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Successful Strategies for Adopting Electronic Medical Records Systems at Hospitals

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This is to certify that the doctoral study by

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Walden University
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Abstract

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MS Computer Science, Illinois Institute of Technology, 1988

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

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Abstract

Some healthcare leaders lack strategies to successfully implement electronic medical record (EMR) systems to improve patient care efficiency and effectiveness. Grounded in the technology acceptance model, the purpose of this qualitative multiple case study was to explore strategies healthcare leaders use to implement EMR systems. The participants comprised five healthcare leaders who implemented EMRs in U.S. hospitals. Data were collected using semistructured interviews, government websites, and relevant documents and analyzed using Yin's five-step data analysis method. Three themes emerged: (a) adequate training, (b) workflow analysis, and (c) technical support. A key recommendation is for management to provide customized training to the healthcare employees based on employees' verified roles and responsibilities within the EMR system. The implications for positive social change include the potential to provide physicians a platform for sharing patient data for customizing and improving patient care at reduced costs.

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Dedication

I would like to dedicate this study to my parents: Hirday Nath and Chandrani Pandit. I am so grateful for all the unconditional support they provided since the day I was born. Without their support, I would not be able to achieve this doctoral degree and make them proud of me. I would also like to dedicate this study to my husband, Amit Okhandiar, and my two children: Neil and Krish Okhandiar for their patience, love, inspiration, and encouragement. Lastly, I would like to dedicate this success to my family members, relatives, and friends: Rakesh, Sunita, Vippul, Anju, Urmila, Pankaj, Chitra, Ashok, Nadeem, Nikki, Avinav, Aqeel, Alok, Vicky, Neal, Gopal, and many others for participating, volunteering and opening doors for opportunities

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Section 1: Foundation of the Study

Background of the Problem

In 2010, President Barack Obama signed into law the Affordable Care Act (ACA), which established comprehensive healthcare insurance reforms designed to improve the quality of services at lower cost (Dranove et al., 2015). The ACA awarded incentive payments to eligible professionals and hospitals as a means of promoting the adoption and meaningful use (MU) of EMRs and to enable the transition away from paper-based record keeping by 2015 (Slavitt & DeSalvo, 2016). The MU program was designed to increase the EMR adoption rate while improving hospitals' quality of care, reducing the incidence of medical errors and costs associated with healthcare and creating a culture of patient safety (Ford et al., 2016). By 2014, only 59% of hospitals in the United States had adopted EMRs (Meigs & Solomon, 2016). Beginning in 2015, eligible providers who had not met the requirements of the Centers for Medicare and Medicaid Services (CMS) for MU of EMRs were subject to a penalty on Medicare reimbursements—starting at 1% and increasing an additional 1% each year thereafter. The penalty was expected to rise to 8% by 2022 (Balestra, 2017; Gabl, 2014). In addition, eligible providers who wanted to continue receiving monetary awards and avoiding penalties needed to continue to demonstrate MU every year (Gabl, 2014).

I conducted a qualitative multiple-case study to explore strategies that healthcare leaders have used to successfully implement EMR systems in hospitals. According to Smith (2018), qualitative case studies provide data-rich and contextual evidence and involve multiple sources. My study explored the strategies that healthcare leaders use to successfully implement an EMR system in a hospital has the potential to add value and create positive change. Such positive social change may include improvements in the quality of patient care and the efficiency of the

healthcare system. The findings of my study could provide support for leaders in the form of defining new processes, fine tuning existing processes, clarifying training needs, and improving communication with providers, patients, and the community.

Problem and Purpose

Despite the support and incentives provided by the Health Information Technology (HIT) for Economic and Clinical Health (HITECH) Act for healthcare providers to adopt EMRs to reduce healthcare costs, only 59% of U.S. hospitals in 2014 had adopted EMRs (Meigs & Solomon, 2016). Eligible providers who either do not meet or have not met the requirements of CMS MU of electronic health records (EHR) are subject to a 1% penalty on Medicare reimbursements; such penalties began in 2015 and continue to increase each year up to a maximum of 5% (Balestra, 2017). The general business problem is that some healthcare leaders struggle with the successful adoption of EMRs. The specific business problem is that some healthcare leaders lack successful strategies to implement EMRs.

The purpose of this qualitative case study was to explore strategies healthcare leaders use in implementing EMRs successfully in hospitals. The targeted population for this study included healthcare leaders from at least three hospitals in Southern California who have successfully implemented EMRs. The results of this study could catalyze social change by providing physicians a platform to share patient data with EMR providers. According to Hill et al. (2015), sharing patient data with EMR providers can improve the accuracy of health records, eliminate redundancies, improve data integrity, and reduce errors and processing time. These improvements can have a positive effect on healthcare services, healthcare costs and patient lifestyles, and can lead to healthier communities.

Nature of the Study

There are three types of research methods: quantitative, qualitative, and mixed. The quantitative and qualitative research methods differ in their analytical objectives, the types of questions asked, the types of data collected, the instruments used, and the flexibility in the design of the study (Connelly, 2014). Using a quantitative research method entails collecting numerical data to test a theory (Claydon, 2015), whereas the qualitative research method entails exploring and understanding a social or human problem from the perspective of an individual or a group to generate descriptions of phenomena analysis (McCusker & Gunaydin, 2015). In the mixed method, researchers use both the qualitative and quantitative methods to collect and analyze data to understand a phenomenon (Halcomb & Hickman, 2015). The rationale for choosing the qualitative research method for this study was that the data collected for the study included open-ended questions to obtain detailed descriptions of strategies that healthcare leaders use in the successful adoption of EMRs. Data collection involved collecting narrative data to answer the questions of what, how, or why regarding the phenomenon. Because this study did not involve collecting numerical data to test a theory, the quantitative method was not a suitable research method for this study. For that reason, the mixed method, which includes both the quantitative and qualitative methods, was also not appropriate for this study.

Some popular designs for qualitative studies include phenomenological, ethnography, narrative, and case study (Price, 2015). Phenomenological research is based on exploring the shared phenomenon experienced by group of individuals providing insights into their motivations and perceptions without considering the psychological origin of the meanings (Goulding, 2005). Phenomenological research was not appropriate for this study because the purpose of the research was not to explore the personal meanings of the lived

experiences of the leaders, but rather to explore the strategies healthcare leaders use to improve successful adoption of EMR systems. Ethnographic research is based on describing the shared values, behaviors, and beliefs of a group of people, also known as *culture* (Goulding, 2005). Ethnographic research was not appropriate for this study because the purpose was not to understand the culture or beliefs of healthcare leaders. Narrative qualitative research is based on the lived experiences of individuals who share personal stories (Greenhalgh et al., 2005). The narrative qualitative research was not appropriate for this study because I was not seeking personal stories from healthcare leaders.

Using a qualitative case study requires collecting data for in-depth understanding of a behavior of an individual, group of people, or an event (Connelly, 2014). This study involved an in-depth analysis of behavior of a group of people to identify the successful strategies leaders have used to implement EMRs. A multiple-case study design includes selecting several instrumental bounded cases to develop a more in-depth understanding of a phenomena than a single case can provide (Yin, 2018). For this reason, choosing healthcare leaders from at least three hospitals was appropriate for collecting narratives and associated records for in-depth analyses to understand the strategies healthcare leaders use to successfully implement EMR systems.

Research Question

The research question guiding my study was: What successful strategies do healthcare leaders use to implement EMRs?

Interview Questions

1. What strategies did you use to successfully implement your organization's EMR?
2. What were the key challenges to implementing EMRs?

3. How did you overcome those key challenges to implementing EMRs?
4. How did you measure the success of executing the strategies to implementing EMRs?
5. What lessons did you learn that you would like to share with healthcare leaders to potentially improve EMR implementation success rates?
6. If you could go back in time, what would you have done differently to improve the implementation of your hospital's EMR system?
7. What else would you like to add that has not been addressed by the interview?

Conceptual Framework

User acceptance is the key indicator of the successful implementation of a newly introduced technology (Davis, 1989). In 1989, Davis developed the technology acceptance TAM model to explain an individual's intention in adopting a newly implemented technology. The TAM is dependent on two factors: perceived usefulness (PU) and perceived ease of use (PEOU) of technology (Davis, 1989). The PU of technology refers to the perception of the enhancement in productivity by adopting a given technology (Davis, 1989). The PEOU refers to the perception of the degree of effort required to use the technology (Davis, 1989). The TAM suggests that when users are presented with new technology, the users' perceptions of the usefulness and the ease of use of the technology influences their decision on how and when to use the technology. In the TAM, people who perceive technology as useful and easy to use accept technology more readily than those who do not. TAM was an appropriate framework for this study because TAM involves developing an understanding of the key factors that affect the successful implementation of an EMR system in an organization.

Operational Definitions

American Recovery and Reinvestment Act (ARRA): This economic stimulation package, established in 2009 by the U.S. Congress, provided for institutions to receive federal funds by demonstrating the MU of HIT in their practices in ways that would lead to improvements in patient care (Balestra, 2017).

Certified EHR technology: An EHR approved by the Office of the National Coordinator (ONC), this certification demonstrates that the EHR vendor meets the technological capacity, functionality, and security requirements set by the U.S. Department of Health and Human Services for managing patient health records in electronic format (CMS, 2017).

Electronic health record (EHR): A patient's health information in electronic format (Balestra, 2017).

Electronic medical record (EMR): A digital version of a patient's medical data (Balestra, 2017).

Health Information Technology for Economic and Clinical Health (HITECH) Act: An incentive program, started during the George W. Bush administration that became part of the American Recovery and Reinvestment Act of 2009 to promote the adoption and MU of certified HIT (Balestra, 2017).

Meaningful use (MU): Medicare and Medicaid providers must demonstrate effective use according to established government criteria to receive federal funds under an incentive program provided in the HITECH Act (Balestra, 2017).

Assumptions, Limitations, and Delimitations

An assumption is a thought a researcher accepts as true without proof (Foundation for Critical Thinking, n.d.). This study was based on a few assumptions. My first assumption was

that the participants would be willing to take part in the study and respond to the interview questions truthfully and without bias. My second assumption was that my interview questions would suffice to gain a clear understanding of the successful strategies that healthcare leaders have used in implementing an EMR system. My third assumption was that the documents containing necessary information regarding the implementation process would be available.

Limitations are influences a researcher cannot control (Kamati et al., 2014). The interviews for the study were limited to healthcare leaders at hospitals in Southern California who were willing to provide an unbiased response to the questions.

Delimitations are the choices made or the boundaries set by the researcher for the study (Kamati et al., 2014). This study included a small sample size to gain in-depth knowledge and understanding of the research problem. For that reason, the participants were limited to a small number of qualified healthcare leaders in Southern California. This study included healthcare leaders who have successfully implemented EMRs in hospitals located in the United States and who were willing to participate in this study to generate data for an in-depth analysis to identify factors that lead to successful EMR implementation.

Significance of the Study

For my research, I focused on identifying the strategies healthcare leaders use in successfully implementing an EMR system. The findings of my research may be valuable to healthcare leaders in improving the quality and efficiency of healthcare services by enabling healthcare leaders to manage patient data electronically. Physicians adopting EMR systems can help an organization maintain accurate health records for their patients, eliminate duplicate records, reduce errors, reduce processing times, decrease operating costs, and provide a platform to share patient data (Hill et al., 2015).

Successful implementation of EMRs for managing patient information can also catalyze social change. Using EMR systems, physicians can access patient data and information on real-time basis (Lesley & Shmerling, 2015). Physicians can have access to not only routine information regarding the patient but also digital data such as medical chart notes, lab results and medication lists (Lesley & Shmerling, 2015). The patient can also access their health data from personal devices from EMR systems (Lesley & Shmerling, 2015). Real-time access to electronic patient data can enable physicians to provide customized care to their patients and thereby improve the quality of healthcare and patient outcomes (Wang et al., 2015). The findings of my study could lead to a healthier community with improved healthcare service, reduced healthcare costs, and improved patient lifestyles.

Review of the Professional and Academic Literature

A literature review, which is critical to the success of any academic research process, includes books, peer-reviewed articles, and other sources of information related to the problem being investigated (Maier, 2013). Researchers use literature reviews as sources of knowledge for their studies (Yin, 2018). My research focused on identifying strategies used by healthcare leaders in the successful implementation of an EMR system within the TAM framework, which involved analyzing key factors that affect the adoption of new technology in an organization.

As part of the research, for the literature review, I obtained related literature from Walden University Library using the ProQuest database, EBSCO, Google Scholar, scholarly journal articles, magazine articles, government documents, and books. The articles were published less than 5 years before the expected year (2021) of degree completion for current relevance to the study. The keywords used to search for articles included *electronic medical record, EMR, electronic health record, EHR, healthcare, the barrier to adoption, history of EMR, health*

information system, *health information technology*, and *user acceptance of technology*. The literature review provided useful information related to the research question. The literature review includes 70 references, 93% of which are peer reviewed, and published within 5 years prior 2021. The entire doctoral study includes a review of 140 articles, 85% of which are peer-reviewed and were published within the 5-year period before 2021. A few sources published before 2014 were included to contribute to a well-rounded description of the problem.

The objective of this study was to investigate the strategies deployed by healthcare leaders to successfully implement EMRs in hospitals in the United States. The TAM was used as a framework for data analysis, which included the analysis of technological readiness and user acceptance of a new technology's implementation in an organization. The findings revealed the behavioral, environmental, and personal factors that affect the successful implementation of an EMR system in a hospital.

Technology Acceptance Model

The successful implementation of an EMR system ultimately depends on end users accepting and appropriately using the system for patient care (Holden et al., 2016). The TAM framework, developed by Davis (1989), is a popular model used to study the factors that affect the adoption of a newly implemented technology—in this case, EMR—in an organization (Dutta et al., 2018).

The TAM framework is derived from the theory of reasonable action (TRA) and the theory of planned behavior (TPB; Marangunić & Granić, 2014). The TRA and TPB theoretical frameworks were created specifically to understand the user acceptance of information technology (Chauhan & Jaiswal, 2017). In 1967, Fishbein developed a TRA framework, a social–psychological/behavioral theory, to predict human behavior based on their attitudes (Fishbein &

Ajzen, 1975). The TRA framework is used to predict and explain human behavior based on reasonable action or behavior intention (Patwardhan et al., 2015). In 1975, Fishbein and Ajzen (1975) revised the TRA model to include the relationship between attitudes toward a behavior, behavioral intention, and the actual behavior. The same authors claimed that the attitude or behavioral intention is affected by a person's beliefs about the outcomes of behavior and the evaluation of those outcomes. The same researchers found that a person's attitude is affected by the subjective norms regarding the belief that behavior is desirable by specific others. Fishbein and Ajzen claimed that the behavioral intention of a person is based on the person's attitude toward both the behavior and the subjective norm. Here a person's *attitude* refers to the positive or negative evaluations by an individual toward the performance of behavior, while the *subjective norm* refers to the perception that a significant group desires the individual to perform or not to perform an action (Ma et al., 2015). Marangunić and Granić (2014) claimed that the weakness in the TRA theory is that it looks at a single factor—the behavioral intentions of the person's attitude—as the primary predictor of behavior, and it does not consider variables, such as personality and demographics, which can affect a person's behavior.

In 1980, Fishbein and Ajzen introduced the TPB model as an extension to the TRA model that included perceived behavioral control (Ajzen, 1991). The TPB model claims that an individual's behavioral intention is a function of three factors: attitude, subjective norms, and perceived behavioral control (Marangunić & Granić, 2014). The perceived behavioral control refers to the perceptions of internal and external constraints on a person's behavior (Ma et al., 2015). Fishbein and Ajzen (1975) claimed that beliefs form perceived behavioral controls regarding an individual's possession of opportunities and resources needed to engage in a behavior. In the TPB model, a relationship exists between perceived behavioral control and

behavioral achievement (Ma et al., 2015). The TPB theory states that a positive attitude toward a behavior, combined with favorable social norms and strongly preferred behavior, is the best predictor of the performance of a behavioral intention and, in turn, a displaced behavior control (Ma et al., 2015). According to Ma et al. (2015), organizations have adopted TPB theory to predict and understand motivational influences on behavior and to identify how and where to target strategies for changing behavior.

In 1985, Davis introduced the TAM model as an extension to TRA and TPB to make predictions about users' acceptance of technology (Chauhan & Jaiswal, 2017). Davis (1989) claimed that a user's adoption of a system could be predicted by motivation theory that is influenced by an external stimulus consisting of the system's features and capabilities. A person's beliefs regarding the usage of a system could be influenced by external factors, such as social, cultural, and political aspects, as the person makes decisions about how and when to use technology (Larasati, 2017). Other external variables may include system characteristics, user training, user participation in the design, and the nature of the implementation process (Venkatesh & Davis, 1996).

Davis (1989) claimed that a person's performance of a specified behavior is determined by their behavioral intention to perform the behavior, which is influenced by a person's attitude and social norm concerning the behavior in question. Davis (1989) made two main changes to the TRA and TPB models to predict the user's attitude toward the use of information systems or technologies (Chauhan & Jaiswal, 2017). The first change to the models included the removal of the subjective norm, leaving only the consideration of the person's attitude for predicting actual behavior. The second included the identification of two distinct beliefs: PU and PEOU of technology. Davis (1989) defined PU as the degree to which a person believes that using a

particular technology will enhance their job performance and PEOU as the degree of effort required to use the technology so that the performance or productivity gain outweighs the ease of use of the technology. According to Davis, the PEOU has a direct influence on the PU, and both PU and PEOU influence a person's behavior in determining whether they will accept or reject a system (Qu et al., 2018). According to Patwardhan et al. (2015), organizations use PU and PEOU in measuring the probability of accepting and adopting new technologies.

Numerous studies support the significant effect of PEOU on the behavioral intention to adopt new technology through PU (Ma et al., 2015). Çam (2016) used the TAM framework to study the factors affecting the usage level of the Central Physician Appointment System (CPAS) by measuring the PEOU, PU, and confidence level of the participants. The author collected data from 420 patients who had used EMRs and noted that the system enabled patients to save time, which positively affected their perception of scheduling an appointment easily and meeting with a physician. Çam (2016) concluded that patients' attitudes to adopting the technology were favorably impacted by gaining their trust in the system and instilling a level of comfort in entering their information into the system.

Looking at physicians, Abdekhoda et al. (2015) conducted a study to determine the organizational contextual factors affecting physicians' adoption of EMR. The authors collected data from 330 physicians working in hospitals affiliated with Tehran University of Medical Sciences to assess the physicians' attitudes toward EMR adoption using the TAM model and organizational context variables. In their study results, Abdekhoda et al. (2015) noted that PU, PEOU, and internal and external factors such as management support, physicians' involvement, physicians' autonomy, and the doctor-patient relationship have a direct and significant effect on physicians' attitudes toward EMR adoption.

Or et al. (2018) examined the factors that affect the implementation of EMRs in small or solo private general practice clinics in Hong Kong during the pilot implementation of the technology, with the purpose of learning from the process before a full-scale rollout. The authors interviewed 23 physicians and clinical assistants from seven small or solo private general practice clinics to evaluate their experiences, expectations, and opinions regarding the deployment of EMRs. The analysis of the data reflected that technological characteristics, clinician–technology interactions, skills and knowledge, and the user workflow technology fit affected the implementation of EMRs (Or et al., 2018). As a result, the authors concluded that to increase the likelihood of EMR implementation buy-in to improve access to patients' healthcare information, it is essential to improve PEOU and PU by identifying the users' and organizations' needs prior to large-scale implementation.

Since the TAM was first proposed, it has been gradually refined and integrated into various models when studying the adoption of new technology (Gellerstedt et al., 2018). Ozturk (2016) suggested that the use of the TAM when integrated with other models, can provide practical implications for operators and technology vendors in terms of identifying factors that affect users' adoption of new technology in an organization. Gangwar et al. (2015) included an integration of the TAM approach with the technology–organization–environment framework to explore factors affecting the adoption of new technology such as cloud computing in an organization. The researchers collected data from 280 companies in the IT, manufacturing, and financial industries in India. The authors concluded that the factors affecting the adoption of cloud computing included PU and PEOU, technical compatibility and complexity, organizational readiness, top management commitment, competitive pressure, and trading partners (Gangwar et al., 2015).

Zailani et al. (2014) investigated elements contributing to the successful adoption of new technology—in this case, radio-frequency identification in Malaysia's healthcare industry. Zailani et al. (2014) collected data from 223 managers and supporting staff and noted that factors influencing adoption included not only PEOU and PU but also government policy, top management support, and security and privacy. Abdekhoda et al. (2018) studied the determinants of EMR adoption by presenting a comprehensive model using the TAM integrated with the technology-organization-environment model. The study included data from 330 healthcare personnel working in hospitals affiliated with Tehran University of Medical Sciences. The researchers noted that the PU, PEOU, technological context, organizational context, and environmental context had a significant effect on EMR adoption (Abdekhoda et al., 2018).

Kim et al. (2015) investigated the factors that influence users' intentions to make use of mobile EMR systems. The authors observed the operation of a mobile EMR system in a tertiary university hospital for 7 months and collected data from 450 subjects (65 doctors and 385 nurses) regarding user acceptance of the system based on the TAM framework integrated with the unified theory of acceptance and use of technology (Kim et al., 2015). Kim et al. noted that both doctors and nurses used the EMR system to improve the continuity of care and work efficiency. Use of the EMR system included viewing inpatient lists, alerts, and patients' clinical data with high frequency. Based on usage log analyses, Kim et al. (2015) concluded that the doctors used the system to retrieve laboratory results, whereas the nurses used the system to retrieve nursing notes. In their conclusion, Kim et al. (2015) stated that using the mobile to access EMR system helped improve the doctors' and nurses' work performance, which in turn influenced their intention to adopt the system. The TAM has evolved into a leading model for predicting and explaining the acceptance of new technology. TAM is therefore expected to be an

appropriate framework for this study in identifying factors that impact the adoption of EMR systems in U.S. hospitals.

Overview of EMRs

An EMR system is a comprehensive digital medical record management system for managing personal lifetime health status and healthcare data (Wang et al., 2015). Many hospitals are replacing their paper-based recordkeeping systems with EMR systems to improve the quality and efficiency of healthcare services by managing patient data electronically (Jindal & Raziuddin, 2018). EMR systems are used by healthcare workers at all levels, including physicians, nurses, pharmacists, and support staff (Malhotra & Lassiter, 2014). Nonetheless, nurses comprise the most significant portion of healthcare professionals and interact more with EMRs than other healthcare professionals due to the nature of their work (Top et al., 2012).

In the early 2000s, the U.S. healthcare industry began the adoption of technology-enabled systems designed to improve the level of service supplied to patients while reducing the associated costs of healthcare (Smith et al., 2013). In 2004, the Federal Office of the National Coordinator was created to coordinate and promote the implementation and use of HIT and electronic healthcare exchange systems nationwide. In 2009, the U.S. Congress passed the HITECH Act as a means of promoting and providing financial support for the use of HIT in the healthcare industry while establishing programs intended to improve quality, safety, and efficiency of care (Dranove et al., 2015; Sterbenz & Chung, 2017). In 2010, President Barack Obama signed into law the Affordable Care Act (ACA), which established comprehensive healthcare insurance reforms designed to improve the quality of services and lower costs while providing new consumer protections (Dranove et al., 2015; Sterbenz & Chung, 2017). The ACA legislation awarded incentive payments to eligible professionals and hospitals as a means of

promoting the adoption and MU of EMR and enabling a transition away from paper-based recordkeeping by 2015 (Slavitt & DeSalvo, 2016). The MU program was designed to increase the EMR adoption rate while improving hospitals' quality of care, reducing the incidence of medical errors and costs associated with healthcare, and creating a culture of patient safety (Ford et al., 2016).

In 2010, to encourage hospitals to begin implementing and using EMR systems in meaningful ways, CMS laid out a three-phase plan for EMR implementation that included a financial incentive program (Slavitt & DeSalvo, 2016). The first phase, which started in 2010, incorporated the adoption of EMR-certified technology and the demonstration of effective use of certified EMR systems in a meaningful manner (CMS, 2018). The program provided incentive payments to eligible professionals and hospitals to promote the adoption and MU of EMR (Centafont, 2016). The second phase, which began in 2014, called for a demonstration of the capability to exchange electronic health information among providers, thereby seeking to improve the quality of healthcare; the third phase, which began in 2016, called for the use of advanced features of EMR technology in exchanging healthcare data to effectively and efficiently improve patient care on a large scale (CMS, 2018). These programs helped boost adoption rates for certified EMRs at independent hospitals from 48% in 2008 to 80% in 2017 (Health IT, 2019). Beginning in 2015, eligible providers who have yet to meet the CMS's requirements for MU of EMRs have been subject to a penalty on Medicare reimbursements—initially 1% and increasing each year by an additional 1%. The penalty is expected to rise to 8% by 2022 (Balestra, 2017; Gabl, 2014). Furthermore, eligible providers that hope to continue receiving monetary awards while avoiding penalties must continue to demonstrate MU year-on-year (Gabl, 2014).

Benefits of EMRs

According to the Centers for Disease Control and Prevention, medical error is the third most common cause of death in the United States (Makary & Daniel, 2016). Makary and Daniel (2016) defined a medical error as an unintended act or one that does not achieve its intended outcome, or a deviation from the process of care that may or may not cause harm to the patient. In 2013, 10% (251,000) of total deaths in the United States (2.6 million) were due to medical error (Makary & Daniel, 2016). The magnitude of this issue has led healthcare professionals to increase the levels of patient safety and improve the quality of patient care (Malhotra & Lassiter, 2014). However, healthcare costs continue to rise. U.S. national health expenditure as a percentage of GDP from 2008 to 2018 is between 16% and 18% (Malhotra & Lassiter, 2014). By 2019, the U.S. healthcare market is expected to reach $2.2 trillion (Zhang et al., 2013).

To meet the demand for improved services at a lower cost, the healthcare industry is seeking ways to leverage IT to provide higher-quality service (Fred, 2016). The benefit of HIT is its ability to improve the access to the digital data effectively and efficiently from anywhere. The successful implementation of an ERM system can improve the accuracy of health records, eliminate redundancies, enhance data integrity, reduce errors and processing times, and provide physicians a platform to share patient data with EMR providers (Hill et al., 2015). Although, the United States government provides financial support to healthcare organizations to ensure that EMR systems are implemented in their hospitals, by 2014, only 59% of hospitals in the United States had adopted EMRs (Meigs & Solomon, 2016). According to Mohammed et al. (2014), the lack of skills on the part of healthcare leaders as well as the necessity for building strategies, training, time management, communication plan, and capital investment can limit the use of EMRs in hospitals

Healthcare organizations embracing technology experience many benefits such as improved communication, reduced workload, fewer clarification requests and medical errors, decreased healthcare costs, and improved quality of healthcare services (Abdekhoda et al., 2018). For example, EMR systems collect, store, and retrieve physician and patient data in real time at the point of care (Abdekhoda et al., 2018).

EMR's ability to facilitate patient information-sharing is bringing about changes to practice while providing improved service to patients (Birtwhistle & Williamson, 2015). For example, Top et al. (2012) surveyed 350 nurses working at inpatient care units in four hospitals in Turkey to study the impact of EMR systems on nursing care management, order entry, information management, quality of data and service, and clinical care. The authors indicated that by using EMR systems, nurses were able to provide a better quality of service to their patients than they could with paper-based recordkeeping systems. Nurses perceived that the EMR system made their job easier, improved their ability to make essential care decisions, provided easy access to patient information, and helped improve communication with other members of the care team (Top et al., 2012). According to Davis (1989), the PEOU has a direct influence on the perceived uses. In addition, both PU and PEOU influence the person's positive behavior in deciding to accept a system (Qu et al., 2018). The PEOU has a direct influence on the perceived uses, and both PU and PEOU influence the person's positive behavior in deciding to accept a system (Davis, 1989; Qu et al., 2018). These ideas were validated by a study conducted in 2013 by Rajagopal. The author surveyed 150 patients in hospitals in India to explore the impact of healthcare technologies on the delivery process, the quality of the administration process, the ease of physicians' access to medical information, the precision of medical tests, and the reduction in physicians' workload. Rajagopal studied the relationship

between service quality and technology use, the perceived quality of healthcare services, and the relationship between patients' satisfaction with IT usage and healthcare services. The adoption of EMR systems helped physicians boost the accuracy of test results while reducing their workload and costs (Rajagopal, 2013). As a result, the physicians were able to provide an improved quality of healthcare service.

Singer and Fernandez (2015) investigated the impact of using EMR systems on communication between pharmacists and primary care clinicians by comparing the primary care EMR data with the data faxed to the pharmacy pre- and post-implementation of an EMR system at an academic family medicine clinic. The study included evaluation of requests placed by 555 pharmacists and prescribers before EMR implementation and 857 requests three years after EMR implementation. The communication requests were grouped into various categories: refill accepted, refill denied, clarification, incorrect dose, interaction, drug insurance/coverage application, new prescription request, supplies request, continued care information, duplicate fax substitution, and confirmation by phone call. Singer and Fernandez (2015) concluded that the use of the EMR system in an academic family medicine clinic improved communication between pharmacists and prescribers, leading to a reduction in the number of clarification requests, interaction notifications, and incorrect dose notifications, and it also facilitated an improvement in the safety of prescribed medicine.

Taylor et al. (2014) also investigated the impact of EMR use on communication in a hospital pre- and post-implementation. Their study included data from 75 enrolled patient, nurse, and physician triads' pre-EMR implementation and 123 triads post-implementation to evaluate whether the nurses and patients communicated with the physicians on a particular day. The authors concluded that although the use of EMR helped reduce face-to-face communication

between physicians and nurses, it hindered the quality of communication between physicians and patients. Adoption of EMR systems led to fewer patients being able to predict the length of their stay due to the reduction in communication between physicians and patients (Taylor et al., 2014).

An EMR system offers a range of features, including problem/diagnosis, progress charting, medication orders and administration, and past medical history for research (Lin et al., 2013). As a repository system for patient-related data and transactional data, an EMR system comprises of a valuable data source for research (Lin et al., 2013). Lin et al. (2013) explored the trends in EMR data used for research, along with probable future developments, to help optimize the value and use of said data for study outcomes. The authors noted a substantial increase in the number of EMR-based studies published during 2010–2011 compared to 2007–2008. They concluded that researchers were able to expand the scope of evaluating diseases and outcomes using advanced techniques and linking EMRs to other patient-level data to overcome issues related to missing data (Lin et al., 2013).

Tu et al. (2015) studied 186,237 patients of 167 family physicians throughout Ontario to validate the use of EMR data for research. The researchers examined patient records, including doctors' documentation of clinical encounters, electronic prescriptions, laboratory tests, blood pressure and weight records, referrals, consultation letters, and all fields in the patient profile, from the EMR Administrative Data Linked Database for physicians who had used an EMR for at least one year. Most of the increases in the data entered and the use of basic functions of EMR systems occurred in the first two years of the program's implementation (Tu et al., 2015). Tu et al. (2015) also observed that as the physicians gained experience, the levels of completeness for almost all EMR fields increased-and concluded that EMR data is useful for secondary uses.

EMR technology promises major potential for the secondary use of data for research, which could help improve the safety, quality, and efficiency of healthcare (Van Velthoven et al., 2016). Van Velthoven et al. (2016) investigated the information governance procedures for extracting data from EMR systems in 16 countries and explored the extent of EMR adoption and the quality and consistency of EMR data in seven countries. Using the management of diabetes type 2 patients as an exemplar for the study, the authors noted that procedures for information governance, levels of adoption, data quality, required time, and ease of obtaining approval varied widely across the countries studied. Some of the countries seemed ready for secondary uses of data from EMR, while in other countries, users faced challenges due to the countries' lack of experience in using EMR data for research, lack of standard policies and procedures, bureaucracy, confidentiality concerns, data security concerns, technical issues, and costs (Van Velthoven et al., 2016).

EMR data is also being used by practitioners to prevent diseases. For example, idiosyncratic drug-induced liver injury (DILI) is an uncommon ailment that causes liver disease (Heidemann et al., 2015). Heidemann et al. (2015) studied the use of EMR text search tools to identify patients with DILI, collecting data from 527,000 outpatients to test the search algorithm. The EMR system's text search tool could be used to identify potential DILI cases to help prevent liver disease (Heidemann et al., 2015).

While practitioners are using EMR to retrieve summary information on their practice population as well as on individual patients, researchers are using EMR systems to study rare diseases, thereby helping hospitals to improve the quality of patient care (Birtwhistle & Williamson, 2015). An EMR system provides real-time, useful data on trends related to chronic diseases and risk factors associated with the development of a disease (Birtwhistle &

Williamson, 2015). Bremond-Gignac et al. (2015) studied the effect of an ophthalmology-specific EMR system on the management of rare eye diseases. The study included data from 135,206 outpatient consultations between 2011 and 2014 at a medical center specializing in rare eye diseases. The eye diseases were grouped into five disorders: congenital aniridia, Axenfeld/Rieger syndromes, BEPS, nanophthalmos, and Rubinstein-Taybi syndrome (Bremond-Gignac et al., 2015). As a result of their analysis, Bremond-Gignac et al. (2015) asserted that ophthalmology-specific EMR use contributed to a comprehensive ocular visual phenotype that was useful for clinical research. Compared to paper-based data analysis, the use of an ophthalmology-specific EMR system helped reduce data analysis time (Bremond-Gignac et al., 2015).

Practitioners are also using EMR for improving the quality of preventive patient care (Yarborough et al., 2019). Nehring et al. (2013) pointed out that excessive weight gain during pregnancy increases both the mother's and the child's risk of numerous health problems, Lindberg and Anderson (2014) investigated the impact of EMR systems' use on the consistency and accuracy of an antenatal gestational weight gain counseling program. Lindberg and Anderson (2014) customized an EMR system to generate a weight gain alert that prompted the counselor to advise the associated patient on her gestational weight. The customized system also provided the counselors with a template that included a script for discussion as well as a handout containing personalized gestational weight gain information for the patient (Lindberg & Anderson, 2014). After observing 348 preintervention and 345 postintervention patients to evaluate the impact of the alert in terms of improving the quality of care and controlling gestational weight gain through counseling, the authors concluded that the alerts contributed

significantly to the consistent provision of proper prenatal gestational weight gain counseling to patients (Lindberg & Anderson, 2014).

EMR databases are a good source of patient data that can help identify high-risk patients in time for treatment (Unni et al., 2014). These databases give researchers the opportunity to study diseases and reduce the time needed to analyze data and share it with national databases for further research (Bremond-Gignac et al., 2015). For instance, Unni et al. (2014) investigated the impact of EMR database use on the calculation of fracture risk assessment (FRAX) score for postmenopausal women to determine the percentage of women whose risk of fracture exceeded National Osteoporosis Foundation thresholds. The study included data from an EMR system that included 345 female patients aged 50 or older whose demographic, inpatient, outpatient, and clinical information was associated with a family practice, internal medicine, or obstetrics/gynecology clinic during the period 2007–2008 (Unni et al., 2014). Unni et al. (2014) concluded that the FRAX calculator available in EMR databases allowed physicians to perform risk evaluations and identify high-risk patients, enabling timely treatment and leading to improved healthcare services.

Sepsis, a life-threatening illness caused by the body's overdrive in response to an infection, is a leading cause of death as well as the most expensive condition to treat in U.S. hospitals (Novosad et al., 2016). Taneja et al. (2017) collected multiple biomarker measurements and EMR data from 444 hospitalized patients to identify patients in the early to peak phase of sepsis. Early detection of sepsis is likely to have a substantial impact on reducing sepsis through the utilization of infection-prevention strategies such as vaccination, reducing the transmission of pathogens in healthcare environments, and appropriate management of chronic diseases (Taneja et al., 2017).

A cloud-based EMR system can help lessen the need for a local clinic infrastructure and provide the capability to share data at different levels of healthcare, thereby improving the ability of clinical and public healthcare providers to make customized decisions (Birtwhistle & Williamson, 2015). Practitioners can access population-level information about care and best practices for delivering it to chronic disease patients while evaluating its effectiveness; they can also gain insights into the care of such patients, judging how well a disease can be controlled and what medications can be used to do so (Birtwhistle & Williamson, 2015). Haskew et al. (2015) studied the impact of cloud-based EMR solutions on reducing the gaps in HIV treatment in an outpatient setting—Comprehensive Care Centers—in Kenya between October 2012 and November 2013. 2,169 patient records were missing data pre-cloud EMR implementation, while 764 were missing data post-implementation (Haskew et al., 2015). Furthermore, in the pre-implementation environment, 1,346 patients who were eligible for Antiretroviral Therapy (ART) had not yet started on such treatment, while post-implementation, only 270 patients who were suitable for ART had not yet received the therapy (Haskew et al., 2015). Haskew et al. (2015) concluded that the implementation of an EMR system designed to help ensure early treatment for eligible patients resulted in a significant improvement in data quality and provision of clinical care data. Furthermore, the cloud-based EMR system helped remove the requirement for local clinic infrastructure and provided clinical and public health decision-makers with the capability to share data at different levels of healthcare. To ensure the successful adoption of an EMR system, Haskew et al. (2015) suggested the need for a holistic view of healthcare network integration that encompasses management commitment, integration between IT and business, and continued investment.

Meghea et al. (2015) investigated the effects of EMR adoption and use of EMR during pregnancy on maternal and child healthcare utilization and health among pregnant mothers and their infants. For their study, the researchers investigated 226,558 Medicaid-insured pregnant women who delivered a singleton birth in Michigan between 2009 and 2012 and their infants. The researchers compared 34% of the women and infants who received care from providers who had successfully implemented EMR with those providers who did not use an EMR system. Women who received prenatal care from providers who had successfully implemented EMR were more likely to attend well-child visits (Meghea, et al., 2015). The providers who used EMR technology supported improvement in children's well-being by providing women with Medicaid and other healthcare programs available from using EMR system (Meghea et al., 2015).

For a hospital, maintaining the highest-quality medical records is vital, and the storage and retrieval of the information is also important for future patient care (Evans, 2016). Pera et al. (2014) investigated the perceptions of healthcare personnel toward the implementation of EMRs. The data was gathered from 164 doctors and 296 nurses from January to June 2013 in a tertiary care medical college hospital in India (Pera et al., 2014). 75% of the study population was comfortable working with the EMR system (Pera et al., 2014). The use of EMRs improved timely decision-making and patient care due to immediate access to the patient's disease history (Pera et al., 2014). Without complete patient information in the patient's EMR, nurses faced major problems, including a delay in services due to the dispersion of records, the multiplicity of form types consuming major time, and the inability to understand doctors' notes (Pera et al., 2014).

Barriers to EMRs Adoption

The healthcare leaders are implementing IT to improve the delivery of care (Dey et al., 2013). The application of EMR technology has become a focus of the healthcare sector (Goo et al., 2015). EMR technology is gradually becoming a comprehensive information system for managing personal lifetime health status and healthcare data (Wang et al., 2015). Successful implementation of EMRs is helping hospitals improve performance, lower costs, and provide higher-quality services (Wang et al., 2015). Despite the widespread acknowledgment of the benefits and improvements yielded through EMR implementation and the incentives provided by the government for implementing EMRs, the adoption rate has remained low: By 2014, only 59% of hospitals had adopted such a program (Meigs & Solomon, 2016). For successful EMR adoption, healthcare leaders must first fully understand and eliminate barriers to adopting new technology before designing and implementing a system to reduce the risk of endangering patient safety or to improve the quality of care (Ayatollahi et al., 2014). Leaders' awareness of barriers and the provision of support to overcome these barriers can help hospitals improve EMR adoption rates (Ayatollahi, et al., 2014). Healthcare professionals find challenges in adopting a complex information system such as an EMR for several reasons; for example, cost and productivity loss continue to present challenges in EMR adoption (Jamoom et al., 2014).

One of the barriers to adopting an EMR system is the need to overcome technical difficulties and limited management support (Ajami, & BagheriTadi, 2013). Goo et al. (2015) collected data from 269 hospitals with more than 100 beds in a metropolitan area of South Korea to study the technical challenges of EMR adoption in a hospital environment. Goo et al. (2015) noted several barriers to the successful implementation of an EMR system at these hospitals. These barriers included (a) complex user interface design, (b) limited technical support provided,

(c) system unreliability (d) concerns about privacy, confidentiality, and security of patient information, (e) infrastructure, (f) support for the data migration process, and (g) computer skills of physicians. In addition, an earlier study by Or et al. (2014) identified the computer skills of physicians as a potential barrier to EMR adoption. These results supported the findings of studies conducted by Ayatollahi et al. (2014) in Iran and Goldstein et al. (2014) in Canada. Ayatollahi et al. (2014) surveyed 62 experts who had worked in the Department of HIT and the Ministry of Health and managed the development and adoption of EMR. The authors inferred that the low adoption of EMR was due to technical, organizational, personal, financial, and legal barriers. Goldstein et al. (2014) studied anesthesiologists' experiences with the EMRs used by the acute pain management service at two tertiary care centers in Canada along with physicians' barriers to adopting the EMR system. The authors compared the data from two academic health sciences centers regarding the challenges they had encountered over the past decade in developing and implementing an EMR system for acute pain management. The authors noted that the barriers to adoption included financial, technological, and time constraints. Goldstein et al. (2014) suggested that the challenges to EMR implementation could be eased by a corporate strategy that acknowledges the barriers and provides the necessary financial and technological resources.

A similar study was conducted by Kruse et al. (2015), who explored the impact of EMR adoption in long-term care (LTC) facilities such as nursing homes, assisted living centers, LTC hospitals, rehabilitation hospitals, and psychiatric hospitals that are ineligible for the HITECH Act incentives. The barriers associated with EMR adoption in LTC included initial costs, user perceptions, and implementation problems (Kruse et al., 2015).

Narattharaksa et al. (2016) claimed that the challenges to EMR adoption included the need for management to communicate clearly defined project goals and scope; the allocation of

adequate resources, including budget and clinical staff, during the implementation phase; and the facilitation of communication channels between physicians and IT staff. Weeger and Gewald (2015) investigated physicians' hostility toward using an EMR system in German hospitals. Weeger and Gewald (2015) conducted in-depth interview with the medical director, the assistant medical director, and the physicians and assistant physicians, all with different levels of experience with EMR implementation. Using the TAM, social cognitive theory, and the unified theory of acceptance and use of technology framework for their study, the authors noted that barriers to EMR adoption included physicians' resentment over using computerized medical records and a lack of pressure from the administration to use such a system (Weeger & Gewald, 2015). Weeger and Gewald (2015) concluded that barriers to EMR acceptance by physicians included cognitive behavior, environmental factors, and personal factors such as self-efficacy and emotions. On a similar note, Goo et al. (2015) explained that the technical challenges in EMR adoption in a hospital environment existed because the use of EMR in a hospital environment is important to clinicians but not to administrators.

As EMR implementation grows, the need for quality resources becomes ever more critical (Stevens et al., 2015). Jawhari et al. (2016) examined the impact of EMRs on primary care practices in resource-constrained settings in sub-Saharan Africa. Jawhari et al. (2016) reviewed 749 public domain articles published before February 2015. Of these, Jawhari et al. (2016) selected 32 articles based on context and grouped the relevant literature by type, design, and focus as well as context. The categories that emerged from the analysis as factors affecting EMR implementation in a resource-constrained setting included the systems, people, processes, and products (Jawhari et al., 2016). Among the systems-related constraints identified included access to a reliable power source, a suitable location for hardware, hardware speed, and a secure

and reliable network and Internet service (Jawhari et al., 2016). The people-related constraints included the types of resources, training, and support provided, the workplace environment, and the leadership offered (Jawhari et al., 2016). The processes-related constraints involved a change in management at the time of deployment and support for post-deployment (Jawhari et al., 2016). The constraint related to products included the inter-operability of EMR software with other applications. Jawhari et al. (2016) concluded that the interplay of these four factors is the best predictor of the effective use of EMRs in resource-constrained settings.

Tilahun and Fritz (2015) studied barriers to adoption of EMR in a resource-constrained environment, specifically the use of the DeLone and McLean (D&M) information system, to measure the successful implementation of EMR technology in a low-resource setting. The researchers collected data from 384 health professionals working in five governmental hospitals in Ethiopia, where a comprehensive EMR system was in use for 3 years. The researchers noted that computer literacy was the mediating factor in the relationship between the service quality, EMR usage, and user satisfaction of health professionals. Computer literacy was a major factor impacting the adoption of EMR and suggested that EMR implementers and managers in low-resource environments should provide users with access to technical support and basic computer training skills (Tilahun & Fritz, 2015).

Concern is also growing that physicians using EMRs pay more attention to the computer screen than to the patient during clinical interaction, which can be detrimental to the relationship between the patient and the doctor (Alkureishi et al., 2016). Alkureishi et al. (2016) investigated the impact of EMR use on patient–doctor relationships and communication, including information from 53 studies conducted between August 2013 and March 2015. The authors used behavioral analysis to objectively measure communication using video or direct observation and

pre- and post-EMR implementation surveys to examine patient perceptions. Alkureishi et al. (2016) reported that EMR usage had no impact on the patient–doctor relationship. This conclusion agreed with a study conducted by Lee et al. (2016), who investigated the perceptions of outpatient residents and faculty members using EMR technology and indicated that patients were satisfied with the service provided by such physicians. Their study included internal medicine faculty and 180 resident patients at the University of Chicago's primary care clinic one-year post-EMR implementation. In their analysis, Lee et al. (2016) noted two major themes: clinical functions of EMRs and communication functions of EMRs. The researchers indicated that most patients were satisfied with physicians using EMRs. Lee et al. (2016) concluded that despite concerns that EMR use might impede doctor–patient communication, patients reported positive perceptions of the system, with many expressing high levels of satisfaction.

Another growing concern regarding EMR implementation has included the impact on the implementation of an EMR has on the existing workflow (Jones et al., 2018). Tall et al. (2015) investigated the effect of an EMR system on patient-related factors correlating to emergency department (ED) workflow efficiency. The study included data from 61,626 patients who had stayed in a hospital over 18 months pre-, during, and post-EMR implementation. Tall et al. (2015) reported that the installation of a hospital-wide EMR system did not affect workflow efficiency in the ED; however, the number of patients admitted from the ED to the main hospital dropped significantly, while the percentage of patients who left without being seen at the hospital increased noticeably. The researchers found that although the adoption of a hospital wide EMR could reduce the number of patients admitted, the adoption rate continued to be low. The authors attributed this to lack of knowledge and inadequate training and support (Tall et al., 2015).

An EMR can help improve the workflow of data (Jones et al., 2018). For example, Cahill et al. (2014) studied the evolving clinical challenges associated with the implementation of electronic personal health records (PHR) integrated with EMRs. These scholars noted that PHR databases allow patients open access to clinical data without the benefit of simultaneous expert clinical interpretation, thereby creating the potential for greater patient distress and uncertainty. Cahill et al. (2014) focused on developing conflicts and consequences associated with the use of a PHR that paralleled data acquisition of an EMR in real time. They concluded that providing patients with access to their EMRs through a web-based PHR system has the potential to enhance the flow of information between patient and healthcare practitioner, leading to improved health service (Cahill et al., 2014).

One more barrier to EMR adoption includes EMR functionalities (O'Donnell et al., 2018). Alshameri et al. (2014) investigated the relationship between media, IT, and management studies, deploying triangulation between these three areas and EMR usage. The authors noted that an EMR system does not include all the essential elements of traditional paper-based medical recordkeeping, which has worked for physicians, management, and patients since the beginning of practice. Alshameri et al. (2014) concluded that EMR vendors and management should consider views from three different dimensions—medicine, management, and information management—to gain a solid understanding of the dynamics that can occur when relaying a patient's story. A certain depth, space, and volume is crucial to the comprehensive nature of medicine. Necessary dialogues can thus be addressed, and more intuitive and tacit knowledge from medical experts can be made available. In their analysis, Alshameri et al. (2014) pointed out that a comprehensive EMR, which uses digital objects and includes more information than just the data of the day, brings accountability to the patient, more expertise to

the fingertips of the physician, and available data for management purposes, all of which make up the critical ingredients of an effective EMR. An EMR should capture a patient's story through various departments and uses (Alshameri et al., 2014). The dynamic between departments and users of the EMR needs to be an integrated process that includes the necessary elements of all involved. Filling the gaps in the observed features, supporting better healthcare, and securing long-term results is a mark of the improved health of a society. Thus, Alshameri et al. (2014) recommended that physicians consider the medical, technological, and management aspects of EMRs to make a thorough and informed diagnosis and prognosis of a patient's health.

Lima et al. (2015) studied the effects of ease of access to data, hospitality, and infrastructure on the perceived quality of urgent care services by users. The authors evaluated the satisfaction levels of 136 patients concerning waiting times, confidence in the service, the model of care, and the reason for seeking care related to acute complaints, cleanliness, and a comfortable environment. In their findings, Lima et al. (2015) asserted that patients considered accessibility, hospitality, and infrastructure more important than the cure itself. The authors suggested that the attitude of patients can be applied as a guide in improving the quality of care and satisfaction rates (Lima et al., 2015).

Another barrier to adopting an EMR system involves the cost. Dranove et al. (2014) investigated the financial impact of EMR adoption on operating costs in U.S. hospitals, collecting data from thousands of institutions between 1996 and 2009. The authors noted that although an increase had been seen in the initial cost of adopting an EMR system, the cost at hospitals in IT-intensive locations fell after 3 years, while costs in non-IT-intensive places continued to increase even after 6 years of EMR use. In response, Dranove et al. (2014)

suggested that healthcare administrators, policymakers, and vendors can benefit from designing and implementing EMR features that are more useful to healthcare professionals.

Data security is yet another barrier to adopting EMR systems (Van Velthoven et al., 2016). Because an EMR is a patient's database record that can be transmitted securely (Koutzampasopoulou Xanthidou et al., 2018), EMR systems maintain current and historical medical data related to the patient. As mentioned, nurses comprise the most significant portion of healthcare professionals and interact more with EMRs than other healthcare professionals (Top et al., 2012). Besides caring for patients, the role of the nurse includes protecting patient data as stated in the Code of Ethics for Nurses from the American Nurses Association (2015). Ma et al. (2015) investigated the factors that motivate nurses to protect privacy when using EMR technology. The researchers collected data from 302 nurses and used the theory of planned behavior to predict an individual's behavior. The authors evaluated each individual's behavioral intention as a function of attitude, subjective norm, and perceived behavioral control. In their analysis, they stated that the PU and compatibility, peer and superior influence, and self-efficacy and facilitating conditions predicted these three factors (Koutzampasopoulou Xanthidou et al., 2018). Koutzampasopoulou Xanthidou et al. (2018) offered the following suggestions to improve the data security of an EMR system:

- The data should be divided into categories, and not all the information should be accessible by and/or visible to everyone.
- The EMR system should be based on an open and flexible architecture so that more categories and subcategories can be added in compliance with the business plan.
- EMR use should be implemented in stages, bearing in mind both medical and financial concerns.

- The sharing of data should be a patient's decision, as the patient owns his or her record.

Factors Affecting the Successful Implementation of EMRs

In the highly competitive global healthcare industry, hospitals are trying to gain an advantage over their competitors by using innovative technologies such as EMRs to improve operational efficiency and patient services (Boonstra et al., 2014). However, implementation can be a challenge. Studies have shown that the factors affecting the adoption of new technology in a hospital include PEOU and usefulness, government policy, top management support, technical support, and security and privacy (Lambooij et al., 2017; Zailani et al., 2014). Thus, an understanding of the internal and external factors that affect EMR adoption can assist healthcare leaders in improving EMR adoption.

Studies have shown that external factors such as inefficiently run organizations, market environment, and work environment can impact the adoption of an EMR system (Kruse et al., 2014). Zhivan and Diana (2012) studied the impact of EMR implementation in cost-inefficient hospitals. Their study included data from 1,544 hospitals provided by the American Hospital Association (AHA) and the Medicare Cost Reports from the CMS. The researchers concluded that hospitals that operate inefficiently were more likely to adopt EMR technology compared to those operating cost-effectively because the benefit of improving an inefficient hospital outweighs the cost of using the system (Zhivan & Diana, 2012).

Lee et al. (2013) came to a similar conclusion. The authors studied the impact of EMR adoption on 30-day rehospitalization, 30-day mortality, inpatient mortality, and duration of stay. The study included data for the 2 years before and 2 years after EMR system implementation at 708 hospitals in the United States from 2000 to 2007 to gain insights into these systems' effect on hospitalization and mortality rates. Lee et al. (2013) noted that hospitals that adopted systems

experienced reduced length of patient stay and 30-day mortality rates but saw an increase in the levels of 30-day rehospitalization. They also concluded that inefficiently run hospitals were more likely to adopt an EMR system because the benefits of EMR use in such a hospital outweighed the costs of adoption (Lee et al., 2013).

Menachemi et al. (2012) studied the impact of three dimensions of the market environment (munificence, dynamism, and complexity) on physicians' EMR adoption rates. The study used the Health Tracking Physician Survey and Area Resource File to analyze data from 4,720 physicians. Menachemi et al. (2012) noted that as a result of insistence on the part of health maintenance organizations (HMOs), physicians in areas with higher unemployment rates and poverty levels were more likely to adopt EMRs than their counterparts in malpractice crisis states and marketplaces perceived as competitive with a higher numbers of primary care physicians (PCPs) and specialists per capita.

Internal factors that can impact the adoption of EMR technology include technical support and the work environment (Or et al., 2014). Or et al. (2014) investigated factors that private physicians perceived as relevant when considering EMR adoption. The authors interviewed 16 physicians operating in private clinics to collect data on elements affecting EMR adoption. They noted that the issues that impacted the adoption of an EMR system by physicians in private clinics included the usefulness of the system, ease of using the system, access to technical support, reliability of the system, security of patient information, use of physical space, the data migration process, work environment, cost, and the technical skills of the physicians.

Narattharaksa et al. (2016) investigated the factors that healthcare personnel in Thailand perceived as necessary for the successful implementation of EMR systems. The researcher included data from 1,069 medical personnel who were given a nationwide survey to identify

critical elements for successful EMR adoption. The researchers concluded that for successful adoption of EMR, management expertise is more important than IT know-how. Therefore, Narattharaksa et al. (2016) suggested that for successful EMR implementation, healthcare leaders should clearly define the project's goals and scope, allocate an adequate budget, involve clinical staff in the implementation phase, and facilitate good electronic communication among IT and management staff.

Smith et al. (2013) investigated the impact of sophisticated EMR on EMR adoption. In the study, the researchers examined 80 hospitals representing 20 U.S. states that had sophisticated EMR systems and compared them with similar hospitals with less-advanced EMR systems to understand the relationship between EMR sophistication and the implications for financial performance. Their results revealed that hospital size and financial performance are strongly associated with EMR sophistication. The higher the level of EMR sophistication, the higher the financial performance of the hospital (Smith et al., 2013). Smith et al. (2013) noted that the level of EMR sophistication and hospital size are factors that affect EMR adoption, which in turn impacts the financial performance of a hospital.

Wang et al. (2015) examined the impact of adding intelligence to an EMR system by integrating EMR workflow and data on the adoption of the EMR system. The authors collected data from 12,818 patients, including patient diagnoses, demographic data, vital signs, and structured lab test results. As a result of their analysis, the authors noted that a self-learning system could lead to an improvement in physicians' work efficiency and the system's flexibility and usability while decreasing maintenance costs and increasing adaptability (Wang et al., 2015). The authors concluded that a new-generation EMR system, with the capability for self-learning

and real-time feedback, can add intelligence by constructing a direct pathway between EMR workflow and data, thus improving the adoption of EMRs.

Lambooij et al. (2017) examined doctors' and nurses' perceptions of successfully implemented EMR systems, the use of EMRs in their hospitals, and the quality of the data in EMRs. The study included data from 402 doctors and 512 nurses who had experience in implementing and using EMRs in hospitals. The authors noted that doctors and nurses perceived the EMR system as being more comfortable to work with when it was aligned with their work. Lambooij et al. (2017) concluded that the doctors valued the bottom-up communication and support of the IT department during EMR implementation, while the nurses preferred an open and innovative organizational culture.

Baird and Boak (2016) examined the factors that contributed to the successful implementation of an EMR system in a small emergency care center. In their study, which included data from 34 paramedics in the organization, the authors noted that the paramedics' interaction with the EMR and PEOU were important factors affecting EMR adoption. The paramedics had strong and varied preferences about how and when they wanted to integrate EMR use into their practice. The authors noted that healthcare leaders play an important role in successfully implementing EMR by introducing the flexibility in using the technology. The authors noticed that involving the EMR users in the integration process enhances both the individual and collective ability to make sense of the change and thus removed barriers to EMR adoption. Baird and Boak (2016) concluded that the successful implementation of the EMR system was achieved because the leaders of the emergency services company responded quickly to feedback regarding problems with the technological interface in the initial design and provided individuals flexibility in using the system as long as the desired outcome was achieved.

In short, the authors asserted that the leaders' responsiveness, supportiveness, and flexibility contributed to the successful adoption of the EMR system within the organization (Baird & Boak, 2016).

According to Dey et al. (2013), successful EMR implementation cannot be achieved all at once; instead, it should be developed gradually over multiple stages. At each stage, as EMR capability increases, the operational performance of the providers must also be enhanced, and as the implementation of EMR grows, so does the need to overcome computer illiteracy among physicians grows (Dey et al., 2013).

Transition

The purpose of this qualitative multiple case study was to explore strategies that healthcare leaders use to implement EMR systems successfully. In Section 1, I defined the problem and purpose statement of this study. In that section, I also explained the nature of this study, the research questions, the conceptual framework, and the significance of this study and presented a review of the professional and academic literature. In Section 2, I presented topics such as the role of the research, participants, the research method and design, population and sampling, ethical research, data collection instrument and technique, data organization technique and analysis, and reliability and validity. In Section 3, I addressed the findings, implications for social change, recommendations for action and further research, and reflections along with an overall conclusion.

Section 2: The Project

Purpose Statement

The purpose of this qualitative case study was to explore the strategies that healthcare leaders use in implementing EMR successfully. The targeted population for this study included healthcare leaders from at least three hospitals in that the United States that have successfully implemented EMRs. The results of this study may bring social change by providing physicians a platform to share patient data with EMR providers. According to Hill et al. (2015), shared patient data with EMR providers can improve the accuracy of health records, eliminate redundancies, improve data integrity, and reduce errors and processing time. This can have a positive effect on healthcare services, healthcare costs and patient lifestyles, leading to a healthier community.

The Role of the Researcher

In a qualitative study, the researcher's role in the data collection process involves selecting a limited number of respondents with the intent of obtaining in-depth knowledge of the data collected and validating the results of the study (Glass et al., 2012). The researcher must have a thorough understanding of the conceptual framework and the processes used to collect data using more than one technique (Glass et al., 2012). According to Watts et al. (2017), paying attention to ethics throughout the data collection process—from the inception to the conclusion of the study—is critical to maintaining the correctness and accuracy of the data. In fact, a data collection process could entail many ethical challenges: For example, during the interview process, an interviewer or researcher may gain knowledge of or be exposed to sensitive information (Yin, 2018). Accordingly, Haahr et al. (2013) recommended that a researcher maintain a boundary around the types of questions being asked to an interviewee during the interview process. Over the course of the selection process, I ensured that I had no personal

relationship with the selected participants so their responses would not be subject to any outside influence.

The Belmont Report is a leading document on the topic of ethics and healthcare research (Zagorac, 2016). The Belmont Report guidelines are based on three basic ethical principles: respect for persons, beneficence, and justice (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979). Bromley et al. (2015) defined *respect for persons* as referring to those participants who are capable of deliberation about personal goals and protection of those who have diminished autonomy. Bromley et al. (2015) also noted that *beneficence* refers to protecting participants from harm, and *justice* distinguishes between those who ought to receive the benefits of research and those who should bear its burdens (Bromley et al., 2015). I used the principles of the Belmont Report as a guideline for the study with the intention to adhere to the basic ethics of research. To preserve the integrity of the interviews, I implemented Wester's (2011) five main ethical principles, which include the following: (a) having respect for research participants; (b) allowing research participants to join the interview process on a voluntary basis, with the option to opt out of the study at any time; (c) taking special precautions when working with minors, pregnant women, people who have terminal illnesses, and the like; and (d) ensuring that participants are protected from any harm before, during, and after the study.

Couper (2011) recommended that a researcher conducting qualitative research use various tools to collect data for case studies to reduce bias in conclusions and improve data validity. Data collection methods may include direct observation, in-depth interviews featuring open-ended conversations with key participants, focus groups, paper-based surveys, archival records, and documents and other physical artifacts such as instruments or devices (Yin, 2018).

In this study, I used direct observation and in-depth interviews featuring open-ended conversations with each participant. To minimize bias and improve data validity, the interviews were recorded and transcribed, and each transcription was shared with its respective participant to ensure proper wording and to make sure that the participant's views were accurately represented. Participants had the chance to clarify or expand on their viewpoint, thereby reducing biased conclusions and improving data validity.

Participants

According to Kieft et al. (2014) researchers select participants based on the study's research question. The selection criteria determining eligibility for this study thus included healthcare leaders who had successfully implemented EMR systems in hospitals in Southern California. To gain access to research participants, Goldman and Swayze (2012) recommended the use of a three-step process: identifying potential participants, making contact, and gaining commitment. For this study, I used a formal method to obtain access to the participants by consulting a directory (such as that available at http://www.hasc.org/member-hospitals-systems, which provides an online listing of hospitals in Southern California) and contacting the local chapter of the American College of Healthcare Executives to identify hospitals that use EMRs as well as a contact person at each such hospital. Several different methods were used to identify the most appropriate person within the hospital to answer the questionnaire as well as to contact potential participants and motivate them to respond. A telephone call to the hospital's public relations manager was the preliminary method of contacting hospital personnel, to include a brief explanation of the research project with a view to identify the most appropriate person for this study. Maramwidze-Merrison (2016) recommended using professional social media sites, such as the professional networking site LinkedIn, as an effective and efficient participant recruiting

tool, noting that using these sites can help bypass the gatekeepers in an organization. Bearing this in mind, I used social media as another method for recruiting participants for this study.

Among other advocates, Marshall and Rossman (2016) recommended that researchers establish working relationships with study participants by sharing their expertise and listening to the participants during interviews, asserting that participants must feel safe before they engage with an interviewer. Checking for clarity during the interview process can also enhance the relationship (Marshall & Rossman, 2016). During the interview process, to build a relationship with the participants in this study, I encouraged them to share their expertise and knowledge. I actively listened to the participants' responses to the interview questions to gain their trust and confidence. The participants were provided with a signed document stating that their contact information and responses would stay private and concealed from the public. The participants were informed that all responses were treated as confidential, and only researchers were able to access the data. Steps were taken to ensure that no information about identifiable persons or organizations were published without their consent. I shared my contact information with the participants in case they had any questions. The participants also received full information about this study to help them determine whether to continue with the process. Participants who chose to continue and who agreed to participate received an informed consent form to review and sign, along with information on the process they could use to opt out of the program at any time.

Researchers such as Robinson (2014) have recommended establishing inclusion and exclusion criteria for participation in the interview process. For this study, the inclusion criteria for participation comprised of healthcare leaders who were involved in the successful implementation of an EMR system in a hospital. The exclusion criterion for participating in the

program included healthcare leaders who have not participated in the successful implementation of an EMR system.

Research Method and Design

Research Method

A research method is a process used to gather data to answer the research question (Marshall & Rossman, 2016). The three types of research methods are quantitative, qualitative, and mixed. The objective of quantitative research is to collect and analyze statistical data to produce an outcome that can be applied to larger populations (Claydon, 2015). The objective of qualitative research differs from quantitative; qualitative research is conducted to collect narrative data that can help answer what, how, or why questions surrounding the phenomenon (McCusker & Gunaydin, 2015; Yin, 2018). For this study, I used the qualitative research method to explore strategies that leaders use to successfully implement EMR in a hospital. The qualitative research method was appropriate for this study because it provides the opportunity to ask open-ended questions and to collect narrative data instead of using closed-ended questions to collect statistical data, as with the quantitative method. The mixed method includes both quantitative and qualitative methods (Yin, 2018). The mixed method was not appropriate for this study because I was not collecting statistical data. My objective for this study was to gather data on the strategies that healthcare leaders might employ to improve EMR adoption and to establish a link between the strategies used by participating healthcare leaders to overcome challenges related to physicians' beliefs and the successful implementation of an EMR system.

Research Design

Popular designs for qualitative studies include phenomenological, ethnographic, and case study approaches (Price, 2015). The phenomenological research design is used to explore the

shared phenomenon experienced by a group of individuals providing insights into their motivations and perceptions without considering the psychological origin of the meanings (Goulding, 2005). A phenomenological design was not appropriate for this study because the purpose of my research was not to study a phenomenon in the healthcare industry related to the adoption of an EMR system. Ethnographic research is the study of the shared values, behaviors, and beliefs of a group of people (Nelund, 2013). Ethnographic research design was not appropriate for this study because the purpose of my research was not to study the shared values, behaviors and beliefs of healthcare leaders who have successfully implemented the EMRs. Using a case study design requires collecting data to allow the researcher to formulate an in-depth understanding associated with an individual, group of people, or event (Connelly, 2014; Yin, 2018). This study involved undertaking an in-depth analysis to explore the strategies that healthcare leaders have used to successfully implement EMRs. A qualitative multiple case study design involves investigating several instrumental bounded cases to develop a more in-depth understanding of a phenomena than a single case can provide (Yin, 2018). A multiple case study design was appropriate for this study because I was collecting narratives and associated records from multiple sources for an in-depth analysis. Boddy (2016) suggested that employing a multiple case study design allows a researcher to use multiple data collection methods to develop a deeper understanding of a problem. For that reason, I selected a multiple case study design for the exploration of healthcare leaders' strategies to improve the adoption rate of an EMR system in a hospital, was appropriate for this study.

According to Fusch and Ness (2015), failure to reach a data saturation point in the data collection process can degrade the quality of the research and endanger the validity of the results of the study. Data saturation in a study occurs when any additional information has no effect on

the results of the study (Fusch & Ness, 2015). For this study, the data were collected until no new information was produced, thus ensuring that data saturation was reached in the data collection process.

Population and Sampling

The probabilistic sampling method involves random sampling with a high probability of drawing an unrepresentative sample in a small population (Van Hoeven et al., 2015). Marshall (1996) recommended using a nonprobabilistic sampling method for a qualitative study, because the aim of qualitative research is to develop an in-depth understanding of a complex human issue rather than a generalization of the results. Therefore, I used a nonprobabilistic sampling method for this study to select healthcare leaders who have experience in successfully implementing EMRs in a hospital.

The convenience nonprobabilistic sampling method was not appropriate for this study because the purpose of the study was not to select the participants from the target population based on their availability or the convenience of the researcher. The quota nonprobabilistic sampling method was also not an appropriate sampling technique for this study because the purpose of this study was not to solicit participants from among the members of mutually exclusive subcategories until a target number of elements was sampled from the subcategories. The snowball sampling method was appropriate for this study. The snowball sampling method is based on a referral approach whereby a small number of individuals exhibiting specific characteristics recruit others who have similar interests from within their networks (Valerio et al., 2016). Snowball sampling was appropriate for this study because I carefully selected healthcare leaders who were successful at implementing an EMR system in a hospital.

The purposive sampling method was appropriate for this study because the method does not require a researcher to generate a result that aims to create a generalization for the entire population (Etikan et al., 2016). In the purposive sampling method, a researcher has access to limited resources, time, and workforce; decides what needs to be known; and identifies and selects individuals who can and are willing to provide that information based on their own experience (Etikan et al., 2016). In the purposive sampling method, a researcher carefully selects participants to suit the study with the expectation that each participant will provide in-depth information valuable to the study. I approached leaders in the healthcare industry who had knowledge about and experience in successfully implementing EMR systems (Appendix A). The purposive sampling method was therefore appropriate for this study.

In a qualitative case study, identifying the point of data saturation in the data collection process is the key to data validation (Fusch & Ness, 2015). To successfully answer the research question, a researcher must identify the appropriate population and sample size (Robinson, 2014). Specifically, an appropriate sample size for a qualitative study is one that adequately answers the research question (Marshall, 1996). Qualitative researchers focus on relatively few participants who can describe their experiences or knowledge with respect to the research questions or phenomenon (Baškarada, 2014). According to Kerr et al. (2010), in a qualitative study, the point at which any additional information has no effect on the result is the sufficient sample size for the study. Boddy (2016) suggested including two or more cases to reach data saturation. For my study, the sample size included five hospitals and five physicians. The interview process continued until no new data collected augmented the results of previous interviews, indicating that data saturation had been reached. The data saturation point defined the

sample size appropriate for the study, revealing time spent interviewing more participants would not lead to new insights into the study.

For this study, the criteria for selecting the participants for an interview included their knowledge about and experience in successfully implementing an EMR system. The letter of cooperation for research was emailed to the identified candidates. The selected participants included leaders who had been instrumental in the successful implementation of an EMR in a hospital in Southern California. These participants received an email containing a cover letter that stated the research objectives along with a request for participation (Appendix B). The cover letter was limited to one-page conveying core information related to this study, printed on the university letterhead and endorsed by the supervisor at the university. On agreeing to participate, participants received an email with an attached file containing questions to be answered. The cover page of the questionnaire contained an introductory statement indicating the purpose of the study, and it was considered essential that respondents understand and accept the purpose of the study and be willing to participate in the program. The selected participants were required to sign a consent form before participating in the interview and received information about how to withdraw from the study, the process used for securely storing the information gathered during the interview, and the plan to destroy the data after 5 years. Telephone calls and email were used to set appointments with the interviewees based on their availability. The face-to-face interviews were conducted to gather in-depth data from the participants at a location agreed upon by the participants and myself. The face-to-face interviews included a list of open-ended questions to gather in-depth data from the participants regarding the research topic. To ensure data saturation, I continued to conduct semistructured interviews with open-ended questions until no new information was generated through the interview process.

Ethical Research

The main role of a participant in research is to serve as a source of data for the study, and a researcher has the responsibility to protect the life, health, dignity, integrity, right to self-determination, privacy, and confidentiality of all participants (Yip et al., 2016). Researchers usually ask participants to sign a form to indicate that they have voluntarily agreed to participate in the research (Lie & Witteveen, 2015). Prior to their acceptance as candidates for an interview as part of this study, participants had a full understanding of their part in the study and were provided with information about the purpose and duration of the study as well as their contribution to it. To confirm their understating of their part in the study, the participants received a written consent form that they must sign before they could participate in the interview process. The consent form included the IRB approved number 01-04-21-0592134 and the information for participant to contact the institution for verification of the study's legitimacy. Before voluntarily joining the interview process, research participants were made aware of the rules and procedures for opting out of the interview process and withdrawing from the study. The selected candidates received a package containing information about the consent form, the process of withdrawing from this study, and the process used for storing and destroying the data collected during the interview process. As an incentive to take part in the program, participants had the option to receive a summary of the findings. Close attention was paid to ethical considerations, when collecting data, to maintain the integrity and confidentiality of the data collection and data management processes.

The electronic and hard copies of data, including interview transcripts, consent forms, and hospital documents were collected during the interview process, are kept in a secured location for 5 years, after which the electronic and hard copies of data will be removed from all

storage devices, including hard drives, cloud storage, network storage, and smart devices. At the end of 5 years, the data will be destroyed by reformatting the storage devices and shredding the hard copies of the documents. To protect their identities, the participants are referenced by a unique identification code as P1, P2, P3, P4, and P5.

Data Collection

Instruments

The data collection process involves collecting, analyzing, categorizing, coding, and interpreting data to identify patterns based on triangulation between interviews, documents, and observations (Yin, 2018). In qualitative research, the researcher, who hears, sees, and interprets the data, is the primary data collection instrument (Marshall & Rossman, 2016). Accordingly, I was the primary data collection instrument in this study. I used direct observation and in-depth interviews to collect data.

Dresch et al. (2015) have recommended the use of multiple data collection methods, including interviews, document analysis, and location visits, for in-depth analysis. In qualitative studies, Yin (2018) suggested the use of documents, archival records, interviews, direct observation, participant observation, and physical artifacts as data collection methods. The primary source of data collection for this study included semistructured interviews to explore strategies that healthcare leaders used for successful implementation of EMR systems. The face-to-face, open-ended, in-depth interview questions were used as the primary data collection strategy for this study. An in-depth interview for qualitative studies tends to be open-ended less structured, and lead to a deeper understanding of physicians' strategies for improving the implementation of EMR systems. The interview method was appropriate for this study because it provided me with an opportunity to ask immediate follow-up questions to clarify any ambiguity,

thus assisted me in improving the quality of data obtained for this study. Secondary sources of data collection included documents, archival records, and observations.

To enhance the validity and reliability of the data collection instrument, I used member checking. Member checking allows researchers to improve the reliability and validity of the data collection process (Birt et al., 2016; Carter et al., 2014). Member checking can help researchers reflect on their biases while ensuring that the study is reflective of the participants' experiences (Kornbluh et al., 2015; Thomas, 2016).

Technique

Researchers conducting qualitative research should use a variety of tools to collect data for a case study to reduce bias in conclusions and improve data validity (Couper, 2011). Such data collection methods may include direct observation, in-depth interviews featuring open-ended conversations with key participants, focus groups, paper-based surveys, archival records, and documents and physical artifacts such as instruments and devices (Yin, 2018). The data collection strategy for the qualitative study included a combination of face-to-face interviews using open-ended questions posed to participant to achieve a deeper understanding of physicians' beliefs about adopting EMR technology. Tella (2015) recommended the use of electronic data collection technology for its ability to fulfill all the examined parameters more cost-effectively than paper-based data collection methods. According to Tuttas (2014), although electronic or web-based data collection may be a cost-effective and time-saving data collection method, however, an electronic method of data collection may be limited when respondents are not comfortable using a computer. For that reason, I used face-to-face, open-ended, in-depth interviews as the primary data collection strategy for this study. An in-depth interview for qualitative studies tends to be open-ended and less structured and thus led to a deeper

understanding of physicians' strategies for improving the implementation of EMR systems. The face-to-face interview method was appropriate for this study because it provided me with an opportunity to ask immediate follow-up questions to clarify any ambiguity. To improve the accuracy, reliability and validity of this study, I triangulated the data with information from multiple sources including government websites, the hospital's website, and hospital documents.

The process for conducting this study after IRB approval, I identified leaders in the healthcare industry who have successfully implemented a hospital based EMR system in Southern California. The participants included healthcare leaders who had different levels of experience in effectively implementing an EMR system. The candidates for the interview were solicited via email to participate in the interview process (Appendix B). Qualified participants received a call to inform them that they meet the requirements to participate in this study. The qualified participants also received information about the interview process and the procedure that will be used for storing and destroying the data collected during the interview process. Participants were asked to read and sign the consent form to participate in the program. Once accepted, participants had their privacy strictly maintained. Information on the process for opting out of the research at any time was shared with all participants. Döös and Wilhelmson (2014) suggested that the proximity and cooperation of a research team improves the quality of qualitative fieldwork and analysis. I recruited qualified healthcare leader, at local hospitals in Southern California, who would provide in-depth and detailed information related to the successful implementation of EMRs.

After selecting the participants for the interview, I conducted an individual face-to-face interview with each participant at a location and time of his or her choice. During the interview process, I recorded the participant's responses to the questions. After the completion of the

interview, I transcribed the recorded interview, then synthesized, interpreted, and summarized the findings into one to two paragraphs per answer to an interview question. After completion of the data interpretation of the primary interview, I shared my interpretation of the data with the participant for data validation in a subsequent member checking interview. I provided the participant an opportunity to ask questions and clarify any issues. I recorded the secondary interview as well as the primary interview. In the case where discrepancies were detected in the interpreted data, I repeated the process until all answers correlate. After validating that the interpretation of the data was correct, I asked for more details and added any new information that came from the secondary member-checking interview to the data drawn from the primary interview. At the close of this study, I sent a letter expressing my gratitude to everyone who participated in the study.

Data Organization Technique

The raw data collected and transcribed interview from the participant are stored at a secured location. Stanton and Rogelberg (2001) recommended that researcher separate identifying data from the sensitive data. The identifying data were separated from the sensitive data and saved into an electronic file. To protect the identity of the participant, each folder was labeled with a unique identifier. Wilson (2014) recommended that a researcher use a research log to document any verbal and nonverbal communication during the interview process with the participant, which I also did and stored the document in a safe, locked place with the other data collected. Jacob and Furgerson (2012) recommended that the interviewer should keep files in folders and locked away in a safe place. The electronic files were encrypted, and password protected to protect the confidentiality of the participants. The recorded audios were transcribed, converted to text format, and saved in a Microsoft Word document using a password-protected

personal computer. The electronic storage devices and printed documents are saved in a secured location for 5 years that will be destroyed at that time.

Data Analysis

According to Yin (2018), the data analysis process for a qualitative case study includes the processes of grouping, describing, classifying, interpreting, and identifying patterns in data as well as any relationship between the groups. Robbins and McAlearney (2016) recommend the use of an iterative approach of organizing and analyzing the data in order to identify patterns, draw and verify conclusions. The practice of grouping the data into small segments with key topics helps the researcher categorize and discover patterns in the data (Gale et al., 2013). For this study, I used analytical software NVivo for data analysis to create categories based on key themes that emerged from the data analysis. During manual analysis, the data in each category were organized and analyzed using an iterative approach to identify patterns to draw and verify conclusions. To support the findings, the data collection and analysis were guided by the TAM framework, which involved developing an understanding of key issues that affect the adoption of new technology in an organization (Davis, 1989). In the TAM model, people who perceive technology as useful and easy to use will more readily accept technology than those who do not (Davis, 1989). The attitude of adopters toward accepting a new technology affects the positivity or negativity of their behavior when using new technology (Davis, 1989).

Reliability and Validity

Reliability in qualitative research refers to whether the results of the study can be repeated if the study is conducted again (Bryman & Bell, 2011). Reliability is the consistency with which researchers reduce the degree of variability of observations made when the research is repeated under similar conditions (Shi et al., 2016). Reliability refers to how consistent the

information-gathering process is and whether conducting the research at a different time using similar instruments would result in similar results and conclusions (Silverman, 2016).

Validity in qualitative research refers to the correctness and accuracy of the conclusions of the study (Wester, 2011). During the data collection phase, I conducted member checking of the interview transcript interpretation to contribute to the validity of transcript accuracy. The recorded interviews were transcribed, and the participants were given an opportunity to clarify or expand their viewpoints. One approach to mitigate bias is through methodological triangulation: relying on multiple types and sources of data (Jonsen & Jehn, 2009; Varpio et al., 2016). To enhance the reliability of this study, multiple sources of data were used, including interview data, supporting hospital documents, notes, and direct observation, to triangulate the data. The recorded interviews and paper-notes are stored in a safe place for 5 years and will be destroyed thereafter. I took the necessary steps to ensure that the data analysis was conducted ethically to exhibit dependability, creditability, transferability, trustworthiness, and conformability.

Like reliability, the dependability of a study refers to its ability to be repeated by other researchers at different locations under different conditions (Munn et al., 2014). To improve the dependability of this study, I ensured that the study method aligned with the research question, which included explaining any adjustment made to the data collection method and preliminary data analyses. In addition, I used the member checking of the data interpretation to check the transcript's accuracy. Dresch et al. (2015) recommended that the collected data include recorded interviews and written notes as a combination of voice recordings with notes offer advantages in improving the accuracy of data analysis.

Credibility refers to the believability of the results of the study (Trochim, 2006). To improve the credibility of this study, it was critical that the data collected during the interview

process be interpreted without bias. Any possible biases were shared with the participants at the start of the process to increase the validity and verifiability of the findings. One approach to mitigating bias is through triangulation, which can enhance the validity of the process using multiple external analysis methods concerning the same events (Fusch & Fusch, 2015; Marshall & Rossman, 2016). The triangulation method is used by researchers to gather data by way of multiple sources for use in analyzing the data and then presenting the results of the study (Fusch & Ness, 2015). An in-depth data analysis based on data collected from multiple sources can enhance the reliability and credibility of the study, which can lead to data saturation (Fusch & Ness). For this study, I gathered the data from multiple sources and explored the experiences of the participants, and the participants were the only judges of the credibility of the results.

Transferability in qualitative studies refers to the degree to which the results of the research can be generalized or transferred to other contexts or settings (Trochim, 2006). I have provided an accurate description of the study methodology, processes, assumptions, and limitations to improve the chances that another researcher is able to apply the results of this study to other contexts or settings. Conformability in a qualitative study refers to the degree to which the results of a study can be confirmed or corroborated by others (Trochim). I established the conformability of this study by following the relevant procedures for accomplishing the task and ensuring that each step is documented correctly during the data collection process and throughout the entire research study. Data saturation refers to the point in the research when the researcher has enough information to replicate the study and beyond which any additional information has no effect on its results (Fusch & Ness, 2015). For this study, I collected data until any new data had no effect on the result of the study, indicating that the data saturation point had reached.

Transition and Summary

In Section 2, I stated the purpose of the study and described the role of a researcher in terms of collecting data and maintaining the ethics of mitigating bias. I provided information on the research method and design that I used for sample population, sample method and sample size. I also discussed the data collection instrument and technique that was used for data collection and data analysis. I explained the necessary steps that I took to ensure that the data analysis was conducted ethically to exhibit dependability, creditability, transferability, trustworthiness, and conformability. Initially, I started the research with interviewing a small group of physicians and administrators at a hospital in Southern California to gather data on the strategies they used to successfully implement EMR systems in their hospitals. The interview process continued until the data saturation point was reached. To achieve methodological triangulation, in addition to interviews, I reviewed the supporting hospital documents and notes. In Section 3, I address the findings, the implications for social change, and provided recommendations and actions for further research. I ended the Section 3 with reflections and an overall conclusion.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this qualitative case study was to explore the strategies that healthcare leaders at U.S. hospitals use to implement EMR systems successfully. During data collection, I conducted interviews with five U.S. healthcare leaders. The participants addressed the primary research question: What successful strategies do healthcare leaders use to implement EMRs? The semistructured interviews included seven interview questions (Appendix C) posed by telephone at a date and time agreeable to each participant. After the recorded interviews were transcribed, I performed member checking and methodological triangulation to ensure data saturation and to assure the reliability and validity of the study results. My findings revealed the successful strategies the participating organizations developed for implementing EMR systems while reducing healthcare costs and improving patient care services to meet the needs expressed by the healthcare industry and the community. Based on the TAM conceptual framework, the literature review, and data collection, I identified three principal themes related to the strategies used to implement an EMR system successfully: (a) adequate training, (b) workflow analysis, and (c) technical support. The participants described easy access to training, customized applications, and experienced staff as necessary for successfully implementing an efficient and effective EMR system.

Presentation of the Findings

My study addressed the following research question: What successful strategies do healthcare leaders use to implement EMRs? I conducted a qualitative multiple case study to answer this research question and conducted interviews featuring seven open-ended questions (Appendix C) that I posed to five healthcare leaders who successfully implemented an EMR

system. To ensure participants' confidentiality, I referred to them as P1, P2, P3, P4, and P5, during data collection and analysis. My use of a case study design (with interviews) enabled a comprehensive exploration of the phenomena, including the participants' experiences and resulting viewpoints.

One critical factor in any qualitative case study is the potential for researcher bias. To mitigate potential bias, I used an interview protocol, qualitative questionnaire, and member checking during data collection, As defined by Koelsch (2013), member checking is used to clarify and verify the meanings of participants' responses. I used methodological triangulation to ensure validity and reliability of the data analysis, with data sources including interviews, government websites, and documents. I entered data from interviews, field notes, and member checking into NVivo to identify three themes for analysis. Table 1 illustrates the emergent nodes and themes from this analysis.

Table 1

Emergent Nodes/Themes

Themes	Number of Sources	Number of References
Workflow Analysis	5	80
Adequate Training	4	47
Technical Support	5	32

Note. Total number of sources (Healthcare leader P1 through P5) = 5

Table 1 shows that the total number of times the theme was referenced by the healthcare leaders during the interview. The theme *adequate training* was referenced by four physicians 47 times, while the theme *workflow analysis* and *technical support* were referenced by all five physicians 80 and 32 times, respectively.

Data saturation, which occurs when no new information or themes appear (Fusch & Ness, 2015), demonstrate studies' trustworthiness and validity (Robinson, 2014). I used member checking for clarification and to achieve data saturation. Each of the initial codes and themes came from the transcribed interviews related to the research question and were associated with the conceptual framework and the existing body of knowledge from my literature review.

Theme 1: Adequate Training

All levels of healthcare workers use EMR systems, from physicians and nurses to pharmacists and support staff (Malhotra & Lassiter, 2014). To realize the full benefits of using EMRs, healthcare leaders should emphasize the importance of training personnel in their use before implementation (Bushelle-Edghill et al., 2017). A key strategy identified during data gathering, putting the training program into practice, was repeatedly verified as essential to successfully implementing the participants' EMR systems. Training strategies identified during data collection included (a) providing appropriate training to the users, (b) using a state-of-the-art training facility, (c) customizing training content by role, and (d) providing an onboard training program for new hires.

P4 provided details on the additional work done by the management before implementation to ensure that employees were trained and ready to use the EMR immediately after implementation:

> Before EMR implementation, the corporate office sent their EMR manager and analyst to the vendor's headquarters for training in practice management and EMR certification. This experience allowed the healthcare leader to understand the full scope of possible features that could be made available to their staff through the adoption of an EMR system. Before starting the project, the corporate office built a team that included outside

> contractors. The corporate office contracted a company for a month to provide several knowledgeable trainers in both the doctors' and nurses' modules. The healthcare leaders invested a lot of time and effort in training their staff, doctors, and nurses in using the EMR system before the implementation. [Management] believed that it would be a challenge to get the staff, doctors, and nurses to use the system after the implementation of EMR.

P5 shared a similar training experience:

> The corporate office employed many trainers to train the senior doctors until they were comfortable using the new system. The hospital provided training and support to the existing and new doctors and nurses joining the hospital every month. Without getting trained and certified on the EMR system, the nurses and doctors could not access the system.
>
> Initially, the healthcare leaders observed resistance from the physicians due to the change in their work routine introduced by the new EMR system and additional requirements to learn the use of the new system. The physicians felt that they were not computer-savvy so they would have to undergo vigorous training to get certified in using the EMR system. It was a challenge to introduce the new technology to the senior physician. The senior physicians had some difficulty with using the computer. They had worked at the hospital for a long time and took longer to adapt to the new system, since they were used to old ways of doing things.

According to P4, it was essential that users be trained in using the EMR system to reduce communication errors:

> The hospital provided training rooms with computers designated for the users to become familiarized with the EMR software. The training was conducted at the medical office and in the doctors' lounge so that physicians could practice on test patients. Several training sessions were scheduled to provide various training to physicians, nurses, staff, and analysts. Separate training rooms were used for training the doctors and the nurses. The healthcare leaders put in considerable effort that allowed providers and staff to develop a level of comfort in using the software. It gave them the basic system knowledge needed to use the customized templates within the system as a part of their everyday workflow.

P3 shared the benefits of providing training before the EMR implementation:

> The training provided before the EMR implementation helped the hospital reduce the staff's time in adopting the EMR system. The staff received training videos to get them trained in using the EMR system. The staff was cross trained on more than one EMR module for business continuity and for providing improved service to their patients.

According to Platt et al. (2019), cross training is an educational strategy for educating and training individuals across multiple role responsibilities to promote teamwork and boost the quality of patient care. Platt et al. (2019) described teamwork as essential for delivering safe and effective care, emphasizing that it must be embedded in an organization's culture and workforce training. According to Crowley et al. (2019), training should closely simulate the actual job roles, competencies, and work tasks to be truly effective. Educational content tailored to specific roles is more likely to be understood and recalled (Lopez et al., 2018). As such, P4 noted,

> The hospital offered the users various options for the training based on their role. The hospital arranged several hours of lecture series, demonstrations, and hands-on training.

> The training program was customized between 2 to 8 hours, depending on the roles. The doctor received training anywhere from 2 to 4 hours, while a surgeon received more rigorous training because their training included medicine and their area of specialization. The nurses received more than 8 hours of training, because they were expected to use the EMR the most, even more than the doctors.

Such an approach aligns with the findings of Top et al. (2012), who reported that nurses represented the most significant portion of healthcare professionals and interacted more with EMRs than other healthcare professionals because of the nature of their work.

P5 reported that "the training included a demonstration of the application for few days in the medical lounge, followed by 2 days of lecture for 3 hours each. The certification exam also followed a 1-day-long session." Further describing the training program, P4 said that,

> Once the doctors were comfortable with the system, they needed to pass the exam to get certified. The doctors had to get a score of 80% or more to receive a certificate to demonstrate their proficiency in using the EMR system before using the system on a real patient.

P3 stated that onboarding training for new employees was critical for shortening the learning curve and using the EMR correctly to improve productivity. New employees were trained in using the EMR from the outset, as part of the onboarding program. P3 said,

> A senior resource in the clinic was assigned to train the new staff on using the EMR system. The trainer was responsible for demonstrating the use of the EMR system, providing hands-on training, and after that monitoring the new staff until the staff was comfortable in using EMR system by themselves.

P4 described an EMR usage policy that was put in place for new hires:

> The hospital introduced an onboarding training program to provide training to new doctors and nurses joining the hospital every month. The organization introduced a policy whereby the nurses and doctors could not use the EMR system until they were certified in using the system.

The emergent theme of adequate training is aligned with the TAM framework and the body of knowledge from the literature review in this study. Computer literacy is the mediating factor in the relationship between the service quality, EMR usage, and user satisfaction that impacts the adoption of EMR (Tilahun & Fritz, 2015). EMR implementers and managers can provide users with basic computer training skills to improve the EMR adoption process (Tilahun & Fritz, 2015).

Theme 2: Workflow Analysis

According to Or et al. (2018), the likelihood of EMR implementation buy-in can be increased by improving PEOU and PU, which can be accomplished by identifying user and organizational needs before large-scale implementation. Specifically, doctors and nurses are more comfortable working with an EMR system when it aligns with their work (Lambooij et al., 2017). P1 and P2 indicated that initially the EMR's workflow was different from the hospital's workflow. P4 stated,

> Healthcare leaders needed to work with the EMR vendor to identify the differences between the EMR's workflow and the hospital's workflow. Identifying the gap in the workflow could help the healthcare leaders prioritize the areas of improvement before the implementation.

Likewise, P2 noted that “it took few months to identify gaps in the EMR workflow and develop an action plan to overcome the gaps in EMR workflow.” P4 described the challenges involved in using the EMR workflow to bill patients and insurance agencies:

> The EMR’s billing module had a completely different workflow than the hospital’s workflow. The system was inefficient in getting the bills out on time and did not manage the denials from the insurance companies. The challenge with using the EMR system was managing the revenue cycle and denials of the payment from the insurance companies. The corporate office wanted an EMR system where the information would flow smoothly and efficiently from the time a patient visits the hospital to the time when the invoice is generated. When a patient visits a hospital, the doctor should know how to create and use the electronic notes and complete them so that the system can generate the invoice for the client. The EMR system needed to include efficient revenue and denial management modules to get the invoice out on time and minimize the rejection of payments from the insurance agencies. Not properly managing the revenue and denials can impact the adoption of the EMR system.
>
> Monitoring the data accuracy, sending the bills out on time, and managing the denials is the key identifier of successful implementation of the EMR. It is critical to ensure that the EMR workflow can record all the services a patient receives from the time the patient checks into the hospital until the patient checks out of the hospital. The EMR system should generate the invoice for the patient and the insurance company at the right time, for utilizing the hospital services. If there is a denial of the payment by the insurance company, the system should be smart enough to capture the reason for the rejected invoices.

P4 also described ways of overcoming workflow challenges:

> "To overcome the billing workflow challenges, the healthcare leaders organized an ongoing 2-hour weekly meeting with the billing team and EMR vendor to ensure that everything was running smoothly" (P4).

Post EMR implementation with enhanced workflow, P3 reported increases in the number of records entered by staff, the number of medications transmitted, and the ease of managing patient billing records, as well as a reduction in paper-based prescriptions and calls to customer services:

> By the end of the second week of training, the staff could use the EMR system to bill the client. The number of patient visits had increased, and the efficiency of entering the patient information and sharing of patient information among the staff had improved. The staff were able to manage the workflow better. They were able to generate the report with the list of patients who have billed and patients who were still to be billed.

Post EMR implementation, P1 and P3 noticed an improvement in the number of patients visit and correctness of medication information sent to pharmaceuticals. They [physician] no longer had to send paper prescriptions; rather, "the data was being transmitted electronically to pharmaceuticals once the staff became familiar with the EMR system. Furthermore, calls to customer service had reduced."

Healthcare leaders also encountered difficulty in making the system easy for physicians to use, as P4 described:

> Having physician's notes in electronic format is essential in the EMR system for a hospital. However, some doctors were not eager to use the EMR, because they were used to writing notes and they found typing a lot harder than writing notes. The nurses were

> afraid of making mistakes in entering data in the EMR system that may jeopardize a patient's life.

P1 and P5 shared a similar experience:

> Initially, the physicians and the staff found the system very difficult and complex to use, even though the hospital provided several training sessions at the office. Whenever the physician saw a patient, they called the staff to take care of the notes.

Barriers to adopting a complex technology can be overcome by reducing the "difficulty to use" factor, specifically by focusing on the user-friendly features of EMR (Singh et al., 2020). P1 and P4 described how templates were developed for physicians to enter data into the system quickly, with various productivity software integrated with the EMR system to reduce the "difficult to use" factor. P4 stated that:

> The physicians were provided with templates that standardized the data input to help create meaningful data reports. The templates were easy to use and required limited typing. The hospital installed an electronic dictation system and provided training to the physicians on using the dictation system to transcribe the notes. The doctors had to press the function key F2 on their keyboard to invoke the dictation software and speak into the EMR system. The dictation software automatically transcribed voice to text and added the text to their notes. To make these templates effective for the end user, the hospital consulted with physicians from each department. This step was critical for effective implementation.

P4 also described physicians' perceptions of the EMR system after implementation of these customized templates:

> Traditionally, the physician wrote the notes on paper[s] that were difficult to search. Once the data was in the electronic format, using the EMR system helped physicians save time in searching patient information. When the doctors got used to the system, they found electronic notes easier to create and use. [Physicians] could copy and paste patient information such as vital signs, labs, and radiology data directly into their notes and orders. Having an easy-to-use template helped hospitals get physicians on board quickly. The tools, such as dictation software and user-friendly templates, and training on using these tools, were critical in reducing the time to bring the physician on board, which helped improve the success rate of an EMR implementation.

P3 noted that the EMR workflow did not

> Initially include integration with the blood lab interface. Whenever a patient went for a blood test, the blood result[s] were faxed to the clinic, and then the staff would scan the document and save it in the EMR system. It took few months to integrate the EMR system with the blood test lab to move the staff away from a paper-based system to digital data. After integrating the EMR with the lab, the data was transmitted electronically from the lab to the EMR system. The physician could access the result on a real-time basis to provide improved service.

P5 reported that post EMR implementation,

> Once the doctor learned how to use the system with lab data, their work became very easy. The lab result and X-rays were available right away to the doctors. The doctors could access the data right on the screen and could write and share their notes with other physicians. There was an increase in the number of medical records completed on time and improvement in the number of follow-up[s] on the orders. The automated process has

> made it easy for the nurses to place the order. When the physician enters an order into the system, the data is automatically transmitted to the pharmacy, and [the pharmacy] has the drugs ready for the patient.
>
> Similarly, if a patient needs to get a procedure done, once the physician places the order, the system notifies everyone instantaneously. The lab and radiology orders are submitted to the lab online, where a technician collects the specimen and enters the data into the system. The patient results are accessible over the handheld devices, such as the iPhone. A physician can monitor the number of medical records completed on time and followed up by the nurses accurately from anywhere at any time.

Such an approach is in line with the findings of Singh et al. (2020), who reported that use of transcribed data in EMRs helped physicians reduce the medication errors common with handwritten medical records, benefiting patients and doctors alike. According to Top et al. (2012), by using an EMR system, physicians can provide better service to their patients than when using paper-based recordkeeping systems. Specifically, an EMR system can make their job easier, improve their ability to make essential care decisions, provide easy access to patient information, and help improve communication with other care team members (Top et al., 2012). Cahill et al. (2014) concluded that enhancing the flow of information between patients and healthcare practitioners by providing patients with access to their EMRs through an online system can improve health service.

P4 noted that for ease of use, the EMR workflow must align with the hospital's policy and procedure. Whenever the healthcare leader identifies a gap in the EMR workflow, the corporate office works closely with the EMR vendor on implementing the changes. Whenever a gap in EMR is identified and communicated to the EMR vendor early in the implementation

phase, it can help the vendors customize the application to meet the hospital's needs for providing improved services to their patients.

Theme 2 of workflow analysis is aligned with the TAM framework and the body of knowledge from the literature review in this study. Previous researchers have also concluded that the PU, and PEOU significantly affects physicians' involvement and attitude toward EMR adoption (Abdekhoda et al., 2015).

Theme 3: Technical Support

One barrier to adopting an EMR system is the need to identify and overcome technical difficulties (Ajami & BagheriTadi, 2013). P2 advised that overcoming technical challenges in EMR implementation requires a team with the right resources, whose members have technical as well as business knowledge. The team must have the subject matter expertise in using the system and must understand users' daily routines to be able to map users' workflow to the EMR's workflow. The team should maintain open channels of communication with users and follow up with them after EMR implementation. An excellent team will be knowledgeable and organized, ensuring that there are no residual issues with the system before leaving. If users experience further problems with the system, the team will follow up with them, ensuring that any further actions are identified and resolved.

P3 reported that,

> Whenever there was an issue with the EMR system, the staff temporarily switch back to a paper-based system and worked with the EMR vendor's customer care department to get the issues resolved. Once the issue was resolved, the staff entered the data manually to bring the patient record up to date.

P1 reported that,

Whenever there was an issue with navigating the EMR system, the staff worked with the EMR vendor's customer support department to get online help navigating the system.

P4 provided details on the support provided to help users overcome technical difficulties:

> For healthcare leaders, patient safety is the number-one priority. The healthcare leaders must ensure that if something happens in the operating room, if an oncologist cannot use the system, or if the physician cannot complete the notes accurately, the trainers are available to help them with the system.
>
> The hospital established a 24-hour helpdesk, 7 days a week, to assist the doctor and nurses if they had any issue in entering the information in the EMR system or needed help with the system. There were supporting staff who took shifts to stay on the hospital premises to cover 24 hours a day to help the doctors and nurses working during day and night shifts. The hospital made sure the helpdesk and the trainers were available to the doctor 24 hours a day to offer one-on-one training. Some trainers stayed overnight to provide support to nurses and doctors working during the night shift. The hospital provided additional staff to provide support, education, and training in using the EMR, both during and after the EMR implementation. The training staff were available to the physician 8 hours a day, from morning to evening, and the physician could get training at any time. If the doctors had any issue with using the EMR system, the management provided them with trainers and administrative staff for assistance.

P4 continued:

> To ensure that patient safety is never compromised, the healthcare leaders made sure that the patient information, including the labs and vital signs, was always comprehensive and available, as part of the doctor's notes. The doctor's notes must be comprehensive for any

> physician to read the notes in case the patient chooses to go to another physician. There could be an issue if a physician cannot read a doctor's note properly. Monitoring the doctor's notes for accuracy and completeness is critical for successfully implementing an EMR system. In case the system crashes or the system becomes unavailable, the staff should be able to access the backup data.

P4 also described issues related to the inability to access data:

> Resetting the password was a common issue for the doctors. Some doctors do not come to the hospital often, so they tend to forget their passwords. And because of the HIPAA requirement, the password on the EMR system is reset every 3 months. Without the password, the doctors are unable to use the system.

P4 also reported that:

> To overcome these challenges, the corporate introduced a helpdesk, accessible by the physician and staff, 24 hours a day, 7 days a week. The corporate also made the documents available to staff during the downtime so that the nurses and doctors could receive help any time they needed to continue using the EMR system for patient care.

Likewise, P5 stated that the "hospital assigned a dedicated phone number to support the physician if they had any questions about the EMR system. The trainers met with the doctor in person to help them write the notes and to go through the results."

The theme of technical support is aligned with the TAM framework and the body of knowledge from the literature review in this study. Providing technical support and management support impacts the adoption of EMR technology (Ajami, & BagheriTadi, 2013; Or et al., 2014). The challenges to EMR implementation can be addressed through a corporate strategy

addressing the barriers and providing the necessary financial and technological resources for a successful adaptation of EMR systems (Goldstein et al., 2014).

Applications to Professional Practice

The purpose of this research study was to identify and explore the strategies that healthcare leaders use to implement an EMR system successfully. EMRs' ability to facilitate patient information-sharing can bring about improvements to both physicians' practices and services to patients (Birtwhistle & Williamson, 2015)

The study design was a qualitative multiple case study employing interviews, government websites and document analysis. I conducted interviews with 5 healthcare leaders who have experience in successfully implementing an EMR system. Using NVivo coding, the three themes that emerged through data analysis were: (a) providing adequate training to users, (b) using workflow analysis to identify gaps in the EMR system, and (c) providing technical support to users. To successfully implement an EMR system, healthcare leaders should build and implement their strategies based on the details contained in these three themes. The literature review revealed that successful implementation of an EMR system could improve the accuracy of health records, eliminate redundancies, enhance data integrity, reduce incidence of errors, shorten processing times, and provide physicians a platform for sharing patient data with other EMR providers (Hill et al., 2015).

In the TAM model, the two factors that influence a user's decision about when and how to use a new technology include the user's perceptions of its usefulness (PU), and (PEOU) the user's perceptions of the technology's ease of use (Davis, 1989). Both PU and PEOU influence the decision to adopt and utilize a system (Qu et al., 2018). Top et al. (2012) observed that nurses perceive EMR systems as making their job easier, improving their ability to make essential care

decisions, providing easy access to patient information, and improving communication with other members of the care team. Lambooij et al. (2017) noted that doctors and nurses were more comfortable working with EMR systems when such systems aligned with, and facilitated, their work. According to Or et al. (2018), technological characteristics, clinician–technology interactions, skills and knowledge, and user workflow technology affect implementation of EMRs. Tilahun and Fritz (2015) noted that computer literacy is a major factor affecting the adoption of EMR. Since many healthcare leaders lack strategies for implementing an EMR system successfully, using or adapting this study's findings can provide healthcare leaders with potential strategies for implementing EMR systems successfully.

Implications for Social Change

The findings of this study could contribute to social change by allowing successful implementation of EMR systems. Healthcare leaders can provide physicians a platform for sharing patient data with EMR providers to improve the accuracy of health records, eliminate redundancies, improve data integrity, and reduce errors and processing times (Hill et al., 2015). Physicians can use EMR systems from anywhere to access patients' information, including digital data such as medical chart notes, lab results, and medication lists, in real time using a variety of devices (Lesley & Shmerling, 2015). Real-time access to electronic patient data can enable physicians to provide customized care while improving the quality of healthcare and patient outcomes (Wang et al., 2015) and reducing healthcare costs, leading to healthier communities. The findings of this study could enable healthcare leaders to define new processes, fine-tune existing processes, clarify training needs, and improve communications with providers, patients, and the community.

Recommendations for Action

Through this qualitative study, I explored the strategies healthcare leaders have used to successfully implement EMR systems. Its findings included several strategies shared by participants from five hospitals that healthcare leaders have used to implement successful EMR systems. Addressing the principal themes identified in this study provides a basis for healthcare organizations to develop and deploy a structured approach to implement EMR successfully by focusing on:

- Providing customized training
- Working with vendors to implement ease-of-use features for users
- Providing ongoing support to EMR users

Healthcare leaders could use this study's findings to recognize and address organizational needs, involve staff in the implementation process to promote buy-in, and develop training programs and support teams to assist end users during and post EMR implementation. These findings could assist healthcare leaders in facilitating a smooth transition from a paper-based system to a fully electronic system through which physicians can access patient data in real time from anywhere using a variety of devices (Lesley & Shmerling, 2015). Real-time access to electronic patient data can enable physicians to provide customized care for improving healthcare quality and patient outcomes (Wang et al., 2015).

Recommendations for Further Research

This study included a small sample size of five healthcare leaders, who admittedly might not represent the entire healthcare industry. Future research could thus involve more participants to assure the reliability and validity of findings and could also investigate adoption of EMRs in small versus large organizations for increasing successful ERM adoption rates and for addressing

barriers preventing implementation through developing and implementing strategies for overcoming those barriers. Potential areas for further research include identifying successful strategies and processes for assisting trainers to develop customized training programs, quality improvement methods for EMR vendors to improve their workflow and processes for management to develop or improve support structures for users.

Reflections

The DBA doctoral study process was not only a challenge but also an excellent learning experience for me. I have always been interested in organizational business activities, and I selected my topic because I wanted to know more about the strategies that leaders use to successfully implement technology in an organization. The doctoral program at Walden University gave me the opportunity to learn about the complexities involved in implementing an EMR system in a healthcare organization.

I gathered a considerable body of knowledge while conducting a literature review of EMR system implementations. Communicating with a variety of healthcare leaders helped me gain experience and expertise in the healthcare industry, and the literature review itself helped me identify prospective participants for this study. Completing this study showed me that the healthcare industry is a complex environment, in which healthcare leaders are looking for innovative ways of simplifying the business process so that physicians and nurses can provide improved healthcare service to their patients at a lower cost.

Conclusion

Through this qualitative case study, using TAM theory as the conceptual framework, I identified and explored the strategies that healthcare leaders use to implement EMR systems successfully. The participants in the semistructured interviews were five U.S. healthcare leaders.

I used member checking and methodological triangulation to ensure data saturation and validity for identifying themes. Three principal themes emerged from data analysis of multiple sources: (a) adequate training, (b) workflow analysis, and (c) technical support. These themes aligned with the expected findings from the TAM framework for successfully adopting new technology in an organization.

The findings of this study revealed that, as Fred (2016) concluded, improving services while reducing costs is a primary focus when implementing an EMR system. The findings of this study revealed that healthcare leaders recognize the importance of end-user adoption of a system to the overall success of the EMR implementation process. The themes that emerged from this study included providing adequate training to EMR users, fine-tuning workflows to meet user needs, and providing technical support to end users—all critical strategies for implementing an EMR system successfully. As EMR systems continue to evolve, researchers and practitioners should continue seeking ways to predict, identify, and overcome barriers to adoption of EMR systems for enabling improved delivery of improved healthcare services to patients at reduced costs

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Appendix A: Interview Protocol

1. Email an invitation to participate in the study.
2. Introduce self to participant and provide the consent form.
3. Go over the consent form and respond to all questions and concerns a participant may have.
4. Collect participant's signed consent form.
5. Sign and give participant a copy of signed consent form.
6. Provide information about the transcript review and member**.**
7. Turn on the recording device.
8. Introduce participant with a unique identification code and note the date, time, and location of the interview.
9. Begin interview with first question; follow through to the last question. When interviewing:
    a. Watch for non-verbal cues.
    b. Paraphrase as needed.
    c. Ask follow-up probing questions to get more in-depth responses.
10. Once done with all the questions, wrap up the interview with a thank-you note for their participating
11. Review and interpret the interviews.
12. Analyze the data and generate a summary report.
13. Schedule a follow-up meeting for member-checking interview
14. Set the stage for follow-up interview as part of member-checking interview

a. Provide participant a printed copy of the synthesis of the data.

b. Confirm with the participants that the synthesis represents their answer.

c. Follow up with additional questions.

d. Continue member-checking process until no new data are collected.

15. Reiterate the content based on follow-up questions and concerns from participants.

16. Email participants a “thank you” and the feedback on analysis.

Appendix B: Invitation to Participate in the Study

Email Subject: Invitation to participate in a study

Dear <Participant>:

My name is Vazi Okhandiar. I am a doctoral student in Walden University's Business Administration (DBA) program. I am kindly requesting your participation in a doctoral research study that I am conducting: *Successful Strategies for Adopting Electronic Medical Records Systems at Hospitals*. The purpose of this study is to identify the strategies that healthcare leaders use to successfully implement an EMR system in a hospital. Participation is completely voluntary, and you may withdraw from the study at any time. Every participant's name or any other identifying information will be kept anonymous. The information collected during the study will remain entirely confidential and will not be provided to anyone outside of my supervising faculty/staff.

Your participation in the research will be of great importance in bringing social change by assisting hospitals in successfully implementing EMRs, allowing healthcare leaders to provide effective and efficient healthcare services at reduced cost, improving accuracy of health records, eliminating redundancies, improving data integrity, reducing errors and processing times, and providing physicians with a platform for sharing patient data.

If you would like to participate in the study, please read and sign the attached consent form.

Sincerely,

Vazi Okhandiar, M.S., M.B.A., PMP, Doctoral Study, Walden University

Appendix C: Interview Questions

1. What strategies did you use to improve the implementation of the EMR system in your hospital?
2. Which of these strategies did you find to be the most successful and why?
3. What were the key challenges you faced in implementing those strategies?
4. How did you overcome those key challenges?
5. How did you measure the success of the implemented strategies?
6. What lessons did you learn that you would like to share with healthcare leaders to potentially improve the adoption of EMR implementation in their hospital?
7. If you could go back in time, what would you have done differently to improve the successful adoption of your hospital's EMR system?
8. What else would you like to add that has not been addressed by the interview?