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Challenges in Healthcare Post-EMR Adoption

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Research-in-Progress

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ABSTRACT

The efficient use of information technology in industries in the U.S. and globally created improved efficiencies, increased competitive advantages, and improved the flow of communication. The U.S. healthcare system; however, has been slow to embrace IT adoption historically. In 2009, a signature piece of legislation mandated electronic medical records adoption to decrease medical errors, high death rates, and prescription errors. Despite extensive literature before the adoption mandate deadline, barriers and negative perceptions towards adoption exist. This proposal intends to contribute to the discussion concerning gaps in the literature concerning IT adoption effectiveness and the U.S. healthcare industry. Accounting for 17% of the U.S. gross domestic product with projections showing 25% in the next ten years, understanding the barriers and perceptions are paramount for both the healthcare and IT industry.

Keywords

Healthcare IT, EMR adoption, electronic medical records

INTRODUCTION

A 2001 Institute of Medicine reported indicated that more people in the United States died from medical errors than from significant illnesses, highway accidents, and work-related injuries. The findings from this particular report emphasized that redesigning systems to use IT more efficiently would lead to safer and higher quality care (Honore et al., 2011; Kellermann & Jones, 2013). Medical errors cause approximately 44,000 deaths in the United States annually (Patel et al., 2012). The medical errors result from process errors and failing to provide recommended treatment plans.

According to the Center for Medicare and Medicaid Services (CMS), healthcare spending grew 4.3% in 2016. CMS noted that healthcare accounts for 17.9% of overall gross domestic product with projections showing a quarter of the U.S. GDP would come from healthcare spending. These figures are alarming considering that 3.5% of U.S. GDP spending is on the military. Despite the widespread implementation of technology in numerous industries, the healthcare industry has deficiencies in adopting new technology.

A legislative push for electronic medical records (EMRs) occurred under the Obama Administration in 2009. The consensus thinking at the time was to include financial incentives and significant consequences for identified physicians to participate in adopting EMRs and their related counterparts. The legislation intended to decrease costs, medical and medication errors, and created a landscape where information technology is used in a meaningful fashion to improve work efficiencies. The outreach by the government did increase overall adoption rates throughout the U.S.; however, overall resistance to the process and continued usage continues post-implementation.

This research proposal intends to explore the post-implementation challenges of EMR adoption. The marriage between physicians and other end-users and those in the I.T. industry remains fractured as physicians across the country still have mixed perceptions about the effectiveness of adoption and whether or not a value-added benefit does exist. Such perceptions and realities associated with adoption continue to pose challenges as the full intended effects of the EMR mandate has yet to be realized.

BACKGROUND OF THE PROBLEM

Public policy in the U.S., Europe, and other parts of the world addresses reforms in the healthcare system. Such reforms include improving quality outcomes, patient safety, and cost containment. Despite the efforts from these industrialized nations, the overall results of these efforts have not been widely successful. Projects related to healthcare adoption increased as technologies have also experienced challenges. An estimated 50 – 80% of EMR projects failed despite tightly controlled trials (Cucciniello, Lapsley, Nasi, & Pagliari, 2015). Contributing factors to high failure rates include the degree of change within the organization post-adoption, end-user perceptions, and high costs associated with post-implementation within the affected organization (Cucciniello et al., 2015; Duncan, 2015).

EMRs are an innovative improvement to existing processes, and this innovation and ongoing implementation process will involve an attempt to address the barriers relating to health care quality, increasing costs, and decreasing medical errors. EMRs are difficult to define by conventional definitions as they rapidly evolve and have variability across clinical settings. The lack of conventional settings makes it more difficult for companies specializing in EMR software to develop a consistent platform which benefits all settings universally.

In 2009, President Obama pledged more than $50 billion for five years toward health IT and almost $20 billion in the 2009 economic stimulus package in the American Recovery and Reinvestment Act to assist providers making the initial push (Diana et al., 2014). With a significant number of deaths and medication errors attributed to human error, the legislation's primary goal was to improve quality of care outcomes universally. Additionally, another objective was to improve IT in an industry that was known as a slow adopter.

As part of the certification process, the ARRA included definitions of the criteria for meaningful use, which were as follows: (a) improve quality, safety, and efficiency, and reduce health disparities; (b) engage patients and families; (c) improve care
coordination; (d) improve population and public health; and (e) ensure adequate privacy, and security protections for personal health information (Friedman, Parrish, & Ross 2013; Murphy, 2011). The ARRA includes 14 core objectives for hospitals and 15 for providers (Friedman et al., 2013). If the providers and hospitals do not meet the meaningful use criteria, they faced financial penalties under the legislative act.

Significant inefficiencies and waste exist in the U.S. healthcare industry (Zhang et al., 2013), and costs in the U.S. healthcare industry are higher than industrialized countries with similar or better healthcare systems. The healthcare industry's significant inefficiencies include high costs, medical errors, and poor coordination of care. Health information is highly sensitive, which has resulted in regulatory issues and concerns about privacy and security (Patel et al., 2012).

HEALTHCARE DELIVERY SYSTEMS

Healthcare delivery systems are complex based on the numerous levels of interactions and framework. These complex frameworks feature fragmentation, high costs, and inefficiencies of scale and productivity. Collectively, healthcare systems lack focus on the value of innovative products, efficient facilitation of products and services, and disturbances within network integration. Examining healthcare delivery systems provide an opportunity for additional research by understanding the dimensions of healthcare, integration of healthcare, and further enhancing the speed and delivery of information exchange.

To develop an understanding of the healthcare model, the dimensions of the healthcare system needs an examination of six dimensions. The six dimensions were safety, effectiveness, patient-centeredness, timeliness, equity, and efficiency (Murphy, 2011). Information and the transfer of information are critical pieces involving health care delivery systems. In this study, health care delivery systems referred to the form of delivery for information by electronic and technological means.

Integration of healthcare is a complex phenomenon that encompasses two categories (Strandberg-Larsen & Krasnik, 2009). The first category encompasses health care as an entity that follows economic functionalities relating to financing with multiple providers. The second category encompasses coordination of activities for patient benefits that functions synchronously. Integrated healthcare is complicated because of difficulties measuring the effectiveness of integrated health care delivery, as the metrics are not well-defined (Strandberg-Larsen & Krasnik, 2009).

The speed and urgency in administering healthcare delivery affect physicians and their workload. Physicians indicated that more uniformity in workflows, improved efficiency, and improvement in the quality of care are noted motivators for EMR and IT adoption (Gagnon et al., 2014). An efficient flow of electronic communication helps enhance the transfer of information and helps physicians perform their duties more fluidly. Before the 2009 mandate, more physicians utilized paper-based methods to perform most workflow functions. Furthermore, the lack of a mandate such as the one issued in 2009 would likely limit effective electronic communication flow, as there were no direct incentives or penalties by recognizing adopting technologies.

Electronic medical records are a benefit for physicians in managing patient care. Looking up information, delivering results, and using electronic prescriptions are valued functions for EMR systems (Gagnon et al., 2014). Delays occur when clinical information is not readily available, along with systemic delays associated with prolonged processing time from physicians entering information (Coleman & Pon, 2013). The government mandate intended to ensure that access to clinical information, review of critical medical information, and lowering the probability of medical errors using acceptance of information technology adoption (Duncan, 2015).

THEORETICAL FRAMEWORK IN EMR ADOPTION

Research of EMR adoption before the 2009 mandate deadline included numerous quantitative methods to examine the relationship of EMR adoption and different variations of resistance. A review of the literature post-mandate revealed the use of some of the same theoretical framework to draw logical conclusions to the validity of the theory before implementation and to explore if any additional themes existed post-implementation. Depending on the scope of the study and the target population, the constructs of how the theories used varied.

The technology acceptance model (TAM) is one of the more commonly used theories in researching information technology and information systems. The focus of TAM is the behavioral intention to use a system affected by two beliefs: perceived usefulness and perceived ease of use. TAM has been used to examine computer behavior to determine causal relationships between user attitudes and the theoretical constructs.

The focus of perceived usefulness is how a person believes that use of a particular type of technology improves job performance. Perceived ease of use indicates that a person believes using a particular type of technology will be free of effort (Davis et al., 1989). Perceived usefulness is also a fundamental driver of user intentions; therefore, the influence changes over time with increased experience using the system (Davis et al., 1989).

Despite the frequency with which researchers have used TAM to study information systems and user influence, noted limitations exist (Cheung & Vogel, 2013). Reliance on this theory can result in several dysfunctional outcomes, including overlooking essential phenomena, ignoring IT artifact design and evaluation, identifying the full range of consequences of IT adoption with limited investigation, and limited usefulness in the evolution of the IT adoption context (Cheung & Vogel, 2013). As TAM does not account for personal and social influences, a reliance on TAM by itself results in a significant limitation for its intended result.

The theory of planned behavior (TPB) has been applied in studies on electronic records adoption. TPB assists in evaluating the positive or negative effect of technology use; perceptions and opinions of those affected by electronic records adoption; and perception of the skills, resources, and opportunities necessary for an individual involved in EMR adoption (Seeman & Gibson, 2009). TPB is a useful theory to use for EMR adoption due to its effectiveness in examining the other variables in adoption that does not exist under TAM and other TAM variations.

Research revealed that comparison TAM and TPB for observing medical practitioners (i.e., physicians, nurse practitioners, physician assistants) provided additional insight (Seeman & Gibson, 2009). Based on the complexity of the professional's workload, the high level of education, and working in highly stressful environments, Seeman and Gibson posited that TAM might not be useful. The authors conducted a review of TPB to determine if another theory could be more effective in developing an understanding of user acceptance. As such, the survey instrument included the TPB variables perceived behavioral control, perceived social influence, and attitudes toward EMR.

TAM's effectiveness derives concepts from social psychology, as well as testing individual end-users with the adaptive technology. TAM's effectiveness in other industries is still superior to the application in healthcare studies (Kim, Lee, Hwang, & Yoo, 2016). Some research on EMR adoption included the use of TPB and the Unified

Theory of Acceptance and Use of Technology (Duncan, 2015; Seeman & Gibson, 2009). Limitations of using technological theories are limited in scope as it does not note the causes related to the adoption process, as well as the post-implementation period (Duncan, 2015; Kim et al., 2016).

OPPORTUNITIES FOR ADDITIONAL RESEARCH

Despite the mandate's imposed deadline, 100% adoption did not occur. Adding to the complex challenges with EMR adoption includes the accuracy of the surveys conducted, the definition of an acceptable level of adoption, and the use of new technologies in a consistent fashion. As with any other major project that involves multiple stakeholders, end-user attitudes and perceptions may further complicate the intent of the original mandate to promote operational efficiency and drive down costs.

The installation costs associated with EMR adoption were high before the mandate (Duncan, 2015). One particular research opportunity should examine the long-term ancillary costs of implementation. For example, if a physician group invested a substantial amount towards installation-related costs, what are the long-term value-added benefits of using EMRs. Physicians may have more resistance in accepting the new technology if forced to continue to pay tens of thousands of dollars into additional consultations and system updates. If the costs continue to escalate managing an EMR system over an extended period up to seven years, would those costs be a deterrent for physicians to continually upgrading their existing framework? Despite the different iterations of TAM, additional research could include a combination of the diffusion of innovation or theory of reasonable action to address the deficiencies related to a research design exclusively focused on TAM. Such additional research should examine the psychological barriers post-adoption to understand how IS may improve feedback to overhaul, if necessary, the post-implementation, maintenance, and subsequent upgrades to operating systems.

Additional research is required to determine the causal factors of EMR adoption rates disparity between rural and metropolitan settings. According to the 2016 Census figures, approximately 60 million people representing 19.3 percent of the total population exist (Census, 2016). Despite a significant number of the population residing in rural areas, a significant gap exists concerning research related to EMR adoption and the causal relationship between adoption rates and improved healthcare quality outcomes. Based on the lack of depth of literature available, it is essential for industry professionals, academia, and scholar-practitioner to continue the examination of the factors related to adoption. Recent studies show adoption rates, on the practice-level, were higher in rural areas than urban locations (Whitacre, 2017). Such high adoption rates are attributable to the practical use of Regional Extension Centers (REC). These RECs, created by the Office of the National Coordinator, function by providing direct assistance to providers during the adoption process as mandated in 2009. A review of the efficiency of the RECs noted by Whitcare (2017) noted that adoption rates were proportionately higher when rural providers partnered with a REC. Thus, additional studies in rural regions could provide additional insight into the adoption disparity between the two population bases. Identifying the external factors of adoption in rural settings with fewer resources readily available may improve overall acceptance, along with a better understanding of technology adoption in healthcare settings.

CONCLUSION

The seminal work provided in the 2001 Institute of Medicine *To Err is Human* noted that the healthcare system was fragmented and a lack of significant policy and technological efforts would not address core problems within the framework of U.S. healthcare. With a significant number of injuries and deaths attributed to medical errors, prescription errors, and other related causes due to human error, a nod towards improved technological integration in healthcare delivery systems gained momentum. Changes were necessary to determine ways to overcome the obstacles within the healthcare industry.

In 2009, President Obama signed the American Reinvestment and Recovery Act as an effort to accelerate adoption of information technology. Unlike other industries domestic and globally, I.T. utilization is not as significant as desired. The slow adoption rates were believed to contribute as a critical element to escalating healthcare costs. The legislation intended to improve adoption rates, decrease medical-related errors, and improve quality of care outcomes.

It is imperative for the healthcare industry and the overall health of the U.S. economy that information technology continues to work with end-users and other identified stakeholders. Although adoption rates improved due to

ARRA, there still exists significant resistance to change and perceptions related to IT integration in healthcare. Costs still exist as an ongoing concern for physician groups and smaller practice groups who may not be able to sustain the financial costs incurred with additional software updates without capability. Work efficiency may not also be improved despite the integration of technology into the healthcare framework.

As with other industries, technology and information systems will render obsolete over time. Thus, the theories used in research before the adoption rates are suitable for additional research to understand any additional barriers towards adoption that may exist. Theories such as TPB, TAM, and UTAUT have commonly used theories used in IT research. Although these theories provide significant value to the topic of adoption of new technologies, a subsequent theory or identifying a new population can help address significant gaps of research and lack of literature in the topic of healthcare IT adoption.

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