 2017 led to the identification of articles published in

periodicals, with the inclusion criteria expanded for germinal literature in support of theoretical and methodological elements of this study. The research process for this literature review led to more than 257 articles, books, and official governmental documents, of which approximately 137 appear in the literature review. Two hundred and thirty-three articles are peer-reviewed, and 24 are non-peer reviewed. Table 1 provides detail per requirements for minimum standards of sources and percentages of articles within 5 years from projected completion date.

Table 1

Source Identification

<i>Total Number of Sources in Literature Review</i>	Total Number of Sources Less than 5-years old	Total Number of Sources Older Than 5-years old	Total Number of Peer-Reviewed Sources	Total Number of Non-Peer Reviewed Sources
137	251 = 97.66%	6 = 2.33 %	233 = 91%	24 = 9%

Application to the Applied Business Problem

The conceptual framework for this study was the TAM, emphasizing discovery of potentially successful strategies for implementing EHRs in North Central Texas. In qualitative research, answering research questions involves the discovery of previous research undertakings and conceptual framework applications relevant to the research questions to obtain, evaluate, and understand new or emerging phenomena (Wener & Woodgate, 2013). Toward that end, the organization of the literature review began with the critical analysis of the conceptual framework and culminated in the identification of

the gap in the body of research about strategies hospital CIOs used for the successful implementation of EHR systems.

Critical Analysis of Conceptual Framework

The conceptual framework for this qualitative case study was the TAM. Davis (1989) used the TAM theory for research in an attempt to understand the underpinnings of resistance to technology acceptance. I used the TAM theory as a lens through which to view strategies hospital CIOs in Texas used for the successful implementation of EHR systems. Identifying the obstacles to acceptance is a challenge for CIOs, who must maintain ongoing education, skill set development, and research-driven strategies to help them succeed in their leadership roles while encouraging the uses of new technologies in their health care settings (Kannry et al., 2016).

TAM is one of the most influential extensions of previous theories, such as the theory of reasoned action (TRA), the theory of planned behavior (TPB), and the diffusion innovation theory. Previous theories could apply to the idea that successful EHR implementation strategies may involve the need to overcome the barriers to technology acceptance, which may involve internal and external forces. The TRA and the TPB theories are derivatives and contributors to the TAM theory. My choice to use TAM as the conceptual framework for this study instead of TRA, TPB, and diffusion of innovation (DOI) stemmed from the idea that TAM may be more suitable than the other theories for exploring the successful strategies of CIOs.

Davis presented a good case for establishing a standard or method for establishing measures to evaluate users' oppositions to and acceptances of EHR implementations. Davis advanced the TAM model, emphasizing two technology acceptance measures: ease of use and usefulness. Researchers used the two measures, closely related to social behaviors, to discover that when someone establishes an intention to act, then the individual will respond without limitations (Strudwick & Hall, 2015). Davis proclaimed multidisciplinary vantage points, perceived usefulness, and perceived ease of use as fundamental and distinctive indicators for decisions to use information technology.

Ashraf, Thongpapanl, and Auh (2014) confirmed the validity of TAM across culturally different countries by identifying the commonality of social-technical traits across culture, which assures wide application of the TAM model across various types of settings. Also, scholars utilized TAM in investigations of the adoption of health care information systems by patients, physicians, and other health care staff and claimed that TAM provided an appropriate theoretical basis for those studies (Tsai, 2014). Despite the widespread use of TAM in scholarly research and practice across the globe, there is a need for research to expand TAM to include EHR acceptance behaviors in rural American health care settings, such as in the hospitals of North Central Texas, where acceptance and use may fall below, recommended levels.

Theory of reasoned action (TRA). I considered other theories such as the TRA advanced by Ajzen and Fishbein (1980) who formulated TRA to estimate discrepancies between attitudes and behaviors. Ajzen and Fishbein derived the TRA theory from the idea that behavior may be less than 100% voluntary and subject to controlled conditions.

Another perspective to consider involves intents of individuals' pursuits of activities negatively affecting others; for example, Turab and Casimir (2015) conducted research to examine the linkage between attitude, intention, and behavior concerning factors of influence on training transfer. Training in different industries enhances performance at different levels, yet attitude influences the resulting behavior (Turab & Casimir, 2015). Application of TRA to behaviors such as gambling showed a positive correlation between intentions when favorable attitudes exist (Turab & Casimir, 2015).

TRA is a framework that may account for an individual's attitude, intent, and behavior; however, TRA lacks potential to address the associated complexity of technologies in modern health care settings. Limitations attested to by previously published scholars include lack of distinction between intent goals and behavioral intentions (Sheppard, Hartwick, & Warshaw, 1988). In TRA, there is the exclusion of external conditions such as knowledge, dexterity to perform the behavior, the need for additional resources, and removal of environmental obstacles. Therefore, parameters of the model fall short of expectations. That was the reason that I rejected the TRA lens for conducting this research. According to McDermott et al. (2015), TRA led to models in the health care behavior studies and to a lesser degree or emphasis on uses and applications in business settings.

Theory of planned behavior (TPB). Another theory that I considered for use in this study was TPB. The basis of the theory of TPB is to determine or predict deliberate behavior, which is the process of careful consideration before initiating an action. By adding a behavioral control to TRA, Ajzen (1991) sought to predict deliberate behavior

using TPB because human behavior can be deliberate and planned. Some researchers studying human behavior to understand user acceptance of IT used TPB theory (Madden & Ajzen, 1992). The TPB involves evaluation of variables associated with attitudes, subjective norms, perceived behavioral controls, among others, to predict intentions and behaviors (Shaller, Patil, & Malhortra, 2015). Similar to the TRA, although scholars used TPB in various studies about information technology acceptance, TPB may also be more suitable for research about health-related behaviors and conditions (Vo & Bogg, 2015). Another aspect contributing to my rejection of TPB was the qualitative nature of this investigation as opposed to a quantitative approach.

Diffusion of innovation (DOI). Rogers (1995) expanded Gabriel Tarde's 1903 two-step flow theory of diffusion, leading to Rogers' DOI theory. DOI theory pertains to the conditions that increase or decrease probabilities that individuals in organizations will adopt new ideas, products, or technologies. Rogers argued that four facets influence the adoption of technology: invention, diffusion through multiple communication systems, time, and consequences. The conditions influencing the speed of adoption follow a standard deviation curve of five categories of users that Rogers reported: the innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%), and laggards (16%).

Dibra (2015) studied the factors of innovation influencing sustainability in the tourism industry through a review to determine factors influencing integration of practices improving sustainability in the tourism industry. Dibra's research analysis included a review of the literature to determine the most suitable theoretical model for

addressing adoption of sustainable tourism practices. Although research on the sustainability of other industries is available, few studies addressed the tourism industry (Dibra, 2015). In Dibra's review of the literature, analysis of the data suggested that DOI theory, in this case, was suitable for the discovery of factors contributing to sustainable tourism practices. However, limitations reported by Rogers included cost and effectiveness of the research involving the diffusion of the innovation; for example, evaluation of the external forces might be cost-prohibitive and time-consuming. Following the 5-stage process described by Rogers (1995) introduces a time lag potentially detrimental to the success of the innovation.

Innovation is a highly studied subject by organizational and social scientist, which presents a potential lens for conducting research using the DOI theory (Dibra, 2015; Rogers, 1995; Wu & Chiu, 2015). DOI theory involves the inclusion of contextual factors such as innovation, individuals, and organizations in examining the diffusion of innovation (Rogers, 1995). Social influences affect the rate of innovative technology adoption. Hospital administrators pursuing purchase and implementation of expensive EHRs focus on improving patient quality care through the provision of safe, effective, timely, efficient, and equitable services (Silverman, 2013).

DOI applications in organizational contexts require focusing on the organizational influences affecting diffusion of innovation and the variations of DOI theory lack cohesive accounting of the multitude of variables and potentially critical factors involved with the adoption of particular innovations (Wu & Chiu, 2015). As described by Rogers (1995), diffusion of innovative technology is a timeline based process, and a myriad of

factors and variables may impact the effectiveness of tactics to enhance technology diffusion (Wu & Chiu, 2015). The DOI theory focuses on the spread of innovative technology via influences of internal and external individuals and groups of an organization. The purpose of this study was to discover strategies CIOs of hospitals used to implement EHRs successfully and not the discovery of methods to employ as influences to diffuse innovative technology.

TAM Applications

Despite decades of research, Conrad (2013) proclaimed that there is a gap in the literature concerning problems with and successful solutions for IT implementation and successful IT innovation adoption at the individual level. Pursuing knowledge of predictors of system usage and acceptance may allow leaders to strategize for optimal technology adoption and implementation, based on ways to expand technology acceptance (Kruse, DeShazo, Kim, & Fulton, 2014). Venkatesh and Davis (2000) conducted four earlier longitudinal field studies testing a theoretical extension of the TAM. Venkatesh and Davis were successful in identifying how both social influence processes and cognitive instrumental processes significantly influence innovative technology acceptance of users.

Ongoing research indicated that incentives might influence individuals' attitudes about ease of use and intent to use and that obstacle to acceptance and adoption of technology vary by industry and complexity of the information systems technologies (Roumani, Nwankpa, & Roumani, 2015). Identification of obstacles in advance of implementing strategies may help prevent objections to technology adoption and lead to

strategies for successful implementation that overcome obstacles to EHR usage (Hsiao & Chen, 2015). According to Hsiao and Chen (2015), studies extended TAM to encompass considerations of human, organizational, and technology factors, including barriers and obstacles influencing technology use and acceptance of new information technology requirements by health care professionals.

Additional twenty-first-century studies expanded the applications of the TAM theory to diverse organizational settings, as follows. Sternad and Bobek (2013) used the TAM theory to explore external factors influencing ERP usage in 44 organizations. Quantitative data analysis indicated that improved technology usage required additional efforts focused on organizational culture, communications, and training. Persco, Manca, and Pozzi (2014) used the TAM theory to evaluate methodological and technological innovations from the implementation of new e-learning systems; perceived usefulness and ease of use were indicators of acceptance of the new and innovative technology. Ashraf et al. (2014) added culture contexts to the study of the acceptance of new technology. Wallace and Sheetz (2014) explored software development ease of use and perceived usefulness of high-quality software designs, using the TAM framework.

Identifying obstacles to technology acceptance and ways to overcome obstacles may lead to successfully aligned strategies for improving acceptance (Vessey & Ward, 2013). Liu and Zhu (2013) identified obstacles to technology acceptance using the TAM theory, such as a need for assurances of system integration and alignment with existing computerized administrative systems. Meir, Ben, and Schuppan (2013) claimed that emphasis on technology acceptance might result in scholars overlooking the significance

of obstacles, such as employee resistance to change. Fear of losing work autonomy, perceived quality of information, and social influences are identified factors affecting technology acceptance (Wang et al., 2015).

Knowing and measuring pre-adoptive behaviors of users' willingness to use IT innovations provides strategic direction for adoption. For example, when there is a high relative advantage, low complexity, and high trialability of new technology, the probability of technology acceptance increases (Lin, 2013). Similar results of early and late adopters indicated that positive attitude and intent to adopt to new technology contribute to acceptance (Escobar-Rodriguez & Romero-Alonso, 2013). Gagnon et al. (2014) indicated there are standard determinants of acceptance of EHRs, such as perceived ease of use, professional norm, social norm, and demonstrated usefulness.

Brown, Venkatesh, and Goyal (2014) tested six models (assimilation, contrast, generalized negativity, assimilation-contrast, experiences only, and expectations only). Exploration through the TAM theory provided the basis for testing the six models, along with perceived usefulness, behavioral intention, use, and satisfaction (Brown et al., 2014). Data analysis of Polynomial modeling indicated the assimilation-contrast model provided researchers the ability to explain relationships between expectations and experiences of perceived usefulness, behavioral intent to use, and satisfaction. Other factors that affected technology adoption reported by Brown et al. were age, gender, and previous technology experiences. Struik et al. (2014) added user preferences as a hedge against obstacles and a facilitator to acceptance.

EHR and electronic health care recordkeeping systems may be complex and inherently subject to sociological resistance (Nambisan, Kreps, & Polit, 2013). The TAM theory provided the lens for a view of this research versus TRA, TPB, and DOI theories. TAM supported exploration into technology acceptance, usage, and strategies that may align with the intention of overcoming obstacles that otherwise may result in slow adoption rates of EHR systems. The discovery of CIOs' strategies for overcoming the numerous barriers to technology acceptance adds to the field of knowledge in successful EHR systems implementation. In turn, this knowledge may enhance acceptance and adoptions rates of EHRs across Texas.

Background of EHRs

The history of electronic health records began in the 1960s with the first implementation of computerized patient medical records, which evolved into advanced EHR systems (Murphy-Abdoch & Biedermann, 2014). Over the 50 years that followed the first implementation of computerized patient medical records, technology advances in computer innovations opened the floodgates for advancements in health care (Turk, 2015). Migration from paper documentation of patient data to digital forms of record keeping occurred through the use multiple software applications and stand-alone computer systems (Murphy-Abdoch & Biedermann, 2014). Development of and demand for innovation in health care technology continued as a potential cost-saving and efficient practice that could benefit patients and their health care organizations (Kerwin, Leighton, Buch, Avezbadalov, & Kianfar, 2016).

The demand for more efficient and affordable health care recordkeeping technology created an expanding ecosystem of vendor competition in sales of clinic-specific software (Liu & Zhu, 2013). Liu and Zhu (2013) proposed a unique model of an integrated e-service with the interconnected process and data-oriented grids. The model tied together electronic medical services, records, and application services with implementation architecture, which Liu and Zhu developed and tested through a prototype. Liu and Zhu contributed to the advancement of proposed technology models for health care professionals. However, the authors also highlighted obstacles, such as the need for ongoing updates and economic motivation, inability to interface legacy systems with emerging technologies, lack of interoperability, and cognitive factors involved in adopting new technologies. The explosion of a variety of applications and clinical specific systems exacerbated the problem of non-interoperable data sources.

Arvidsson, Holmstrom, and Lyytinen (2014) argued that strategic blindness becomes detrimental when mistranslating strategic intent, poor communications ensues, and cognitive entrenchment prevails. Accordingly, through the 1980s, desktop computers contributed to further development of non-interoperable, standalone systems and software applications for specific clinical tasks (Murphy-Abdoch & Biedermann, 2014). Legislative actions by Congress, enacting HIPAA in 1996, resulted in extended health insurance coverage and requirements for security of personal health information (Anthony et al., 2014). The governmental action forced health care providers to change the normal operating procedures concerning the protection of personal medical information (Brumen, Heričko, Sevcnikar, Završnik, & Hölbl, 2013). To meet the

demands of federally mandated implementation of EHRs, hospital administrators pursued adoption of related technologies without a clear understanding of the total-cost-of-ownership (Legoux, Leger, Robert, & Boyer, 2014).

Implementation of EHRs is not an optional activity for hospital administrators and health care providers because of government legislation (Brumen et al., 2013). Hospital administrators have a stake in fulfilling their responsibility for implementation, patient care, and financial incentives (Boonstra et al., 2014). However, Eastaugh (2013) analyzed data from an independent firm's survey of hospital chief financial officers resulting in evidence of a lack of knowledge and strategy concerning total-cost-of-ownership. Eastaugh also suggested that selection of a vendor for EHR systems involved many variables, such as the number of required EHR support staff and salaries, estimated 10-year costs of operations, anticipated revenues increases or losses, and ongoing upgrade costs.

Developing a strategy that integrates the IT infrastructure with the hospital organization is essential to successful EHR implementation (Silverman, 2013). Both Eastaugh (2013) and Silverman (2013) emphasized the importance of organizational strategy alignment with information systems strategy. Functional structuring of business operations strategies with information systems strategies contributes to successful EHR implementation. Recommendations based on findings reported by Eastaugh and Silverman included ongoing research support to address the need for strategies for successful EHR implementation.

The selection of an IT vendor continues to challenge CIOs. Before the adoption of EHRs, directors and CIOs should consider a myriad of issues (Liebe, Hüßers, & Hübner, 2015). Business leaders should consider several aspects of EHR technology: interoperability, financial requirements, customer accessibility, internal business processes, and the means for learning and training (Loukis & Charalabidis, 2013). Health information technology integration, as described by Silverman (2013), requires careful structuring and thoughtful design to facilitate a variety of uses and to accommodate a variety of users.

Lack of interoperability of ill-conceived information systems undermines the business value of innovations (Hung, Chen, & Wang, 2014). Loukis and Charalabidis (2013) analyzed IS data that indicated establishing interoperability increases the positive impact of communication technology and medical informatics on the financial performance of the organizations. As technologies continue to evolve, assuring interoperability of various departmental and organizational specific computer applications, with security and protection of health information, represent paramount concerns for health care leaders (Meigs & Solomon, 2016; Rodrigues, de la Torre, Fernández, & López-Coronado, 2013; Studeny & Coustasse, 2014).

Anthony et al. (2014) provided a background of the U.S. health care systems, federal and state regulations, and laws while describing how the regulatory system affects health care. The emphasis of Anthony et al. research was in the personal health information regulatory compliance. Findings of the research indicated a variety of ways that hospital leadership implements or circumvents regulatory compliance. Anthony et al.

argued that market environment and institutional logics impede standardized compliance. Furthermore, compliance is higher in the case of for-profit hospitals versus not-for-profit institutions (Appari et al., 2013). The conclusion is that organizational differences or changes affect the medical professionals as well as the leadership's strategies.

In their research on requirements set forth for compliance with the HITECH Act and Affordable Care Act, on the implementation of EHR and verification of MU, Appari et al. (2013) described inconsistent results. Specifically, Appari et al. found that implementation of EHRs that met a lower level of MU criteria obtained higher levels of baseline quality of care than those implementing higher levels of MU. The implication is that the acceptance of advanced EHRs requires time for diffusion of technology acceptance.

Enactment of the HITECH Act in 2009 also provided incentive funding for the implementation of EHRs, based on verification of meeting MU criteria (Emani et al., 2014). DesRoches, Aduet, Painter, and Donelan (2013) conducted a national survey of 1820 primary care physicians and specialists in office-based practices to determine the number of physicians who had a basic EHR system and met the MU criteria. The response rate was 60% from which a 43.5% of physicians reported having a basic EHR, and 9.8% met MU criteria (DesRoches et al., 2013). The authors concluded that few physicians could meet the requirements in early 2013. Additionally, physicians varied on their familiarity with MU processes and requirements for meeting MU criteria (Adler-Milstein et al., 2014). In conclusion, the pace of implementation was increasing while there was a continued concern with the ease of use.

A further concern for leadership is that simply replacing paper records with EHRs may fail to produce gains in quality and efficiency or the reduction in costs that EHRs have the potential to achieve (Emani et al., 2014). Ease of use is more likely to contribute to improving the potential effect of EHRs. For example, setting expectations too high is counterproductive and may lead to financial losses due to inadequate research and strategic planning (Appari et al., 2013). Indications are that technology implementation alone is likely, but not sufficient, to produce quality improvements.

Myriad factors contribute to success since each medical facility is unique suggesting that one size might not fit all (Abramson, McGinnis, Moore, & Kaushal, 2014; Meeks et al., 2014). Consequently, specific strategies might have varying success from one facility to another. CIOs and hospital leadership responsible for managing the implementation of EHRs have a stake in successfully guiding the processes and procedures (Gellert et al., 2015). Strategies for implementation involve consideration of domains, human factors, and financial implications, requiring knowledge and understanding of the complexities of the health care industry and specific clinical settings (Wu, Straub, & Liang, 2015). Strategic alignment of multiple domains within the organizational structure may enhance the overall health care system.

Strategic Alignment of IS

The intent of Wu et al. (2015) was to fill the gap in the understanding of IT governance and strategic alignment. Wu et al. demonstrated the interrelationship of IT governance and strategic alignment. The findings of the analysis Wu et al. performed on collected quantitative data indicated that IT governance mechanisms have a positive

association with performance. When IT governance and IS strategies align in positive ways, then organizational performance increases Wu et al. The results of the study indicated that, IS strategic alignment fully mediates the linkage between IT governance mechanisms and organizational performance.

Research into the issues contributing to company inefficiencies, delays, overstocking, and insufficient operational flexibility revealed a need for direct involvement and leadership to help address the problems (Wagner, Ullrich, & Transchel, 2013). In the multi-methods research by Wagner et al. (2013), expert surveys, review of the literature, and interviews revealed numerous contributing factors of poor financial outcomes and operational planning. The authors' research resulted in the development of holistic maturity models that organizations could use for assessment of internal processes to align better the integrated organizational operations (Wagner et al., 2013). Similar to the recommendations made by Wagner et al., Wu et al. (2015) emphasized IT governance importance in the alignment of IT strategies with organizational strategies. Both Wagner et al. and Wu et al. addressed the implementation, prerequisites, and benefits envisioned and achieved through leadership's direct involvement, support, and internalization of the operational concepts and models for successful large-scale information systems implementation.

Information sharing through information technology depends on overcoming the initial resistance, sharing the necessary information across departmental borders, and achieving process compliance, all facilitated by direct leadership endorsement and involvement (Bowman, 2014; Ly, Maggi, Montali, Rinderle-Ma, & van der Aalst, 2015).

Hung, Chen, and Wang (2014) studied the relationship between organizational fit and success of the organization. Using a sample of 53 hospitals and regression analysis, Hung et al. examined the moderating effect of five critical success factors: information systems adjustment, business process adjustment, organizational resistance, top management support, and the capability of a key team member during the implementation of an integrated health care information. The results of Hung et al. (2014) implicated the importance of the five success factors and the alignment of IT implementation strategy with long-term organizational strategies.

Arvidsson et al. (2014) reported similar findings as Hung et al. (2014) on aligning IS functionality with strategic intent. Arvidsson et al. added that entrenchment of previous practices and conservatism creates a resistance to change. Interviewing informants, along with follow-up group discussions, and review of documents, allowed triangulation of collected data in the longitudinal case study by Arvidsson et al. (2014). Arvidsson et al. suggested a need for future research into the concept of *strategy blindness*.

Iveroth, Fryk, and Rapp (2013) explored whether the IT alignment currently conceptualized in the current body of research is sufficient for attaining stated, goals such as improved quality, efficiency, and patient care improvements. Iveroth et al. conducted a longitudinal qualitative study of six health care organization in Stockholm over the 2005-2011 period, collecting data from interviews, focus group, observations, and archival material. Analysis of the collected data provided insight into the misalignment between IT strategy and organizational strategy; for example, Iveroth et al. identified that failure

to deconstruct the IT artifact and the existence of various levels of IT maturity contributed to misalignment in their study. One IT strategy may be inadequate for an effective integrated IT strategic solution tied to the overall business strategy. Due to the complexity of divergent IT technologies within health care organizations, different strategy requirements may help fulfill the need to address each to obtain strategic alignment (Williams & Shah, 2016).

Vessey and Ward (2013) provided further agreement and explained the implications of implementing enterprise architecture for aligning management's strategy with the organization's information technology infrastructure. Issues uncovered in the study included cultural and regulatory concerns and technical obstacles IT personnel encounter when establishing or updating the organization's enterprise infrastructure (Vessey & Ward, 2013). The smaller the proposed change, the more quickly and efficiently implementation occurs. Vessey and Ward viewed alignment as how the IS evolves to the ever-changing organizational requirements. Attaining alignment is an ongoing process of adaptation to the organizational infrastructure and mission. Vessey and Ward recommended using their co-evolutionary theory in IS alignment to develop sustainability and competitive edge.

Dulipovici and Robey (2013), in their qualitative interpretative case study, explored the strategic IS alignment by focusing on work practices of end users on knowledge sharing systems. Dulipovici and Robey collected data through interviews, nonparticipant observation, and documentation of data sources. Analysis of the data revealed an understanding and perspective of how IT supports organizations' strategic

goals. The results of a six-month study during the transition from a cross-boundary knowledge management system to a single integrated system showed different levels of opposition. Although the outcome of the study by Dulipovici and Robey indicated the system was capable of handling the requirements, communications and social interaction of various divisions depended upon the original systems due to users' reluctances to change. The actions were due to socially-shaped communication processes already in place. The resulting implication is that attempts at strategic alignment are sometimes unpredictable, creating misalignment of IT.

As revealed in previous research, business leaders often underestimate the complexity and challenges associated with social interactions and users' perceptions concerning acceptance of new technology, regardless of the specific business industry (Dulipovici & Robey, 2013). The medical and health care industry is similar yet unique, and CIOs encounter the same challenges plus the internal and external forces (Kannry et al., 2016). In the Vessey and Ward (2013) research, results were consistent with those of Dulipovici and Robey (2013), indicating that organizational change affects the ability to sustain alignment as strategies change in response to internal and external pressures.

Vessey and Ward (2013) conceived organizations and IS as complex adaptive systems (CAS) that evolve. Vessey and Ward introduced and explained the aspects of IS alignment, the evolution of the system, and theory of sustainability through proper alignment. According to the authors, CAS evolves according to the organizational environment, technology advances, and situational needs. Vessey and Ward posited their focus on the approach to IT alignment revolved around sustainability, increasingly

important in the current environment of globalization, dynamism, and uncertainty. The obstacles from within the organization, response to internal pressures such as financial, social acceptance of IT technologies, and external pressures from external entities such as government, vendors, and competitors affect IT and strategic organizational alignment (Vessey & Ward, 2013).

IT Strategies

Hung et al. (2014) approached the issue of health care and information systems reform through a focus on organizational fit with the business aspect of an integrated health care information system. However, Baird, Furukawa, Rahman, and Schneller (2014) suggested that IT adoption might benefit from standardization based on corporate governance, despite the associated delay in adoption rate. Baird et al. alternatively, recommended close coordination and integration in a combination of centralizations, resulting in a higher rate of computerized physician order entry and supply chain management alignment. Overall, it appears from the mixed results in the literature that governance and single or multiple strategies may depend on the complexity of the situation.

Andrade et al. (2013) presented a different strategic approach to the development of an XML-based interoperable HL7 server platform and HL7 Middleware capable of accessing legacy systems within the hospital's existing infrastructure of system databases. Zinszer, Robyn, Bates, and Buckeridge (2013) similarly claimed that an optimal approach to integration and interoperability strategy is through software bridges and interfaces. An alternative approach to the strategy of EHR implementation offered by

Cegielski, Bourrie, and Hazen (2013) stemmed from a four-round Delphi study to obtain a set of issues affecting IT executive decisions in adopting emerging IT technologies into corporate IT strategy. The first issue discussed by Cegielski et al. was the ability to gain competitive advantages through technology usage, related to the second issues that were about the ability to sustain competitive advantages using technology. The third issue Cegielski et al. discussed was the security of the technology, and the fourth issue pertained to acceptance of technology by customers and clients. Cegielski et al. recommended that leaders consider the four issues in IT strategies employed by CIOs.

There is a multitude of proposed EHR infrastructures due to the lack of standardization and uniqueness of each medical provider. He and Yan (2014) suggested a Simple Network Management Protocol ruled by the Internet Activities Board; the protocol is a uniformed interface capable of interchange with multitudes of different network equipment, creating an accessible and manageable program. The strategy for implementation simplification was the utilization of existing infrastructure and applications (He & Yan, 2014). Huerta, Thompson, Ford, and Ford (2013) referred to the Big Bang theory of EHR implementation, with a focus on making a system operational within 1 year. However, this strategy led to the identification of a low total productivity factor; in response to these findings, Huerta et al. argued that IT results of efficiency, reduced cost, and improving health care delivery may be inconsistent and unsuccessful.

McAlearney, Hefner, Sieck, and Huerta (2015) conducted 45 interviews with six U.S. health care organizations purposefully selected based on successful ambulatory EHR implementation. McAlearney et al. completed six focus groups with 37 physicians who

provided comprehensive data for deductive and inductive analysis that led to answers to their research questions about IT strategies. McAlearney reported three strategies that emerged from their data analysis: (a) use existing HIT literature that emphasizes implementation facilitators, (b) focus on workflow, and (c) incorporate critical management factors that facilitate implementation. Adding to the findings, Johnson and Lederer (2013) claimed that business leaders evaluate business strategies through eight IS strategies reported by Johnson and Lederer: (a) aggressiveness, (b) analysis, (c) external defensiveness, (d) internal defensiveness, (e) futurity, (f) innovativeness, (g) proactiveness, and (h) riskiness.

Silvius and Stoop (2013) asserted that success of strategic information systems are planning and importance in assuring the alignment of information technology systems and services with business strategies. Planning and strategizing for combined effectiveness requires extensive coordination and an integrated strategic approach that overcomes the difficulties and barriers to adoption of EHRs (Silvius & Stoop, 2013). However, Johnson and Lederer (2013) proclaimed that CEOs and CIOs possess different perspectives on the most effective strategy to pursue in EHR implementation. CEOs' perspectives revolve around proactive analysis, whereas CIOs view innovativeness and aggressiveness strategies as primary avenues for EHR implementation (Johnson & Lederer, 2013). Combined contributory agreements between CEO and CIO might result in an effective overall strategy for the challenge of EHR implementation (Johnson & Lederer, 2013).

Barriers to EHR Adoption

Acceptance of advanced and innovative technologies is a common phenomenon (King, Patel, Jamoom & Furukawa, 2014). Although implementation of EHRs provides positive performance factor benefits to health care providers, there are obstacles hindering the process (Boonstra et al., 2014). In their systematic review and analysis, Boonstra et al. (2014) identified 19 frameworks for mitigating issues associated with EHR implementation. The three categories of the frameworks are (a) EHR context, (b) EHR content, and (c) EHR implementation process. Boonstra et al. recommended interventions for each in overcoming the obstacles to implementation.

Devkota and Devkota (2013) argued that expanding the use of EHR systems decreases health care costs and improves patient safety, efficiency, and overall organizational outcomes. However, obstacles to implementation, such as lack of funding and interoperability of current systems, retard the adoption of EHRs. Whereas Franzke, Wright, and Hautamaki (2014) argued that usability is a major concern, Devkota and Devkota (2013) noted that patient care and safety are the beneficial outcomes that should be of concern to leaders. Bagyogo, Lapointe, and Bassellier (2014) claimed that the focus of leaders should be on EHR performance, overall technology potential, and user initiative.

User adaptation and ease of use affect efficiency potential of data-intense environments creating opportunities for electronic patient and provider interactions (Ancker et al., 2014). Otto and Nevo (2013) suggested that, along with concern for safety, there are other mitigating factors such as political and economic issues slowing

the progress of EHR adoption. Physicians' perceptions and resistance to migrating to EHRs, cited by Otto and Nevo were a loss of control, provider attitude, financial negatives, and continuity of care as an obstacle to adoption. Jamoom, Patel, Furukawa, and King (2014) presented a contrasting view concerning what little knowledge exists about physicians' perspectives on EHR adoption and use; in their research, a comparison of the perspectives of adopters and nonadopters revealed similar results as Otto and Nevo. The greatest obstacles perceived by both adopters and nonadopters included purchase cost and productivity (Jamoom et al., 2014; Otto & Nevo, 2013). Compared to other groups studied, the nonadopters showed considerably more concern with various national health IT policies and financial incentives or penalties for electronic record usage as major factors shaping their EHR adoption potentials.

King, Furukawa, and Buntin (2013) cited lower adoption rates in different geographic locations. King et al. studied EHR adoption rates in a low-income population part of the Midwest, another geographic area with a high population of low-income minorities in the Northeast, and a large metropolitan area in the American West. In contrast to the larger metropolitan area, the two underserved areas in the Midwest and Northeast had lower adoption rates (King et al., 2014). Reasons cited by King et al. for low adoption included limited access to advanced health care technology, organizational complexity, and less favorable business scenarios.

Struik et al. (2014) approached problems related to the slow adoption of EHRs in a discrete choice experiment. The experiment occurred to address the following previously identified barriers in the literature: data entry hardware, technical support, the

attitude of the department head, performance feedback, flexibility of interface, and decision support. The perspectives of nurses and physicians were that flexibility of the interface was the factor of highest importance. The results aligned with the TAM, as ease of use, represented an enhancer to the acceptance of technology, described by Davis (1989). Struik et al. demonstrated the internal and external influences on the implementation of health information technologies, and then discussed the social implications affecting organizations.

Cresswell and Sheikh (2013) argued that although much research has covered the health care industry, organizational issues associated with implementation strategies lack adequate research. Zhang et al. (2013) proclaimed that the health care industry is much slower to adopt technology, in comparison to other industries, and there is a larger percentage of adoptions in administrative information technology versus clinical and strategic IT adoptions. Zhang et al. and Cresswell and Sheikh suggested organizational factors dominate as the most influential factors on adoption, requiring research attention.

Regulatory Influences

Concern for the security of patient medical records and the safety of patients prompted legislative action resulting in signing HIPPA into law in 1996 (Anthony et al., 2014). The HITECH Act and American Recovery and Reinvestment Act of 2009 provided incentives to promote the adoption of EHRs and MU of health information technology (Sheikh, Sood, & Bates, 2015). Passage of the Patient Protection and Affordable Care Act of 2010 introduced a far greater emphasis on federal regulations of the American health care industry (Bauer, Thielke, Katon, Unutzer, & Areal 2014).

Shaw, Asomugha, Conway, and Rein (2014) proclaimed enactment of the Patient Protection and Affordable Care Act is the greatest change in American health care policy since the 1960s. Legislation restraining discriminatory insurance practices, providing more affordable coverage and methods of reducing costs may lead to considerable benefits and coverage for an additional 25 million American citizens (Shaw et al., 2014).

Due to the pervasiveness of EHRs and health information exchanges, there is increased potential for improved health care. However, Ben-Assuli (2014) argued that serious concerns are legal and privacy issues. Despite these unresolved concerns, incentives provided through the HITECH Act for attesting to MU contributed to the increased adoption of EHRs (Adler-Milstein et al., 2013). Adler-Milstein et al. (2013) emphasized that hospitals ineligible for the federal MU incentives have extremely low adoption rates. MU eligible providers perform quite well with most scoring 90-100 on the 15 measures of MU (Wright, Febowitz, Samal, McCoy, & Sittig, 2014). The Centers for Medicare and Medicaid Services incentives of \$30 billion have been instrumental in the rapid increase of adoption (Mirani & Harpalani, 2014). However, several states including Texas are slow in the adoption of EHRs (Charles et al., 2015).

EHR Benefits

Nationally, the beneficence of EHRs comes in different forms. Physicians' attest to the clinical benefits of providing enhanced patient care overall, ability to access patients' charts remotely, medical medication alerts, and critical lab values (King et al., 2014). In the research, King et al. performed a cross-sectional data examination of the 2011 Physician Workflow study, representative of office-based American physicians.

The doctors' perspectives on the benefits of EHRs were that between 30% and 50% of physicians in the study stated clinical benefits were the ability to provide recommended care, appropriate tests, and enhanced patient-provider communications (King et al., 2014). However, Asan, Smith, and Montague (2014) studied 8 family practice physicians and 80 patients, leading to findings that physicians spent more time with the EHR screen than with paper records and less time looking at patients. Asan et al. claimed that their findings could be responsible for negative patient perceptions of physicians who use EHR, with implications for the design and adoption of related technologies.

Effective teamwork directly affects the quality of patient care. Properly aligned and implemented technologies can enhance professional health care teamwork (O'Malley, Draper, Gourevitch, Cross, & Scholle, 2015). Gratez et al. (2014) examined whether primary team cohesion affects outpatient EHRs and clinician-rated care coordinated across delivery sites. Gratez et al. claimed that EHR might not have a positive benefit with less cohesive teams; effectiveness and beneficence depend on the users' proficiencies with the systems. From their study of 63 physicians and health care desk staff, O'Malley et al. (2015) claimed that EHRs could facilitate communication and task delegations of teams but could pose challenges to teamwork if there is a lack of integrated software, poor functionality and interoperability, and inadequate ease of use.

Other noted benefits of EHRs, as indicated by Haegerich, Sugerman, Annest, Klevens, and Baldwin (2014) include injury and error prevention through improved surveillance and monitoring of clinical treatments and outcomes. Hoffman and Podgurski (2013) similarly reported enhanced clinical outcomes from EHRs for the prevention,

treatment, and monitoring of infectious diseases, disease outbreaks, and chronic illnesses. EHRs contribute to the rapid analysis of data transmitted electronically to public health authorities. Jaffe, Harold, Frieden, and Thomas (2014) also identified numerous ongoing improvements in health security, enhanced surveillance systems, medical countermeasures, and laboratory networks designed to improve the ability to respond to day-to-day medical issues and emerging health issues.

The ability to store a massive amount of medical data improves continuously yet the accessing data could be challenging depending on the type of database (Wang, Min, Wang, Lu, & Duan, 2015). Communications after health care visits, referrals for specialists or follow-up visits, access to medical records, review of lab results, and maintaining financial records are part of the benefits of EHR systems, which are essentially databases that scholars, such as Wang et al. (2015) continue to try to improve. The benefits of EHRs include the ability to establish a path for accessing relevant data for a variety of medical conditions, transitioning from paper to computers with the potential for reduced health care costs, improved patient care, and safety. However, scholars such as Wang et al. (2015) continue to work toward solutions to the challenges. Noblin et al. (2013) argued that increased numbers of physicians and hospital administrators implementing EHRs assume that the systems will contribute to enhanced safety, efficiency and improved quality of care. As noted, research is replete with analysis indicating that system designs will continue to evolve and continue to garner the beneficial aspects of EHR.

EHRs represented the conversion from paper to digital media to provide physicians, health care staff, and patients the opportunities to store entire medical records and historical data on accessible or mobile storage media (Tansel, 2013). As the patient travels so does the patient's medical record. During medical emergencies, instant access to the patient's medical records might be the difference between life and death. Terry (2013) argued similarly that advances in technology should improve patient health care.

However, Terry (2013), like O'Malley et al. (2015) and Asan et al. (2014), acknowledged drawbacks that accompany the benefits of EHRs. Issues with EHRs such as usability, technological limitations that impede interoperability and safety concerns cast doubt on current EHRs (Terry, 2013). Lee, Kuo, and Goodwin (2013) also highlighted the gap that appeared between expected and actual outcomes of the benefits of EHR implementation. EHRs are inherently expensive because of required infrastructure, electrical power requirements, climatic control, equipment costs, software costs, IT personnel costs, and ongoing updates and maintenance costs. Dey, Sinha, and Thirumalai (2013) suggested that increasing the level of electronic medical records technology might not be beneficial to all providers, based on organizational, environmental, and financial limitations of the providers.

Cost of EHRs

EHR system costs can run into millions of dollars depending on the size and complexity of services provided by hospital organizations (Smith, Bradley, Bichescu, & Tremblay, 2013). Financial decisions made by hospital administrators determine strategies CIO's can pursue in the implementation of EHRs. Investing in information

systems is a serious undertaking, but there is a lack of knowledge about how CEOs determine IS funding allocations among other competing expenses for business priorities (Salge et al., 2015). Wang et al. (2015) noted that data conversion and maintenance processes are costly regarding both time and money that escalates with greater numbers of record additions. Therefore, failure to discern the value of EHR implementation might be cause for hesitancy on the part of hospital CEOs' desire to allocate resources.

Determining the value creation by IT investment is difficult due to the differences between health care and other industries. Sherer (2014) argued that there is mixed evidence concerning the value created by health IT systems and implementation costs become difficult to determine because government incentives programs skew results. Adding to the overall cost of IT systems, management must consider the costs of IT employees. Kruse, Mileski, Alaytsev, Carol, and Williams (2015) reported that barriers to EHR adoption include escalating costs, users' negative perceptions, lack of sufficient implementation planning, and lack of proper training requiring potentially expensive support staff or extended education costs. Human resource managers confronted with demands for qualified IT staff work within the confines of budgets for the costs of technical training and IT personnel (Wang & Kaarst-Brown, 2014). As the expansion of technology increases, the need for technologically perceptive human capital also increases (Majumdar, 2014). CIOs obligate funds for EHR infrastructure and the intellectual capital to maintain the increasingly complex innovative technologies; organizations investing in EHR sustainability initiatives must expect increased budgetary expenses (Majumdar, 2014). Terry (2013) estimated that investments in health

informatics and technology infrastructure costs approximately \$60,000 per bed.

According to the Organization for Economic Co-operation and Development, the United States cost of public health per person exceeds five other high-spending countries examined by Lorenzoni, Belloni, and Sassi (2014). Additionally, the total overall costs of health care in America increased to \$2.8 trillion in 2012 (Jaffee & Frieden, 2014). Researching the financial IT investment, Strong et al. (2014) reported falling short of the expected results of lowered costs, higher efficiency, and patient and provider satisfaction from IT medical record advances. In contrast to Strong et al. (2014), Smith et al. (2013) emphasized that sophisticated electronic medical record system investments result in improved financial performance and increased employee productivity. In agreement with Smith et al. 2013, Bardhan and Thouin (2013) reported a positive relationship between reduced costs and improved care with the implementation of financial and clinical information systems. In light of mixed research results, the significance of the EHR problems, and the relative infancy of their applications, a call for ongoing research persists in the literature, concerning the viability of EHRs, cost-effectiveness, and improved health care resulting from EHR investments (Bardhan & Thouin, 2013; Salge et al., 2015; Terry, 2013).

Barriers to EHRs Implementation

From ongoing research about physicians' perspectives on EHR adoption, the most emphasized barriers to EHR adoption are costs, productivity loss, and decreased interactions with patients due to increased interactions with computers (Bae & Encinosa, 2016; Jamoom et al., 2014; Kruse et al., 2015). Physicians perceived the use of EHRs to

be time-consuming activities affecting the amount of time available for patient interaction (Bensefi & Zarrad, 2014). The majority of physicians who participated in EHR studies felt pressure to complete digital forms that detract from time providing health care to the patient (Meigs & Solomon, 2016). Discounting productivity loss, as familiarization increases, proficiency of the user decreases the time associated with the digital input (Bae & Encinosa, 2016). Social-technical acceptance, environmental impact, and organizational factors appear to be among the major factors influencing adoption of information technology (Zhang et al., 2013).

The literature reflects the reality of existing barriers to the adoption of informatics for most industries. However, there is a need to consider factors concerning the protection and security of patient data (Turk, 2015). The U.S. Congress passed ARRA, expanding HIPAA, with specific guideline and safeguards intended to protect the patients' records (Bredfeldt et al., 2013). However, breaches still occur due to the human factor when dealing with large digital data sources, with the potential for hacking and lack of adherence to the guiding principles (Turk, 2014). Across diverse health care settings throughout the world, there are concerns from patients and the public about the security and privacy of their EHR information (Papoutsi et al., 2015). Training increases knowledge and proficiency of system users and can help users understand privacy and security risks and concerns (Kim, 2013). Constant assessments of users' performances and procedures are paramount to mitigating risks, such as commercial exploitation, lack of accountability, data inaccuracies, prejudices, and inequalities in health care provision (Colligan, Potts, Finn, & Sinkin, 2015; Papoutsi et al., 2015).

Colligan et al. (2015) reported that cognitive workload associated with EHR usage increases for nurses. Although Colligan et al. warned against generalizing a *one-size-fits-all* conclusion about how EHR usage affects every person who uses the technology, the authors did explain that as user experience increases cognitive workload tends to decrease. User workload, cognitive processes required, and investment of time in training and usage may also vary depending on how many systems a user must learn, complicated by a general lack of interoperability among different (Loukis & Charlabidis, 2013). Interoperable information systems in the health care IT industry are uncommon and appears to be one of the most frequently cited problems with health care technology (Slight et al., 2015). There is a growing number of vendors and suppliers of certified health care information systems (Yeung, Jadad, & Shachak, 2013). Consequently, it is beneficial for adopters of IS in establishing an infrastructure focused on interoperability within the organization and with emphasis on collaborators such as customers, the organization supply chain, and business partners (Loukis & Charalabidis, 2013). Interoperability in the case of hospital EHRs is a barrier to implementation (Kruse et al., 2014).

Patient Safety

Improving the quality of care of patients is the espoused benefit for implementing EHRs across the America (Jaffe & Frieden, 2014). Progress in improved health care through technological advances provides longevity, extending life expectancy at birth to 78.7 years (Jaffe & Frieden, 2014). Proponents of EHRs proclaim great strides in improved safety and security of patients and patients' health information (Kushniruk,

Bates, Bainbridge, Househ, & Borycki, 2013). There are ongoing efforts for improving standards related to usability, safer design, and implementation procedures (Woinarowicz & Howell, 2016). EHRs can potentially improve the quality of care for patients, reduce costs, and assure patient safety; yet, researchers suggested there is much room for improving the safety of the patient (Carayon et al., 2013).

Patient safety is a human factor of interaction, which causes errors (Carayon, Xie, & Kianfar, 2014). Researchers and hospital administrators use Systems Engineering Initiative for Patient Safety (SEIPS) model to minimize human errors in health care practice (Xie & Carayon, 2015). The SEIPS model guides the redesign of health care systems to balance the systems and encourage workers in active and adaptive roles in quality health care and patient safety (Carayon et al., 2013). Using the SEIPS model, Xie and Carayon (2015) discovered that poor team communications represented the factor leading to increased errors as well as suboptimal EHRs and decision support design. The human factor plays an important role in patient safety whether the patient records are digital or paper-based (Carayon et al., 2014).

The 2014 edition of the certified EHR technology included specific requirements for health care IT vendors to adopt, with a focus on human factors, safety culture, and usability (Franzke, Wright, & Hautamaki, 2014). The emphasis on EHR design and use evolved to encompass an emphasis on enhancing patient safety and safety culture through collaboration between vendors and users. While Zhang et al. (2013) argued that organizational factors affect adoption rates of EHRs more so than market factors, Nguyen, Bellucci, and Nguyen (2014) highlighted mixed results concerning market

factors such as patients' perceptions of safety. Nguyen et al. reported that only one-third of the patients they studied perceived the improved quality of care and safety associated with EHR implementation. Daker-White et al. (2015) noted that electronic systems could undermine safety, because of human or technological failures leading to errors because of the technology itself. The accurate, timely input of data increases the potential for noticeable benefits and reduces human EHR errors, if not technological errors. Therefore EHRs use enhances patient safety associated with medications, interventions, or other aspects of total patient health care (Daker-White et al., 2015).

Future Trends

Prior EHR research indicated potential benefits of EHRs that include better communication, patient management, research, patient safety, and cost reduction, among other benefits (Struik, 2014). Looking to the future with an optimistic view first requires breaking through the barriers of EHR implementation. Removal of the main barriers could lead to more technological advancements in medical care, better electronic health records, and reduced costs of medical care (Daker et al., 2015; Jamoom et al., 2014). Foldy, Grannis, Ross, and Smith (2014) envisioned the development of new technologies and technology standards that facilitate the breakdown of barriers could alter positively the manner of maintaining and exchanging medical data.

Foldy et al. (2014) predicted that health department personnel would struggle to maintain increased data sets thereby improving service and cost efficiency while meeting increased demands for population health statistics. As the population of technologically savvy patients grows, the expectation for access to medical records and health-related

information will also grow (Friedman, Parrish, & Ross, 2013). With ongoing research that can help fill the gap affecting the successful implementation strategies, future trends may include improvements in accessing EHRs, corresponding with the potential to improve population health in America. Patients who have a better understanding of their contributions to improved health may utilize technologies as sources to potentially avoid preventable diseases (Friedman et al., 2013). There is a pressing need for improving population coverage of EHRs, standardized content, reporting methods, training on optimal EHR use and benefits, and understanding of the legal complexities of using EHRs to support population health (Friedman et al., 2013). Barriers confronting medical care providers limit the potential of EHRs in producing a national collaborative effort to improve population health care in America (Foldy et al., 2014; Friedman et al., 2013). However, scholars such as Milano, Hardman, Plesiu, Rdesinski, and Biagioli (2014) emphasized the trend toward accessible teaching and training of EHR skills, thereby expanding the potential for use in disease management and prevention.

Innovation is the key to the advancement of and sustainability of organizations during economic upheavals and uncertainty in financial markets (Kumar, 2014). Accordingly, organizational leaders may be remiss in failing to invest in a technological future, regardless of the industry. Kumar (2014) suggested that organizations investing in innovation afford themselves the added opportunities that could stem from new technology, products, and management processes. Competitive advantage potential might expand through effective research and implementation of innovative ideas and technology (Kumar, 2014). Payne et al. (2015) reported on EHR goals for 2020 and noted

the need for a long-term framework for EHR innovation. Payne et al. recommended that scholars and health care professionals work with other interested groups, government agencies, and professional organizations to identify creative ways to solve EHR problems that can lead to a sustainable framework for future EHR innovation.

Gaps in Literature

The review of literature about health care record keeping and technology implementation led to the conclusion that there is an obvious gap in the health IT implementation body of knowledge (Boonstra et al., 2014). Specifically, Ahmadi, Nilashi, and Ibrahim (2015) identified numerous issues associated with inadequate processes of EHR implementation and a lack of knowledge about CIO technical strategies required for successful EHR implementation. Ahmadi et al. suggested that CIO technology expertise is essential and a primary factor in successful EHR implementation. Kannry et al. (2016) recommended that leaders become attentive to and act on practice-based research that can help leaders focus on EHR implementation to improve the quality of care for patients served in the health care setting.

Wu et al. (2015) highlighted a general neglect of IT governance which can become a crucial element of IS studies involving strategic alignment. Strategic alignment is essential in developing IT strategies supportive of and integral to organizational strategies. Wu et al. recommended further research into the strategic alignment of IT. Strategic alignment brings together IT strategy and organizational strategy that could contribute to improved efficiency in reaching organizational goals (Payne et al., 2015).

Vessey and Ward (2013), like Wu et al. (2015), called for future research that includes IT strategy and optimal implementation goals for EHR technology.

The suggestions for future research by Cegielski et al. (2013) pertained to the relationship between IT strategy and the timeliness of implementation, based on different types or categories of emerging information technology. A related shortcoming of the health care information systems is the lack of interoperable systems, which has become a major focus on scholarly efforts (Loukis & Charalabidis, 2013; Samal et al., 2016). Investing in health care record keeping through enhancements and innovation in the technology environment is essential for adhering to government requirements. Therefore, overcoming barriers experienced by users and inherent in the technology continues as a major topic of ongoing research efforts. Further research that can help leaders understand the best implementation strategies is essential to successful organizations (Goldwater, Jardim, Khan, & Chan, 2014).

Gardner, Boyer, and Gray (2015) suggested future study and exploration into strategies for implementing and using health information technologies. The continuing emphasis on government directives for EHR implementation increases the requirement for further research in the strategies CIOs use for the successful implementation of EHRs (Jamoom et al., 2014). Financial losses to organizations may occur when CIOs lack strategies for successful implementation of EHRs; the implications are a need for further research into leaders' strategic plans that can lead to social progress and positive health care change from related technologies (Kannry et al., 2016). Payne et al. (2015) shared with other scholars, such as Bowman (2014) and Carayon et al. (2014), the sense of

urgency expressed about addressing EHR problems. Payne et al. claimed that if scholars and stakeholders can help solve the EHR problems, then health care professionals could look toward a bright future for EHR applications and related technological innovations.

Summation

Section 1 of this study includes an introduction to the concepts germane to this proposed study about strategies hospital CIOs in Texas used for the successful implementation of EHR systems. The emphasis on fulfilling the national goal of EHR implementation indicates an urgency in addressing the slow adoption rate. Acknowledged results of research across the spectrum of health care providers and hospital administrators, there is an ongoing need for exploring strategies that hospital leaders, such as CIOs, have used for the successful implementation of EHR systems. Social issues affected by this study relate to the improved quality of patient health care, patient safety, and reducing the overall costs of health care in America.

The scope of this study is to explore strategies hospital CIOs in a multi-county region in North Central Texas use for the successful implementation of EHR systems. The rationale for this study is that the EHR adoption rate in Texas remains at about 80%, compared to the national levels of adoption as high as 94%. The deficiency draws attention to the shortcomings and needs to improve EHR implementation in those Texas hospitals that contribute to the low rate of adoption. Addressing the deficiency may lead to reduction of health care costs, improved patient care, increased patient safety, and overall reduction in the national health care costs.

The implementation of EHRs in the United States continues to progress substantially, despite the obstacles and barriers, due partly to financial incentives (Charles, Gabriel & Furukawa, 2014). However, full compliance with federally mandated requirements remains unmet, with Texas lagging behind the national average (Charles et al., 2015). Exploring the implementation of successful EHRs in North Central Texas might uncover strategies IS directors used in meeting the challenges and overcoming the obstacles to EHR implementation. The existing literature associated with EHR implementation in America is replete with a myriad of issues surrounding implementation efforts (Carayon et al., 2015; Pandhi et al., 2014). However, literature associated with strategies for successful implementation of EHRs, especially in American rural acute care settings is comparatively diminutive (Conrad, 2013). Although health care leaders in the United States demonstrated measurable progress in EHR implementation, the adoption rates in various health care settings continue to fall below expectations (Charles et al., 2015).

Transition

In Section 1 of this study included an introduction to the background, the foundation of the study, the purpose of the study, problem statement, purpose statement, and the nature of the study. The section contained a brief discussion of the conceptual framework and lens of TAM, along with operational definitions, assumptions, limitations, delimitations, and the significance of the study. The review of the literature encompassed an expansion of the discussion of the concepts introduced for this study. In Section 2, discussions included details about the proposed method and design, the role of the

research, and participants in the research project. The discussions included justifications for the choice of research methodology, design, and the techniques for sampling from the population. Elaboration about data collection tools, data organization, and analysis procedures follow, including the consideration of how to enhance the ethical orientation and trustworthiness of this study. Section 3 connects the purpose of the study, presentation of findings, explanation of results, and details of the applications to professional practice, along with a statement of implications for social change. Section 3 includes recommendations for action, suggestions for further research, a reflection of my experience with the DBA Doctoral program, and concluding statements.

Section 2: The Project

The purpose of this qualitative multiple case study was to explore strategies hospital CIOs in Texas used for the successful implementation of EHR systems. Section 2 includes a restatement of the research purpose followed by the description of my role in this study. Included in the section are elaborate details about the population, sample, and recruitment of participants. Justifications and rationales presented in this section pertain to the choice of research method and design. My ethical research orientation includes adherence to the guidelines in the Belmont Report, use of informed consent procedures, confidentiality, and approval of the research by the Institutional Review Board before data collection began. The section includes plans used for data collection, organization, and analysis with additional details about how I intended to enhance the trustworthiness of this study.

Purpose Statement

The purpose of this qualitative multiple case study was to explore strategies hospital CIOs in Texas used for the successful implementation of EHR systems. The population for this study includes three CIOs from 10 acute care hospitals in a multicounty region of North Central Texas who have implemented EHRs successfully meeting Stage 2 of the ONC and CMS specifications of the MU certification standards.

Potential benefits of this study to society include the expansion of efficient quality medical practices and reduced costs for medical care. The implications for positive social change from implementing EHR systems stem from improvements in medical care, leading to healthier members of society who experience lower health care costs and

higher quality of care (Burns, Dyer, & Bailit, 2014). EHR improvements in medical care include rapid and economical medical diagnoses from shared medical data, less redundancy of diagnostic tests, and the potential for fewer medical errors (Bailey et al., 2013). Additional uses of EHR systems for data mining provide further social benefits through the discovery of new medical treatments, the convergent evolution of health information management, and career opportunities for health informatics specialists and IT professionals in health care settings (Gibson, Dixon, & Abrams, 2015).

Role of the Researcher

My role was to explore strategies hospital CIOs in Texas used for the successful implementation of EHR systems. I collected, organized, and analyzed data to gain an understanding of the participants' perspectives in the successful implementation of EHRs. A researcher's role as the instrument of data collection in qualitative research is to access and recruit participants to collect data, which requires maintaining an intellectual relationship throughout the recruitment, data collection, and member checking processes (Patton, 2015). Researchers must maintain positive working relationships with the qualitative research participants to learn what the participants can contribute to the research to facilitate a constructive research process (Grossoehme, 2014).

The infrastructures of hospital-based electronic record systems have similar information systems technology, including network operations, systems layout design, and maintenance. My past work experiences and current employment responsibilities include daily work and routine involvement in enterprise resource planning system operations. I have 18 years of experience with implementation of information systems

technology, which might have influenced my personal opinions concerning the complexity associated with the successful implementation of EHRs. I do not work directly with any of the potential research participants, but do have insider knowledge of and experiences in the field. Greene (2014) claimed that the experiences of researchers, of participants, may lead to insights or challenges and suggested ongoing researcher attention to minimizing ethical implications, avoiding potential biases, and increasing the trustworthiness of the study.

As the principal instrument in collecting for data collection, adherence to the requirements outlined in the Belmont Report (1979) concerning ethical research is of the utmost importance in assuring the protection of all participants. The ethical concepts that guided this research were: respect for persons, including protecting confidentiality; beneficence, or to do no harm by protecting of the wellbeing of participants; and justice, whereby subjects of research should receive equal benefits of the resulting research (Novak, 2014). Refraining from unprofessional interactions with the participants is a high priority and requirement for ethical research (Wallace, 2015; Yin, 2013).

Elimination of all Haegerich sources of bias in research may be difficult, although it is important to recognize and address all possible sources of bias in scholarly research (Strassle et al., 2015). I conducted all interactions with the participants in an unbiased manner, recognizing and refraining from interjecting any personal beliefs or biases into the research study. Greene (2014) discussed the value in recognizing and acknowledging potential biases and remaining aware of which biases are important to reveal explicitly to readers and audiences.

Effectiveness in mitigating bias also depends on the researcher's adherence to protocols specified in the Belmont Report (1979) and for the collection and analysis of data. Allowing participants the opportunity to engage in member checking assures mitigation of sources of bias (Anney, 2015). I took steps to mitigate bias, as described by qualitative research experts such as Greene (2014) and Anney (2015), and I refrained from unprofessional interactions with participants in this study.

The rationale for establishing a data collection protocol is that formal procedures for data collection can lead to standardized, replicable data collection efforts that may result in pertinent data useful for answering the research question (McGonagle, Brown, & Schoeni, 2015). Yin (2014) suggested establishing and using protocol so that each participant receives the same presentation and questions in an unbiased manner.

The data collection plan involved initial interaction with the participant, including preliminary introductions, an explanation of the purpose of the study, and establishing a rapport with the participants (Grossoehme, 2014). The plan for questions and data collection, detailed in the protocol, included questions designed to provoke relevant responses, eliciting the experiences and knowledge participants possess. Interview scheduling, based on anticipated timelines required for the interviews, assured adequate time for complete responses, follow-up questions, and illuminating views (Gergen, 2014). Plans for incorporating listenership in the data collection protocol should result in participants' perceptions that the researcher is respectful, understands the responses, and records the participants' responses without overturning or modifying the facts provided (Alby & Fatigante, 2014).

Participants

Participants for this qualitative multiple case study consisted of three hospital CIOs of the 10 acute care hospitals in a multicounty region of North Central Texas who have implemented EHRs and attestation to Stage 2 MU. The participants possessed the knowledge, technical expertise, and experiences with successful implementation of EHR systems. The purposive selection process ensures the selection of qualified participants who meet specific criteria (Denzin & Lincoln, 2013; Houghton, Casey, Shaw, & Murphy, 2013; Iveroth et al. 2013). Selection of CIOs from hospitals where there was a successful EHR implementation may add to the field of knowledge and contribute to the potential widespread implementation of EHRs in Texas.

Purposeful sampling for participants from the population who are information-rich subjects heightens the trustworthiness of qualitative studies (Palinkas et al., 2015). Criterion sampling, described by Palinkas et al. (2015) as the most common type of purposeful sampling, occurred in this study to ensure recruitment of participants who are thoroughly cognizant of the technical considerations, managerial aspects, and decision processes involved with successful EHR implementation. Eligibility to participate in this study was that participants must be at least age 18, working as a CIO or in an executive technology leadership position within the multicounty region of North Central Texas possessing demonstrable experiences with successful EHR implementation in hospital settings. The participants must have implemented an EHR and attested to Stage 2 of the CMS criteria.

The strategy used to gain access to the participants was through publicly available contact information, published for the administrative, executive, and technical staff of the hospitals represented in this study. The Office of the National Coordinator for Health Information Technology (2016), as a division of the U.S. Department of Health and Human Services, reports a wide range of statistics about the variations in EHR adoption that exist across and within states. Use of this publicly available information helped to corroborate evidence about which Texas hospitals are and are not implementing EHR, along with indications of the levels of engagement of hospitals in EHR usage. An additional source of publicly available contact information for key executives working across the nation's hospitals, statistics and data about EHR usage, and related resources was the Definitive Healthcare Network (2016), established in 2008 to build and promote a publicly available database for hospital and technology innovation data.

During the initial introductions before the interviews, a researcher must establish a collaborative working relationship with the participants to gain their trust and openness (Bernard, 2013; Mojtahed, Nunes, Martins, & Peng, 2014; Yin, 2014). I introduced myself to the participants, explained the intended research project, the reasons and logic behind the research, and the potential benefits of the study for improved business practices and positive social change. These procedures, which are a part of the informed consent process, together with assurances of confidentiality, are essential steps for establishing agreeable working relationships with research participants (Beskow, Check, & Ammarell, 2014; Check, Wolf, Dame, & Beskow, 2014). The overall beneficence of

an amiable working relationship improves the rigor of the resulting research (Houghton et al., 2013).

Research Method and Design

In this section, I described the research method, design, and provided justifications for the qualitative multiple case study. The qualitative multiple case study is appropriate for exploring strategies hospital CIOs in Texas used for the successful implementation of EHR systems leading to an in-depth understanding of the logic leading to the strategies hospital CIOs used in overcoming obstacles to successful EHR implementation. The qualitative research method allows acquisition of data otherwise lost or dormant in quantitative research (Gergen, 2014). Case study design is appropriate in business settings involving multiple informants and different sources of data collection, as described in the following justifications of these choices (Yin, 2014).

Research Method

I chose a qualitative method to explore relevant data needed to answer the overarching research question for this study. Researching to unravel complex technical issues with a contextual understanding appropriately aligns with a qualitative method (Abma & Stake, 2014; Grosseohme, 2014; Houghton et al., 2013). Qualitative studies are prevalent in sociology and information systems research because insight into personal perceptions, in-depth communications, and workplace experiences fail to surface through quantitative methods (Amba & Stake, 2014; Bernard, 2013; Denzin & Lincoln, 2013).

Choosing the qualitative over quantitative research method was logical because identifying individuals' perspectives and processes that may culminate in detailed

implementation strategies is possible through qualitative research (Palinkas et al., 2015). Researchers accumulate unlimited numerical data when using quantitative research methods, which lack contextual meaning or elaboration of particular situations (Yilmaz, 2013). Therefore, the quantitative method was not appropriate for the research question of this study. The quantitative method and mixed method approach (a combination of qualitative and quantitative methods) are suitable for conducting quasiexperimental research, experiments, and other types of studies involving known variables and relatively large sample sizes (Frels & Onwuegbuzie, 2013). I did not conduct experiments and did not intend to limit the research to the study of known variables or expand the research to larger sample sizes that may be outside of the boundaries established for this study. Consequently, a mixed method was not a viable option.

The trend of qualitative research continues to grow as business, management, psychology, and social science researchers realize the benefits of discovery through the subjective nature of perceptions of knowledge, attitudes, and experiences (Roberts & Castell, 2016; Leung, 2015). Garcia and Gluesing (2013) emphasized the advantages of qualitative methods as providing richer, deeper, and more nuanced understanding of many of the phenomena and issues under investigation, compared to a quantitative method. To yield a rich, deep, and nuanced understanding of the context and topics that can lead to an answer to the overarching research question, the proposed research method for this study was the qualitative method.

Research Design

Of the available qualitative design structures, multiple case study best matched the requirements of answering the research question. Multiple case study design is the optimal approach to explore complex shared events in business settings (Cronin, 2014; Sangster-Gromley, 2013; Yin, 2013), such as strategies hospital CIOs in Texas used for the successful implementation of EHR systems. Yin (2014) explained that the value of a case study design in comparison to other designs: with a case study design, in-depth exploration of the phenomenon is attainable while requiring only a small number of participants to obtain in-depth contextual data. Furthermore, researchers using case study designs may observe participants, collect data in the participants' words through interviews, and analyze data from verbal responses for contextual meaning in the process of exploring the phenomenon of the study (Yilmaz, 2013).

I deliberated on other qualitative research designs, such as phenomenological and ethnographic designs. Phenomenological and ethnographic designs did not meet my requirements for this study. In the phenomenological design, researchers focus on detailed reports of lived experiences of a person or several individuals with the purpose of deriving meaning from the essence of those experiences (Moustakas, 1994). The purpose of this study was not to investigate the lived experiences of individuals to understand the essence of their meaning nor to explore personal interpretations of a uniquely experienced phenomenon. Hence, exclusion of the phenomenology design from consideration for this study was appropriate.

Ethnography allows researchers the opportunity to interact and participate in groups over extended periods to understand the cultural aspects of their personal issues (Farrelly, 2013; Murthy, 2013; Walby, 2013), which is beyond the scope of this study. Instead, a case study was the preferred approach for exploring strategies hospital CIOs in Texas used for the successful implementation of EHR systems.

Conducting a multiple case study with multiple organizations that share certain characteristics and phenomena, instead of a single case study, adds to the assurance of reaching data saturation and contributes multiple data sources that can enhance the trustworthiness of findings (Yin, 2014). Data saturation is the outcome of the data collection process, representing the point at which no new information appears to emerge from ongoing data collection efforts (Carman, Clark, Wolf, & Moon, 2015; Fusch & Ness, 2015; Malterud, Siersman, & Guassora, 2015). I conducted follow-up interviews until there was no discovery of new themes or categories. Data saturation depends on the judgment of the researcher (Marshall et al., 2013). Therefore, I remained attentive to recognizing when data saturation occurred throughout the data collection process.

Population and Sampling

The population for this study consists of CIOs from 10 acute care hospitals in a multi-county region in North Central Texas who used strategies for the successful implementation of EHR systems. Purposeful selection of a sample of 3 CIOs from the population leads to a sample size consistent in multiple case study designs. DeFeo (2013) and Malterud et al. (2015) suggested that the larger the power of information participants possess, the smaller the number required for an adequate qualitative case study sample

size. Instead of random sampling, more appropriate for quantitative studies, the purposeful selection of participants possessing qualifications, expertise, and experiences pertinent to the phenomenon under study is a fundamental requirement for enhancing the trustworthiness of qualitative research findings (Denzin & Lincoln, 2013; Elo et al., 2014; Yin, 2014). Purposeful selection of 3 CIOs possessing expertise, qualifications, and experience of having been successful in EHR implementation fulfills the requirement.

Data saturation is essential for ensuring rich, thorough, and trustworthy data. Purposeful selection of participants enhances the potential of data saturation (Elo et al., 2014; Greenwald, 2013; Malterud et al., 2015). The point at which answers to consistent, carefully worded questions result in the same or similar responses from participants indicates data saturation (Marshall et al., 2013). I will remain attentive to the point of data saturation and will prepare to add to the data collection efforts through additional interviews or additional participants if data saturation does not appear to occur with the three participants who will comprise the initial sample in this study.

Establishing criteria for purposeful sampling is a common sampling strategy (Palinkas et al., 2015). Eligibility to participate in this study is a participant must be at least age 18, working as a CIO or in an executive technology leadership position within one of the 10 Texas hospitals represented in this study, and possess demonstrable experiences with successful EHR implementation in hospital settings. Prospective participants will become a part of the sample only after demonstrating eligibility and agreeing to the informed consent terms established for this study. Participants in this study must be able to describe their successful EHR implementation and involvement

during the strategic planning for the implementation process. The selection of three hospital technology leaders who meet eligibility criteria is consistent with recommendations by qualitative research experts for obtaining detail-rich responses data reflecting participants' knowledge and experiences relevant to answering the research question (Masso, McCarthy, & Kitson, 2014; Robinson, 2014; Yin, 2014).

A face-to-face setting for data collection is one of the preferred ways that researchers collect data for qualitative research (Wilkerson, Iantaffi, Bockting & Simon-Rosser, 2014). I conducted face-to-face semistructured interviews with open-ended questions, outside of the hospital setting, at a private, quiet location mutually accessible to the researcher and participant. When interviewing participants, the researcher should establish a comfortable atmosphere in which to obtain honest, detail-rich responses (Mojtahed et al., 2014). Choosing to interview participants in private, and quiet environments lead to honest, relevant data and high-quality audio recordings of interview sessions (Abam, & Stake, 2014; Morse & McEvoy, 2014).

Ethical Research

Protecting the rights and wellbeing of participants is essential to ethical research (Wallace & Sheldon, 2015). The Walden University Institutional Review Board (IRB) assigned me an approval number after evaluation of my research study. Of foremost importance in conducting research is ensuring the highest level of ethical integrity in the study (Haahr, Norlyk, & Hall, 2014). The IRB number for this study was 03-27-17-0433408. Tam et al. (2015) discussed the importance of understandable informed consent terms for research participants. Informed consent procedures in this study occurred

through the generation of an informed consent form and process approved by the IRB.

The informed consent form includes the purpose of the study, the requirements for participation including consent for recording of interviews, and notice that participation in the study is strictly voluntary and without risks. Avoiding possible ethical issues raised by Resnik (2015), there were no incentives offered to participants beyond the beneficence of contributing to the research results, thereby adding to the body of knowledge to potentially improve business practices and create positive social change. Upon acceptance to participate in the research, I sent informed consent forms to the participants via email, requesting their review and return email. By replying to my email with the statement, *I Consent*, the participant agrees to the informed consent terms to participate in the study.

Davies et al. (2014) focused on the importance of participant retention and suggested that researchers should aim for a high proportion of retention following recruitment. However, Melham et al. (2014) discussed the evolution of the right to withdraw from research, noting that the right to withdraw can enhance the working relationships between a researcher and the participants. Included in the informed consent terms is information about a participant's right to withdraw from the study. A participant can withdraw from the study at any time (before, during, or after data collection) without consequences. If a participant chooses to withdraw, notice of intent to withdraw from the study may occur via verbal or written statements. Acceptance of withdrawal requests will be immediate, and I will destroy any data obtained from a participant who withdraws, thereby excluding the data from the analysis in this study.

Confidentiality of each participant is also essential for ethical research practices (Saunders, Kitzinger, & Kitzinger, 2014; Teo & Noyes, 2014). The informed consent form includes information about confidentiality. Confidentiality procedures included assigning a pseudonym for reporting of data, storing data in a secure location, and refraining from sharing or discussing participants or their identifying information with anyone outside of the IRB that approves this study. Providing assurances of confidentiality and protecting participants' identities in research studies adds to increased trust while contributing to open communications (Beskow et al., 2014; Check et al., 2014). Pseudonyms will be alphanumeric codes, with the letter and number P-1, P-2, and P-3 assigned to each CIO or executive leader. In the case that a hospital had more than one CIO or technology leader who was eligible and would like to participate in the study, additional numbers would have continued in the order in which the informants agreed to participate in this study.

Data were recorded on paper (notes and documents) and in electronic files (audio-recordings of interviews, transcriptions, email communications, and analysis files). I will maintain an external drive as a backup to the electronic files. Data on paper and the external drive will remain in a securely locked box for 5 years, accessible to only me. Electronic data will remain on a password-protected computer, and I will be the only person with knowledge of the password. After 5 years, I will destroy all data by shredding all papers including data and notes and permanently deleting electronic recordings and files from the external drive and the main password-protected computer. Assuring confidentiality and security of data associated with the research participants and

their organizations ensures the protection of the participants and integrity of the research (Novak, 2014; Saunders et al. 2014).

Data Collection Instruments

Because I asked the interview questions, recorded and transcribed responses, took relevant notes, and reviewed documents, I am the data collection tool for this qualitative research study. Denzin and Lincoln (2013) explained that in qualitative research, the interview is the primary data collection method and the researcher is the primary data collection tool. Houghton et al. (2013) also opined that the researcher is the essential research tool for assurance of rigor. Morse and McEvoy (2014) similarly stated that, in qualitative research, the researcher is the data collection tool in interviews and observations noted during interviews, which are not available through other means.

As the primary data collection instrument, I conducted semistructured interviews and asked open-ended questions with members of the sample, making notes to reflect nonverbal communications, and reviewed publicly available documents to explore leadership strategies for successful implementation of EHRs. Elo et al. (2014) argued that semistructured interviews elicit rich, contextual responses relevant to the qualitative research topic. Semistructured interviews, as specified by Yin (2014), can yield detailed, rich, insightful data about perceptions, attitudes, and experiences that are meaningful for answering the research question (Irvin, Drew, & Sainsbury, 2013). Gergen (2014) argued that participants might provide views much more informative and richer in content through the interview process (See Appendix B) Therefore; I conducted semistructured

interview procedures to obtain insight into the strategies hospital CIOs used for the successful implementation of EHRs.

I made notes during the interviews to reflect observations of nonverbal communications. Morse and McElvoy (2014) claimed that notes from observations, such as during interviews, may add the contextual meaning of responses during interviewing efforts. Notetaking may add context to the meaning of participants' answers and used to derive insights from nonverbal communications. In agreement with a notetaking approach, Elo et al. (2014) suggested that multiple sources of data add to the trustworthiness of the research. Similarly, Garcia and Gluesing (2013) advanced their premise that, in qualitative research, multiple sources of data such as interviews and notes add to a rigorous investigation.

I reviewed publicly available documents, such as the documents and data maintained by the Definitive Healthcare Network, Government agencies, and hospitals to understand the strategies that can be successful for EHR implementation. Corroborating evidence may stem from documents about information system architecture, historical data, illustrative diagrams, detailed specifications, and implementation timelines. Multiple sources of data increase understanding of the strategies hospital CIOs use for the successful implementation of EHRs. Morse and McEvoy (2015) described how multiple sources of data could enhance the trustworthiness of qualitative research findings. Garcia and Gluesing (2013) also recommended including documents such as meeting minutes, reports, and other publicly available sources that may enhance understanding of answers to research questions. The inclusion of multiple data sources aids in the creation of a

holistic framework for research, facilitating triangulation of data (Singh, 2015). I used publicly available documents and interviews with multiple informants for methodological triangulation in this research.

Adherence to a data collection protocol is important in assuring consistency of the nature of collected data and can help to draw out accurate descriptions of experiences through rich, detailed responses (Brown et al., 2013; Garcia & Gluesing, 2013). Data collection protocols guide researchers in their data collection efforts, standardizing the tool for data collection and minimizing threats to the trustworthiness of results (Singh, 2015). A data collection protocol was used that includes the opening and closing remarks, review of the informed consent process, interview questions, document review processes, and member checking procedures (see Appendix B).

Minimization of threats to the trustworthiness of qualitative research is an advantage of implementing the data collection protocol (De Ceunynck, Kusumastuti, Hannes, Janssens, & Wets, 2013; Garcia & Gluesing, 2013; Singh, 2015). Explanations and reminders of the member checking procedures, as referenced in the data collection protocol, occurred at the beginning and end of the interviews. Member checking procedures added to the trustworthiness of the data collection process by enhancing comprehensive interpretations of the data and the meanings intended by participants in this study. After compiling data and arriving at initial interpretations of data, member checking gives participants the opportunities to clarify, add, challenge, discuss, and elaborate on the initial interpretations of data (Fusch, 2015; Houghton 2013). Adhering to data collection protocols and the use of member checking procedures enhance the

likelihood that results will be credible, dependable, and confirmable (Anney, 2015; Brown et al., 2013; Yin, 2014). I adhered to a data collection protocol and member checking procedures recommended for qualitative case studies.

Data Collection Technique

Researchers use multiple sources, such as interviewing and document review, for case study research (Yazan 2015). My data collection technique consisted of in-person, one-on-one, semistructured interviews using open-ended questions and review of publicly available documents. The interview process in case study research should involve thoughtful, penetrating questions and the researcher should show some acceptable level of expertise in conducting the interviews (Yin, 2014). A protocol represented my guide for adherence to the proposed data collection processes aiding in obtaining consistency of data collection efforts and an added level of expertise to the data collection process.

Semistructured Interview

I followed the systematic procedures of the data collection protocol (see Appendix B), assuring thoroughness and consistency across each case of the study. Upon initiating each interview, dispersal of the study objective, data collection technique of open-ended interview questions, permission to record, and explanation of member checking procedures comprise the preliminary discussion with each participant. Following transcription of the audio recording of the interviews, review of initial interpretations of data with participants through member checking may enhance the findings and trustworthiness of reported results. Obtaining multiple sources of data is essential to assuring a broad range of data for triangulation to support results of the

research (Garcia & Gluesing 2013; Stake, 1995; Yin, 2013). Morse and McEvoy (2014) suggested transcription of the semistructured interviews to produce accurate data for analysis.

Advantages to semistructured interviews include capturing of rich responses to questions, elaborating and expanding available knowledge on the subject under study (Brown et al., 2013; Yin, 2014). Semistructured interviews in this study may produce insightful, detailed data adding value to responses while revealing CIOs' perceptions, attitudes, and experiences that are meaningful to the goal of answering the research question. Researchers obtain an understanding of the phenomena under study through personal semistructured interviews that can lead to important lines of inquiry not previously considered (Moustakas, 1994).

Employing a semistructured personal interview method heightens the researcher's ability to elicit the mental representation of interviewees' insights and real-life experiences (Cleary, Horsfall, & Hayter 2014). Furthermore, respondents may be more comfortable with the opportunities to elaborate on relevant topics in semistructured interviews. In comparison, more highly structured interview approaches or unstructured interviews lack initial guidance for eliciting insightful, rich, and illuminating views (Gergen, 2014).

The disadvantages of semistructured interviews include the time-consuming process of distances traveled, interviews scheduling, follow-up scheduling, and transcriptions of recorded interviews (Farrelly, 2014; Mukhopadhyay & Gupta, 2014). Kristensen and Ravn (2015) emphasized potential costs of face-to-face interviews and the

long period of involvement to obtain, transcribe, and understand voluminous data that stems from semistructured interviews. Recorder malfunctions might jeopardize the interview and data collection process (Yin, 2014). Therefore, the use of two recording devices during the interviews assured against a potential failure. Researchers might encounter unexpected issues detracting from the use of digital recorders (Houghton et al., 2013). I arranged for a quiet and private interview setting and tested recording equipment to enhance the likelihood of generating high-quality recordings. There was the potential that the participants might decline permission to record the interview, complicating the process of recruitment, informed consent, and accurately recording via pen and paper notes, if necessary (Yin, 2014). Poor scheduling and interruptions during interviews could terminate the data collection process (Cleary et al., 2014). Preparation for rescheduling if necessary and encouraging participants to silence electronic devices, forward telephone calls, and arrange their schedules to avoid distractions and interruptions contributed to successful interviews.

Document Review

Publicly available documents are among the potential sources of qualitative research data (Yin, 2014). Researchers pursue multiple sources of data to enhance the trustworthiness of the study derived from methodological triangulation (Anney, 2015). Singh (2015) also suggested multiple methods of data collection, such as interviews and document review, that can enhance research findings. Sources of evidence such as publicly available documents including databases, financial statements, news releases,

website pages, and related graphics, contribute to corroborating data sources (Soltes, 2014; Yilmaz, 2013).

The advantages of collecting publicly available documents include providing illuminating information concerning infrastructure layout of information systems, financial restrictions, historical context, and related policies. Soltes (2014) suggested that document review is a method of corroborating verbal responses and statements presented during interviews. Yin (2014) emphasized reviewing publicly available documents accessible in the public domain. Accessing and reviewing related documents are pertinent steps to developing an understanding of the research problem and enhancing the triangulation process of analysis (Pacho, 2015).

Disadvantages of documents include blocked access to records or failures to provide content reflecting the interview question responses (Patton, 2015). Access restriction might arise due to privacy issues associated with patient records and security procedures (Yin, 2014). Therefore, public records published by outside sources may be good sources for documents, but may also include biases due to personal or political agendas. Patton (2015) also suggested that inaccuracies in documents might result in faulty analysis. Companies with hidden agendas might not reflect transparency in the records or documents available to the public. Therefore, it is important that researchers thoroughly vet the documents for review (Pacho, 2015). I relied on publicly available documents, adhered to a data collection protocol, inspected, and critically reflected on the content of documents, with the purpose of obtaining relevant data and evaluating the credibility of the documents obtained for review.

Member Checking

Member checking enhances the trustworthiness of the qualitative data collection process (Fusch, & Ness, 2015). I employed member checking for verification of the initial interpretations of data. During member checking, participants may provide corrective information, clarifications, or additional insights provoked through the member checking sessions (Greenwald, 2013). Member checking follow-up processes assure inclusion of the participants' fully intended expressed views and can lead to early corrections of data discovered (Fusch & Ness, 2015; Harvey, 2015; Mojtahed et al., 2014). I used member checking procedures to enhance the trustworthiness of the research.

Data Organization Technique

Qualitative researchers have multiple methods for organizing collected data, such as digital databases, computer-assisted qualitative data analysis software (CAQDAS), and traditional file folders described by Yin (2014) to facilitate access and organization. Garcia and Gluseng (2013) similarly discussed the use of technology for the orderly organization of data, which could increase accessibility, security of data storage, and enhance confirmability of the analysis in the research study. Moylan, Derr, and Lindhorst (2015) encouraged the use of advanced technologies for collection and organization of data from interviews, observation, and documents. Cell phones, tablets, computers, and cloud storage are among technologies that could lead to efficiency and enhancement in the analysis of collected data (Moylan et al., 2015)

After considering the data collection methods, the plans for analysis, and the organizational needs in this multiple case study, I used an audio recorder and smartphone to record the interviews and Microsoft Word to transcribe the interviews. Organization of documents consisted of scanning notes and documents into digital format. Nvivo was the CAQDAS system used to analyze data. The recorder of choice was a Sony ICD-UX533 digital recorder for recording interviews and transferring the recorded files for transcription. A desktop scanner to scan and convert handwritten field notes and documents resulted in electronic copies of the paper-based data. The interview recordings were transcribed into Microsoft Word. After the transfer of all collected data to electronic sources, the use of NVivo allowed for reviewing, organizing and the beginning analysis of the data. An external drive of the electronic files is the backup of the electronic data and analysis files, secured with any paper-based data collected in a locked file cabinet for 5-years. All data destruction is to occur after the 5-year period.

Data Analysis

This qualitative multiple case study method consists of collecting and analyzing data from one-on-one semistructured interviews and the review of relevant, publicly available documents. Boblin, Ireland, Kirkpatrick, and Robertson (2013) are among the authors who recommended triangulation during analysis to add credibility to qualitative research and facilitate analysis of complex data collected via different methods from multiple sources. I used methodological triangulation with data obtained from multiple informants and multiple data sources.

Classifying different types of triangulation, Patton (2015) described four types of triangulation in case studies: (a) investigator triangulation, (b) theory triangulation, (c) data triangulation, and (d) methodological triangulation. Investigator triangulation involves several different investigators to accomplish analysis (Archibald, 2016). Investigator triangulation was not an option, because I am the only investigator in this study. Theory triangulation is the process of analyzing a single set of data through different perspectives or theories (Patton, 2015). I focused on the TAM theory as the primary conceptual framework for this study and instead of using investigator or theoretical triangulation; I relied on data and methodological triangulation.

Data triangulation consists of analyzing data from multiple participants to arrive at the convergence of agreement or divergence (Yin, 2014). I collected data from multiple participants and in the process of analysis, looked for the convergence of agreement or divergence among data collected from multiple informants. Methodological triangulation, as described by Patton (2015), is the process of analyzing data collected through different methods for consistency of findings. I collected data from different participants using multiple methods including interviewing and document review being attentive to the triangulation of data during analysis. Yin (2013) also emphasized methodological triangulation as the method suitable for corroborating findings. In agreement with Yin, Yilmaz (2013) and Houghton et al. (2013) added that triangulation during data analysis in case study research contributes to the rigor and credibility of the qualitative research design.

With the plan to triangulate data, I followed the five-phase qualitative data analysis plan described by Yin (2011). Yin suggested (a) compiling collected data, (b) disassembling the collected data, (c) reassembling the collected data, (d) interpreting the data, and (e) concluding the analysis. Details about each of these five phases of data analysis I applied are as follows.

Compiling data is the process of organizing the collected data into an easily searchable database. I arranged all collected data into a single file in order to appreciate the wholeness of the data, to easily search for, and identify significant concepts within and across cases. After transcription of the recorded interviews into a Microsoft Word document, I imported the files into NVivo 11 for grouping, coding, and analysis of data in a search for themes. NVivo 11 software results provides researchers the ability to import transcribed interview data and descriptions of documents reviewed to organize, sort, query, code, and examine data to identify patterns and relationships among groups of data leading to major themes.

Disassembling the collected data is the process of coding and deconstructing data as significant discrete concepts (Yin, 2014). I used MS Word for the manual search for discovery of keywords in the interview transcripts to highlight and identify general concepts and codes that stood out as potentially significant to the formation of themes. I then compared results of the manual extraction of key concepts and codes with findings obtained from similar NVivo 11 functions. According to Zamawe (2015), NVivo is helpful throughout various phases of qualitative data analysis, but cannot replace the thoughtful query required of human analysts. Continuing to group and match discretely,

coded categories while also noting the potential significance of the data to the research question may add contextual meaning (Yazan, 2015). I continued to review interview data and documents for convergence and divergence of concepts identified through the disassembly phase.

Reassembly is the process of follow-up, critical reflection, and member checking to confirm interpretations of data leading to major themes (Yin, 2014). I used NVivo for logging, grouping, and filtering data in the search for major emergent themes.

Reassembly involves the use of patterns and key concepts previously identified to form major themes that can represent answers to the research questions (Yazan, 2015). The phase includes the opportunity to clarify any misinterpretations of data and to reflect on major themes and supporting sub-themes that appear to emerge from the data (Baškarada, 2014).

Interpretation is the process of creating a narrative of the findings obtained during the process of compiling, disassembling, and reassembling the combined sources of data (Yin, 2014). I confirmed grouped relevant concepts, which represented acceptable themes from the analysis that helped to answer the research question. I used methodological triangulation suggested for case study research by Yin (2014), Anney (2015), and Baškarada (2014). My quest was to isolate corroborating evidence which supported and justified the major themes identified in the analysis of data accumulated from interviews and document reviews.

The final phase was the conclusion of the analysis. I used NVivo, as needed, to assist in developing further support of the major thematic findings to substantiate

conclusions derived from the analysis. Qualitative researchers embrace the task of demonstrating high levels of clarity during this phase (Farrelly, 2014; Stake, 2015). NVivo generates graphs and charts that can add clarity by the graphic representations conducive to a better understanding of findings (Zamawe, 2015). Following the generation of substantial narrative and visual support for the major themes, I correlated the key themes identified in this study with the literature reviewed and the conceptual framework (TAM theory) in a discussion of findings. Interview questions directed to hospital CIOs aligned with the conceptual framework of TAM, while the literature review supported the significance of this study and the relevance of the research question. Throughout the research process, I strived to include new and relevant literature to further support and provide knowledge germane to this study.

Reliability and Validity

Scholars previously identified the need for research to be reliable and valid. The concepts of validity and reliability, recently applied more commonly to quantitative research, have qualitative equivalents, initially proposed and described by Lincoln and Guba (1985). Lincoln and Guba detailed the need to appreciate the trustworthiness of qualitative research that stems from the processes that enhance dependability, credibility, transferability, and confirmability of the study. Fulfilling the criteria requires qualitative researchers provide a supportive narrative of the research trustworthiness. Reliability is similar to dependability, which begins at the onset of the research study resulting in a true portrayal of the author's claims (Grossoehme, 2014). Each process of the research in a doctorate-level study is subject to peer scrutiny, which also enhances research

trustworthiness (Lee, 2014). In case study research, triangulation also enhances the trustworthiness of findings by improving dependability, confirmability, and credibility in qualitative research. Additional steps to enhance the trustworthiness of this case study are as follows.

Dependability

Consistent and accurate representation of research findings over time are the expectations from dependability (Munn, Porritt, Lockwood, Aromataris, & Pearson, 2014). Indications include the repeatability of the research procedures with replicable results (Denzin & Lincoln, 2013). Although repeat studies are beyond the scope of this research, consistency of processes and methods stem from the detailed reports of the research steps and choices made in this study. Dependability of the data collection also involves adherence to a data collection protocol and documentation of the processes and procedures applied throughout the data collection and analysis steps (Houghton et al., 2013). Creating an audit trail of data collection processes, decision processes, and analysis processes are instrumental in assuring dependability of the research study (Crowe, Inder, & Porter, 2015). I adhered to the documentation of the sequence of events throughout the data collection process. The process continued throughout the procedures of data analysis and concluded with my reflections and comments on the limitations of this study.

Credibility

Lincoln and Guba (1985) described the concept of credibility in qualitative research as a reflection of the truthfulness of collected data and the report of findings

based on participants' actual viewpoints and experiences. Prolonged engagement enhances the value and believability of the findings (Lincoln & Guba, 1985). The nature of this doctorate-level research process was one of prolonged engagement in the research process that involves ongoing peer scrutiny of the steps of this study. Although potentially imperfect, peer scrutiny remains a predominant method of evaluating the quality of research, dealing with communication about problems when recognized (Benson, 2015). In addition to being subject to peer scrutiny, I obtained data from multiple sources and included member checking and triangulation processes in adhering to the recommendations of Cronin (2013) for enhancing credibility. I also followed the recommendations of Greene (2014) to recognize and document potential sources of bias with the purpose of report findings that accurately reflect the realities of participants.

Transferability

In qualitative research, transferability refers to how well research findings might apply to other settings (De Ceunynck et al., 2013). Transferability remains a decision of the reader who is responsible for determining whether the findings are situationally compatible (Houghton et al., 2013). It is imperative to provide rich, thick description of the elements of the research, because articulated details help readers judge the extent to which findings may or may not appropriately transfer to other contextual environments (Cope, 2014). To enhance the potential of appropriate transferability of this study, I provided rich descriptions of the processes and procedures as well as the population, sample, scope, assumptions, limitations, and delimitations of this study.

Confirmability

Researchers provide confirmability through demonstrative ability in representing data, which are the respondents' views and thoughts and not those of the researcher (Cope, 2014; Tavakol, & Sandars, 2014). Assurance of confirmability is incumbent upon the researcher through a strictly regimented process of research (Houghton et al., 2013). The analysis of research findings must reflect the viewpoints of the respondents and preclude injection of researcher biases into the research study (Tavakol & Sandars, 2014). To assure confirmability, I followed the process of methodological triangulation of the multiple data sources. Member checking was helpful in demonstrating that my interpretations were accurate and correctly reflected the actual data. I will maintain all data for 5 years to make the data available for peer review. According to Kratz and Strasser (2015), peer review of data or data audits is increasingly acceptable ways to demonstrate the type of confirmability that can lead to trust and enhance the value of qualitative research studies.

Data Saturation

Data saturation occurs when there is no discovery of new data or relevant information from continuing data collection (Marshall & Rossman, 2016). Data saturation is a need in qualitative research that enhances the likelihood that sufficient data surfaced to answer the research question (Elo et al., 2014; Onwuegbuzie & Byers, 2014). Failure to achieve data saturation may lead to insufficient, biased, or inaccurate outcomes from qualitative research efforts (Fusch & Ness, 2015). Therefore, I continued with interviews, member checking, and document reviews until the point of data saturation,

recognized through my attentiveness to the point at which no new information appeared to emerge from added data collection efforts.

Transition and Summary

In Section 2, I described the research method and design of the proposed study. This section includes a description of my role, including acting as the instrument for data collection. The section includes the details concerning the collection of data, the methods of data collection, population sampling, ethical research procedures, data analysis procedures, and steps set forth for enhancing the trustworthiness of this study.

Section 3 includes the presentation of the research findings. The reintroduction of the research study purpose, which leads to the detailed discussion of the thematic findings, followed by the applications of findings to professional practice and implications for social change. Recommendations for leaders, suggestions for further research, my research reflections, and concluding statements complete the section.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this qualitative multiple case study was to explore strategies hospital CIOs in Texas used for the successful implementation of EHR systems. Three hospital CIOs participated in this research based on the eligibility criteria presented in Section 2. I conducted interviews in a quiet environment of each participant's choosing, allowing for detailed responses to eight semistructured interview questions. Data collected from multiple sources and multiple participants revealed four major themes. Participants reported the organizational strategy was to implement EHR meeting the MU requirements of Stage 3. In this multiple case study, the participants were unanimous in that there were no formalized implementation strategies and defaulted to relying on the vendor for sequencing the EHR implementation.

All participants established similar strategies of creating implementation teams involved in decision making intended to develop ownership of the EHR implementation process. Participants reported that knowing the obstacles to acceptance of technology or change enhances the ability of leaders to develop strategies for overcoming the obstacles. All participants reported that there was support from the board of directors and senior leadership, which was instrumental in creating a culture of accepting the EHR implementation. Section 3 includes the presentation of findings, applications to professional practice, implications for social change, recommendations for action, recommendations for further research, reflections, and the conclusion of the research.

Presentation of the Findings

The central research question was: what strategies do hospital CIOs in Texas use for the successful implementation of EHRs? To answer the research question, I purposefully selected three hospital CIOs from a population of 10 acute care hospitals where the successful implementation of EHRs occurred in a multicounty region of North Central Texas. The research findings resulted from analyses of data obtained from multiple sources and multiple participants. My findings from the analysis align with Davis's (1989) TAM theory in that one main theme--overcoming resistance to technology acceptance--was key to the overall process of successful implementation of EHRs.

There were four emergent themes predominant in all three cases under study. The four themes include (a) EHR implementation strategies, (b) overcoming resistance to technology acceptance, (c) strategic alignment, and (d) patient wellbeing. From the analysis, the four emergent themes point to strategies used by hospital CIOs for successful implementation of EHRs in North Central Texas.

The first theme--EHR implementation strategies--was the leading emergent theme identified in the overall analysis process. The second theme--overcoming obstacles to acceptance--was key to successful implementation of EHRs in each case of the study. Several strategies discovered were common to all the participants. The themes linked and intertwined with the conceptual framework and literature review. Table 2 depicts the themes, frequency, and percentage of each theme occurrence, which align with the framework of this study.

Table 2

Frequency of Themes

Themes	n (n=42)	% of rate of occurrence
EHR implementation strategies	16	38.1%
Overcoming obstacles to acceptance	12	28.6%
Strategic alignment	8	17.8%
Patient wellbeing	6	13.3%

Note: n=frequency

Theme 1: EHR Implementation Strategies

The overall stated strategy for 100% of the participants was to fulfill the federally mandated requirement of meeting Stage 3 of the MU criteria. P1 and P3 indicated that meeting the MU requirements was inevitable. P2 referred to the necessity of implementation to mitigate potential financial disparities. The overall impetus was that governmental directives were not optional and that EHRs were inevitable; without them, the organization would suffer financially. The first decisions that all the participants referred to was that there were joint decisions by the board of directors, CEOs, and CIOs to begin the process of EHR implementation.

All participants confirmed that, as a business factor, the board of directors and upper management were supportive of the financial investment required to reach their organizational goals. In alignment with the TAM framework, 100% of the participants admitted expectations of resistance to change and acceptance of the technology changes imposed upon staff, nurses, and doctors. Each of the participants referred to several strategies for implementation of the EHRs, with similar approaches directly supporting the strategies and aligning with the organizational strategy. P1 and P3 stated, “the main problem was getting support and acceptance from the users.”

Consistent with previous research, early identification of obstacles that might impede EHR implementation leads to strategies for overcoming the obstacles (Cegielski et al., 2013). P2 stated, “Change is not easily accepted, that is the first consideration.” Interestingly, all participants referred to not having drawn up a formalized strategic plan, deferring to the vendors’ expertise for implementation phasing. The participants unanimously stated, “Formalized plans should have been developed with specified strategies for EHR implementation.”

Regulatory influence.

All participants stated their concerns for the security of personal health and patients’ safety concerns. This concern voiced in the existing literature, as revealed in Anthony et al., (2014) the security of patients’ medical records and safety of patients resulted in the legislative action of the signing of the HIPAA Act in 1996. In addition to newly enacted regulations, the interaction between HIPAA requirements and the new technology were of concern to all participants. EHR systems access became a serious concern because of the number of computer systems throughout the facilities. All the participants referred to conducting annual security audits procedure, and that without the regulatory directive of HIPAA, security would falter, resulting in stiff penalties for breach of HIPAA (Anthony et al., 2014).

Each of the participants in the study referred to an overarching strategy of fulfilling the federally mandated requirement of meeting Stage 2 of the MU criteria. P-2 and P3 stated, “Regulatory influences increased the intensity of the requirement to begin implementation processes.” P-1 stated, “If the HITECH Act and American Recovery and

Reinvestments Act had not been enacted as law, implementation of EHR would not be financially possible.” There was a consensus among the participants that governmental directives contributed to the expedited implementation of the EHR and meeting the MU requirements, as confirmed in previous research (Wright et al., 2014).

Implementation teams.

As an implementation strategy, the participants chose a unique process in preparing for the undertaking of EHR implementation. The strategy of developing implementation teams as described by P-3 was to develop a sense of partnership with staff, nurses, and doctors in the overarching strategy of fulfilling the governmental mandates. P-2 followed the same team building strategy and P-1 used a similar approach to the team building strategy.

Once the teams’ incorporation into the decision-making processes of vendor selection and the implementation processes, teams had a stake in the successful implementation of the EHRs (Fletcher & Payne, 2017). All participants agreed that inclusion of teams was the strategy leading to the successful implementation process. In addition to team building, all the participants referred to the process of understanding how all the employees felt about the forthcoming changes and the effects on them. The participants P-2 and P-3 recruited a multilevel group of motivated and interested staff, nurses, and doctors to form a technology and informatics team. The teams, with the guidance and direction of P-2 and P-3, were introduced to several prototype EHRs working with several vendors. The vendors demonstrated their system and allowed hands-on activities. After the experience with each vendor, further review and study of

each proposed system followed. P-2 and P-3 stated, “Obtaining employee participation responsibly and having input in the decision-making process was instrumental to the overall success of implementation.” P-3 claimed, “Buying into the program was expedited because there were ownership and responsibility to make the system work.”

Participant 1 did not use a multilevel team strategy to obtain buy-in to the implementation of the new technology associated EHRs. Instead, P-1 chose to assign key department heads as points-of-contact for all interactions and depended on them to relay information and obtain input through a proxy. In this process, the burden was on the department head as the motivator of all decisions of the P-1’s implementation processes. All the participants were imminently aware of the expected resistance to technology acceptance. The findings in my research align with existing literature in that IT directors need to identify obstacles and develop plans to overcome the resistance (Cresswell & Sheikh, 2013).

Vendor selection.

The participants referred to the process of vendor selection as a major decision or strategy in the successful implementation of their EHRs. The quality of the product and cost were paramount in the final selection process as reported by the participants. Support during and after implementation of systems was another concern espoused by 100% of the participants. An unusual discovery during interviews was that all participants indicated they had not drawn up formal implementation plans due to the continuing volatility in the requirements and evolving technology. When queried as to what they used to guide the implementation process, 100% of the participants stated, “Dependency

upon the expertise of vendors was our strategy for the EHR implementation program.”

All the participants referred to having trust in the selected vendors’ knowledge of technologies involved and procedural sequencing involved for an integrated implementation of EHRs. P-2 referred to the fact that it may be necessary to cut the loss and move to another vendor if progress deteriorates, proposed solutions fail without recourse, and there is a negative financial impact on the hospital organization.

All participants referred to the selection of a vendor as an extremely serious undertaking and not based on price alone, and that thorough vetting is an absolute necessity. P-3 emphasized the importance of having an organizational cultural fit with the selected vendor. The organizational culture of the vendor must meld with the organizational culture of the hospital. All of the participants indicated that besides a cultural fit, there must be a strong partnership and trusting relationship with the vendor. The consensus among the participants was that having a strong partnership and trusting relationship with the vendor, must withstand adversity, and provide a solid ongoing support system, which is essential during and after implementation.

Previous research by Liebe et al., (2015) confirms the findings of this research in that the selection of an IT vendor is important and continues to challenge IT managers. Before vendor selection, vetting should include a myriad of issues such as overall financial aspects, ongoing support, and potential upgrades. In comparison to the literature, the discovery that all participants lacked formalized strategic plans, choosing the strategy of vendor dependency in planning processes adds to the field of knowledge.

Theme 2: Obstacles to Technology Acceptance

All of the participants referred to the need to obtain user support and acceptance of the forthcoming technology changes associated with EHR implementation. A common practice emerged from the participants' responses: that of developing an implementation team of multilevel employees. Without user acceptance, other implementation strategies might incur opposition at each stage of the process. To that end, each participant developed their implementation team as the primary tool for overcoming the expected resistance to technology changes.

All participants referred to the need to incorporate strategies for overcoming the obstacles to the acceptance of new technology. The consensus was that by identifying obstacles to the EHR implementation and ways to overcome obstacles may lead to successfully aligned strategies for improving acceptance. The findings in (Hamamura, Withy & Hughes, 2017) is confirmed in my research in that all of the participants referred to learning what obstacles exist enabled the development of strategies to mitigate or eliminate the obstacles. My findings are consistent with previous research conducted in (Vessey & Ward, 2013). Comparing the participants' responses to existing literature confirms that EHR systems technology is complex and inherently subject to sociological resistance to acceptance. Findings of my research are consistent with previous research in that there is a fine line between organizational goals and the need to overcome multitudes of resistance to change (Cresswell & Sheikh (2013). All participants accepted the responsibility of identifying obstacles and developed unique strategies to overcome the

obstacles, such as the implementation team concept, vendor selection, and regulatory influences.

Developing relationships.

All of the participants referred to the process of relationship building and how one goes about the process of building positive relationships with different organizational level employees. P-1 referred to simple processes, such as sending an email to employees on birthdays, work anniversaries, and congratulatory email on promotions, which displays interest and concern for them. P-2 and P-3 referred to the process of visiting the clinics on a regular basis as a public relations and management and leadership technique. Direct communications with different levels of employees enhanced the relationships and contributed to the process of overcoming obstacles to the EHR implementation processes. All the participants referred to the adage that when one puts a familiar face of the person on the other end of the line, the relationship or two-way communication process is effective and enhances the success of the communications.

Fear of losing work autonomy, perceived quality of information, and social influences are identified factors affecting technology acceptance (Wang et al., 2015). All participants commented in different words that knowing the employees' perceptions and fears of the technology changes, guided the strategies required to overcoming the obstacles. The participants' three concerns that aligned with Davis's (1989) findings were measurement standards, overcoming the fear of ease of use, and convincing users that there is usefulness in the new technology. All participants referred to the importance of identifying obstacles to technology acceptance and finding ways to overcome the

obstacles. All participants indicated that by identifying the obstacle, led the way to successful alignment of strategies for improving acceptance of the change and new technology. The concept is consistent with previous research using the TAM theory (Handayani, Hidayanto, Pinem, Hapsari, & Sandhyaduhita, 2017).

Theme 3: Strategic Alignment

Hospitals organizations are unique in design and infrastructural layout. No two hospitals are exactly alike but similar in many ways. All the participants referred to the fact that what works for some organizations may not necessarily work in other organizations. Each hospital organization studied was different in many aspects, size, the number of employees, the number of beds, the number of individual clinics, and geographic location. The common ground for all the participant is that alignment of organizational strategy and EHR implementation is an ongoing challenge. Existing research confirms the participants' assertions in that identifying obstacles to technology acceptance and ways to overcome obstacles might lead to successfully aligned strategies for improving acceptance of the change and new technology (Handayani, et al., 2017).

Due to internal pressures such as financial, social acceptance of IT technologies and external pressures from different entities such as government, vendors, and competitors affect IT and strategic organizational alignment processes (Vessy & Ward, 2013). P-3 stated, "we began with implementing the foundation systems including administrative, human resources, financial, and billing systems and then began the process of ensuring the clinical systems alignment." P1 and P2 referred to a similar approach in assuring that the existing legacy infrastructure was capable of integration

with the new technology. Alignment of systems was the common processes all participants espoused in dealing with the vendors' prototype and proof of concept offerings.

Theme 4: Patient Wellbeing

All participants referred to potential benefits because of EHR implementation. The repeated occurrence of the keywords in the participants' responses identified the fourth major theme of improved patient well-being. The theme identified is a primary reason for governmental mandates for EHR implementation. The recurrence of the three terms led to three sub-themes contributing to improved patient well-being. All participants referred to the resulting benefits as improved patient health care, patient safety, and security of medical records. The participants reported improvements in the three areas, confirmed by findings in previous literature as reported in Devkota and Devkota (2013). Patient care and safety are the beneficial outcomes for concerns of IT leaders. The participants' hospital websites corroborate responses provided during interviews and member checking procedures.

Improved patient healthcare.

All participants agreed to the beneficence of EHRs and that data consolidation, and ease of access to that data contributes to improved patient healthcare. P-3 indicated that the increased number of data points required for meeting the MU requirements does not necessarily improve patient care. All participants referred to older medical staff's perceptions concerning data input to portable devices as detracting from time with the patient. All indicated that the newer generation of medical doctors is eager to work with

the technology. P-3 referred to innovative technologies emerging that will expedite the process of inputting medical data during patient interactions. P-1 and P-2 indicated that emerging technologies along with repetitive use would reduce the amount of time reporting data in mobile devices. P1 and P-2 referred to patients having a positive perspective concerning improved health care about their ability to view their records and communicate with their nurse or doctor through the web portal. Consistent with what the participants in this study reported, existing research indicates that patient health care has improved through better communications and patient management due to EHR implementation (Struik, 2014).

Patient safety.

Patient safety involves many issues such as physical safety of the patient, preventative measures during stays, patient identification, administering of medication, and surgical procedures. All participants referred to the benefits of EHRs in tracking patients whether it be outpatient or inpatient care. P1 and P2 referred to the overall safety of patients as confirmed by previous research results as reported by Daker-White et al., (2015). P-3 referred to patient safety as being elevated, however, indicated that additional reporting by medical staff does not necessarily improve patients' healthcare. The findings are consistent with Nguyen et al., (2014), which indicated that only 33% of patients interviewed perceived the improved quality of care and safety.

Safety improved using technology such as scanners, employee and patient identification cards, and other identification processes. Patient safety as concerned with administering medication is a critical issue mitigated through the implementation of

EHRs. According to Daker-White et al. (2015), EHR use enhances patient safety associated with medications, interventions, or other aspects of total patient health care. Each of the participants indicated that Escripts, doctor standing orders, medication identification along with patient identification enhance patient safety.

All participants referred to prevention of unauthorized physical entry to restricted areas is another function of EHRs that enhances patient safety by limiting access to patient records. All of the participants indicated that safety of patients is an inherent responsibility of the IT department due to the integral interface associated with EHR and IT infrastructure. Supporting the CIOs' claims, prior EHR research indicated potential benefits of EHRs that include better communication, patient management, research, patient safety, and cost reduction, among other benefits (Struik, 2014). The participants concurred that as users became familiar with the systems and interfaces, entry errors decreased, which inherently improves patient safety and patient care.

Security of medical records.

All participants referred to the ongoing issues associated with protecting patient medical records due to the exchange of medical records information between medical facilities. Concern for the security of patient medical records and the safety of patients prompted legislative action resulting in the signing of HIPAA into law in 1996 (Ahtony et al., 2014). Further support for enforcing regulatory non-compliance P-1 and P-3 stated that "administering user access is an extraordinary concern as the turn-over of medical support personnel requires continuous surveillance." P-2 indicated that it is almost a full-time job maintaining employee access control along with the security of medical records

transferred electronically. All participants referred to annual security audits as a means of assuring compliance with the regulatory requirements of HIPAA otherwise face stiff penalties. The results of the findings are consistent with Meigs and Solomon, 2016, in that the larger the business or organization, the greater the investment and annual expenditures in assuring compliance.

Comparison of Findings with Other Peer-Reviewed Studies

The first emerging theme for this study was EHR implementation strategies. The participants indicated that as a business factor, EHR implementation was not optional. Findings in my research are consistent with previous research referring to implementation of EHRs as not an optional activity for hospital administrators and health care providers because of government legislation (Brumen et al., 2013). Comparing participants' responses to existing research confirms my findings that legislative action has been a positive influence on EHR implementation. Research reported by Sheikh et al., (2015), indicated that the incentives for meeting MU criteria enhanced EHR implementation.

The literature confirms the finding of the participants' responses, which emphasizes that successful IT implementations are possible through cognitive ability to identify obstacles and develop strategies to avert resistance to acceptance (Silvius & Stoop, 2013). Consistent with previous research data, my findings were that teams working together have great potential of developing successful solutions for technology implementation (Vessey & Ward, 2013). Another sub category of strategies was the selection of vendors. Confirming the participants' responses, Eastaugh (2013) suggested

selecting the vendor for EHR implementation was a significant decision and involves myriad of considerations, and that cost should not be the only basis for the final decision.

The second emerging theme of this study was obstacles to technology acceptance. The TAM theory was the focus of developing an array of strategies designed to overcome the myriad of obstacles illuminated by the participants' implementation teams. Existing research aligns with the framework of this study, in that overcoming obstacles to acceptance requires developing a strong supportive culture of acceptance and identifying strategies to overcome those obstacles (Boonstra et al., 2014).

The third emerging theme of the study was strategic alignment. Hospitals are unique in a multitude of ways, including size, specialization areas, structural design, and organizational culture which must align. The participants' responses were consistent with previous research concerning aligning the EHR with each individualized operation (Eastaugh, 2013). Silverman (2013) in agreement with Eastaugh (2013) indicated that aligning organizational strategy with information system strategy contributes to successful EHR implementation. Research confirms findings of the participants that focus on alignment of the organizational and IT systems is essential in successful EHR implementation (Hung et al., 2014).

Finally, the fourth emerging theme of the study was patient wellbeing. The beneficence of EHRs comes in different forms. Nationally, physicians attest to the clinical benefits of enhanced patient care overall, the ability to access patients' charts remotely, medical medication alerts, and critical lab values (King et al., 2014). In my findings, although there were some differences reported by the participants, there was a

consensus that safety and security of patients have improved as a result of EHR implementations. My findings are consistent with the research finding in (Devkota & Devkota, 2013; Weiner, Yeh, & Blumenthal, 2013). Advancing patients' safety practices was considered by the participants as being a priority. Confirming my research findings, Kannry et al., (2016) stated use of EHRs enhances patient safety by identifying redundancies in tests and identifying medication interaction through alerts.

Comparison of Findings to the Conceptual Framework

The participants' responses are in agreement with research findings of Hsiao and Chen (2015) that identification of obstacles in advance of implementing strategies may help prevent objections to technology adoption. Consistent with previous research identifying the obstacles to technology acceptance using the TAM theory leads to assurances of system integration and alignment with existing systems (Liu & Zhu, 2013). The findings of this study align with the concept viewed by Hsiao and Chen (2015), that the TAM theory exposes factors, which influence individuals' resistance to technology acceptance encompass human factors, organizational factors, technology, among other barriers, and obstacles. The analysis of participant responses indicated that there is a natural tendency to resist technology, which might lead to breaches of the integrity and security of data. Previous research in (Ben-Assuli, 2014), is consistent with my findings.

Comparison of Findings to Existing Literature on Business Practice

All the participants referred to the requirements of fulfilling the MU criteria, and that failure to comply was not optional. Consistent with the previous research EHR implementation is governmentally mandated with a financial penalty for failure to

comply just as in other regulated businesses (Brumen et al., 2013; Sheikh et al., 2015). Previous research confirms the participants' concern about annual security audits. Healthcare providers must comply with HIPAA just as businesses (Chin & Benusa, 2017). Findings of this research are consistent with previous research that as technology evolves the security and protection of health information becomes a paramount concern for healthcare providers (Ben-Asul, 2014; Bhuyan et al., 2017). The findings support prior research regarding the existence of a relationship between organizational strategic alignment with information systems supporting business operations and healthcare information support systems (Loukis & Charalabidis, 2013). Just as industries and businesses must comply with federal regulatory requirements, hospitals organizations must also comply with the major challenges in regulatory compliance (Chin & Benusa, 2017).

Applications to Professional Practice

The significance of the findings in this research may contribute to the application to professional practice in several ways. The results of the study revealed that CIOs of 3 separate hospital organizations used similar strategies, which were contributory to the successful implementation of EHR systems by meeting MU criteria. The findings from the study may provide information managers alternative strategies for successful implementation of EHRs leading to improved patient healthcare and reduced healthcare costs. CIOs must understand the internal and external issues contributing to the opposition to technology acceptance and develop methods for overcoming the obstacles hindering the integration of information systems strategy with organizational strategy

(Handayani et al., 2017; Mambisan et al., 2013). The findings support previous research in that knowing what the potential and actual objections are to the acceptance of technology, helps determine the strategies for mitigating the same.

A key finding of my study was that none of the participants had drawn up formalized EHR implementation plans. The participants had ideas or strategies on what might work but no formal plan to guide their progress. The research revealed that the participants knew what their specific needs were along with projected timelines and worked with the vendors to ensure compliance. The overall implementation strategy was to defer to the proven experts, the vendors, to lay out the strategies involved and the sequencing required for the implementation of the EHR system. Hospital and business leaders may consider the strategy as feasible for advancing the implementation of integrated information systems to improve daily operation, improving patient healthcare or customer service.

The findings from this study indicate that multiple strategies are necessary for each phase of implementing new technology and that what works for one organization may or may not work in different organizational situations. The focus should be on the organizational fit of the vendor, technologies, and end users as instrumental in a successful EHR system implementation (Hung et al., 2014). Information systems manager and leaders utilizing the end users as their sounding board, as contributors to the decision-making process, and obtaining their ownership in the implementation process is key to business success.

Implications for Social Change

The research study contributes to social change by providing successful EHR implementation strategies and methods for overcoming resistance to technological innovations. The findings provide the potential for improving the overall percentage of successful EHR system implementation across the state of Texas leading to an overall reduction in the national health care costs. Increasing the number of successful EHRs will provide increased patient healthcare, improved patient safety, and security (Devkota & Devkota, 2013). The focus of health information systems leaders on patient safety is a positive social impact in providing patient tracking during inpatient procedures, outpatient interventions, and other aspects of total patient healthcare (Daker-White et al., 2015).

The findings of this research may guide other hospital CIOs to successful EHR implementations furthering the potential beneficence of patient quality care, accessibility, and improvements in the general patient population overall health. Sharing data and the results of this study may increase the rate of EHRs, which meet MU criteria thereby contributing to the advancement of quality healthcare to underserved areas in the state of Texas. Addressing the deficiency may lead to reduction of health care costs, improved patient care, and increased patient safety.

Recommendations for Action

The evolution of recording and storing patient medical records is ongoing with every technological breakthrough, which creates difficulties and challenges for medical informatics managers, CEOs, and CIOs. Implementing information systems, which

incorporate all facets of the complexity associated with various hospital organizations is a daunting challenge. CEOs should pursue strategies to ensure CIOs have the full support of all upper-level leaders in the advancement of technology, information interchange, and alignment of EHRs. All hospital leaders should pay attention to the findings of this research, which gives insight as to the organizational obstacles identified by the participants.

Leaders should be mindful of the system users and allow them a participative part in the decision-making process guided by the CIOs. In return, the CIOs must understand that their primary responsibility is to support the activities of the system users and the organization. There are successes identified in this study related to user buy-in to acceptance of the technology. Implementation teams, super users, and champions are all methods of developing acceptance, sharing knowledge, and techniques all leaders in the organization should support. Hands-on training and user familiarization presentations are examples for developing user proficiency and acceptance to the ever-changing technology (Solaja & Ogunia, 2016).

An important finding was that the participants indicated that they did not develop a formalized long-term strategic plan for the EHR implementation project. I recommend to hospital CIOs that before embarking on any major IT project that they develop a long-term plan for implementing the project. The plan should include project scheduling timelines, task dependencies, resource management, resource planning, budgeting, project baseline, change control, and time tracking, with flow-chart graphics to aid in visually managing the overall project.

The results of this study might provide hospital CIOs insight to a variety of strategies, which were successful for the participants. I will share a summary of the research findings with respective participants, faculty of the local teaching hospitals and CIOs. Additionally, I will publicize the research results at discussion panels, lectures, and educational seminars I may attend.

Recommendations for Further Research

The focus of this study was hospital CIOs possessing experience and strategies for successful implementation of EHR systems meeting Stage 2 MU criteria. The study was specific to a geographic location in North Central Texas and consisted of three CIOs who completed successful EHR implementations. The sample was representative of small to medium sized hospitals in the geographic region and offered the opportunity for exploring strategies used in overcoming obstacles to the successful implementation of EHRs. I identified two study limitations and other key areas for further research associated with strategies for successful EHR implementation. Limitations are identified as weaknesses or elements of the research that are beyond a researcher's direct control (vom Brocke & Liang, 2014).

The first limitation identified was the sample size of three hospitals CIOs, which is representative yet limited in scope considering the time element of this study. The sample size is a common limitation of qualitative multiple case study. The sample size limits transferability of the research findings as applied to different business categories. There are myriad differences in the organizational structures, the number of employees,

organizational culture, and organizational strategies, which might create difficulty for the reader to infer transferability. Further research might include a larger number of CIOs from hospital and healthcare organizations to obtain a broader understanding and confirmation or contradiction of existing research findings.

The second limitation was the organization size of the hospitals including the total number of beds supported, and the number of employees staffing the hospitals in this study. The participant sample consisted of small to medium sized hospital organizations, which might not provide the likelihood of transferability to due to the diversity of larger hospital organizations across a larger geographic area. Transferability remains a decision of the reader who is responsible for determining whether the findings are situationally compatible (Anney, 2015; Houghton et al., 2013). Due to the multitude of organizational variables, similar strategies or approaches to solving problems may not produce the same beneficial results. I recommend further research to include small, medium and large hospital organizations providing diversity in patient population thereby improving the potential of transferability to other hospital organizations. I recommend further research on management alignment of information systems and knowledge management technologies, which affect the efficiency, effectiveness and reduce the costs of the organization. Finally, further research might include strategies for improvements in patients accessing EHRs as a method of contributing to their health management with the potential of improved health and reduced healthcare costs.

Reflections

The research topic of strategies for successful EHR implementation stems from 30 years of knowledge and experience obtained from the workplace and working with enterprise resources planning (ERPs) programs at different organizations. The study was a result of academic course work, which resulted in research of ERPs. Healthcare was of interest to me because of the information technology, and curiosity from visiting hospital patients, relative, friends, and my hospital stays.

The desire to discover and learn new technologies was most especially interesting to when the technological procedures and interventions were part of my treatment as a patient. Hence, the decision to pursue this study on the strategies hospital CIOs use for the successful implementation of EHRs. Obtained familiarization with the hardware, software, and infrastructure of ERPs occurred by having implemented networked infrastructures in previous career functions. However, I was not familiar with the strategies that CIOs employed to facilitate successful implementations of large ERPs. I obtained names, telephone numbers, and email addresses from publicly available hospital websites to initiate email invitations and telephone communication to schedule and conduct one-on-one semistructured interviews.

Therefore, it was relatively easy to sit down with an open mind, interview the participants to discover the strategies they used in overcoming the resistance to technology acceptance. The participants chose a safe and comfortable location for the interviews, which allowed time to elaborate on the interview questions and follow-up questions. The similarity in the participants' responses amazed me. The terms they used

were the same and phrasing similar to almost all responses. Strategies were similar with minor differences because of hospital size and the number of employees engaged in the use of EHR. Categories, themes, and subthemes were similar with minor differences with the same approach to solution solving. The participants were different ages, different gender, came from different backgrounds yet had similar approaches to creating solutions, developing strategies on the fly, and successfully implementing their EHRs.

Conclusion

Successful implementation of EHRs, which meet the MU criteria, is a very challenging undertaking. The larger the organization, the greater the challenge due to the number of individual clinical applications there are to integrate into the EHR system. Hospital leaders understand the importance that information technology and other technologies contribute to the improvement in patient healthcare while reducing the overall cost of providing that care. Successful EHR system implementation is expensive and carries an ongoing cost with continual updates. Therefore, CIOs must have the full support of hospital leadership in financial matters, administratively, and organizationally for successful implementation. The overall stated goal of the participants was to meet the MU criteria as set forth by the ONC. What followed was numerous additional strategies to comply with the regulatory requirements otherwise face penalties equated in reduced reimbursements for medical services from the Center for Medicare and Medicaid Services (Adler-Milstein et al., 2013).

Findings of this study indicate that strategies or methods used for successful EHR implementations are common sense approaches to overcoming resistance to change

whether it be technology or changes in procedural practices. All participants confirmed that knowing the employees' perceptions and fears of the technology changes, guides the strategies required to overcoming the obstacles. Users must determine the ease of use and usefulness of the technology in verifying the success of overcoming resistance to technology acceptance (Davis, 1989). The strategies applied by the CIOs in this study such, as the implementation team and informatics team were instrumental in overcoming the resistance to technology acceptance. Identifying the obstacles to resistance enhances the potential for developing solutions to overcome the same.

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Appendix A: Invitation Email Communication

Attention Hospital CIO:

I am completing my Doctor of Business Administration research at Walden University, studying strategies hospital CIOs in Texas use for the successful implementation of EHR systems. I am contacting you because I identified you as a member of the population of technology leaders as a CIO in the Texas hospitals where Stage 2 attestation has occurred that are the focus of this study. I am requesting your participation in a 1-hour personal interview to assist me in understanding strategies you use for the successful implementation of EHR systems. Although there are no other incentives for participation, you may be able to contribute significantly to helping similar organizations in need of EHR implementation strategies, thereby contributing to social change by enhancing patient care and lower the overall costs of healthcare in Texas and across the nation.

Within a 2-week timeframe following your interview, I will send you a summary of up to two pages that will include my initial interpretations of the data I collect. In this process called *member checking*, I will invite you to comment on my initial interpretations of the data. You may add, clarify, explain, challenge, or correct my interpretations at that time. The member checking process should take no longer than a few more minutes of your time. Your participation in this study will be confidential and you will receive a participant identifier code, as further explained in the attached informed consent form. I look forward to answering any questions you may have about my study or the informed consent terms in the attached document. If you would like to participate in the study, you can start by reading the informed consent form and replying to this email as described in

the consent procedures. Additionally, upon completion of the research I will provide you a summarized version of the research results. Please feel free to contact me at XXXXXX.XXXXX@Waldenu.edu. Thank you very much for your time and consideration. I hope you will choose to participate in this study.

XXXXXXXX X. XXXXX

Doctoral Candidate, Doctor of Business Administration

Walden University, College of Management and Technology

Appendix B: Data Collection Protocol

The purpose of this interview is to explore the strategies hospital CIOs in North Central Texas use in successful implementation of EHR systems.

Interview Introductions

I will introduce myself to the participant, stating my name and role as a Walden University student in the Doctorate of Business Administration program and the purpose of the study. I will remind participants about the 1 hour anticipated time required for the interview and that I will be in touch within 2 weeks after the interview to conduct member checking. I will explain that member checking involves their review and added commentary on a summary of the interpretations of the data. Invite questions.

Reviewing Informed Consent

I will present a copy of the voluntary informed consent form that participants agreed to via email and invite any additional questions or clarifications about the terms.

Preparing for Interview Questions

I will ask the participant if they are comfortable with the setting, temperature, and conditions of the room and adjust the conditions as necessary and appropriate to enhance the participants' comfort. I will ask for the silencing of electronic devices and will explain the optimal outcomes to the use of the recording device depends on a quiet and uninterrupted setting. I remind the participant of my intention to take notes during the interview as necessary and appropriate to help me in the research process.

Asking Interview Questions

I will begin the recording device and will announce the interview date, time, and

participant pseudonym assigned to the participant, followed by asking the questions in the same order and using listening techniques and reiteration of answers for clarity:

1. How did your experiences with the hospital information systems infrastructure influence strategies for acceptance of the implementation of hospital clinical applications?

2. What were your long-term strategic phasing plans used during implementation of EHR within the facilities?

3. How were successes of clinical implementations replicated through other clinics concerning strategies for design, acquisition, and implementation of EHR systems?

4. How did you strategize for designing, acquiring, and implementing EHR systems considering the opposition encountered with medical staff's acceptance of EHR implementation?

5. How did you integrate new systems with existing infrastructure assuring successful alignment and implementation of EHR systems?

6. How did federal directives, acts, and laws contribute to the success of your hospital's implementation of information technology and EHR systems, if at all?

7. How did you address other obstacles such as financial and personal issues across the spectrum of your medical facilities?

8. What additional comments do you have that might add to assist other CIOs of acute care hospitals in the successful implementation of EHRs?

Concluding Interviews

I will thank the participant for their time with a reminder that within a 2-week timeframe, I will send an email of my initial interpretations of data in a summary of no more than two pages. The email will include the invitation for participants to review the initial interpretations and add clarifications, explanations, corrections, or express concerns about the initial interpretations of data.

Review of Documents

Name of document: _____

Retrieval date: _____

Retrieval location: _____

Relevance to research: _____

Description of document: _____

Member Checking Email

Greetings, thank you again for contributing valuable data to my study. I am pleased to send a summary of my initial interpretations of the data collected. Please take some time to critically review these initial interpretations. I look forward to your added thoughts about how well these initial interpretations reflect your experiences. Please reply to this email with your thoughts and feel free to add, correct, explain, refute, or ask about any portion of this summary. I look forward to your reply within the week and to your thoughts and updates, you can add to this study through this member checking process. I am also available by telephone or in person if you would like to call me or meet again to discuss these interpretations and to add to these findings. You may contact me at (XXX-XXX-XXXX) or email at xxxxx.xxxxxx2@waldenu.edu and request for a meeting time that is convenient for you.

Appreciatively, XXXXXXX XXXXX