Transformational Leadership and Physician Acceptance of Computerized physician order entry systems and Electronic Medical Records and the role of Chief Medical Information Officers in the United States

Paul A Markham MBA (Merit)

Submitted for the degree of Doctor of Business Administration

March 2012
STATEMENT OF ORIGINALITY
This dissertation contains no material which has been accepted for the award of any other
degree or diploma in any university or other tertiary institution and, to the best of my
knowledge and belief, contains no material previously published or written by another
person, except where due reference has been made in the text. I give consent to this copy of
my thesis, when deposited in the University Library, made available for loan and
photocopying subject to the provisions of the Copyright Act 1968.

______________________

Paul Anthony Markham
ACKNOWLEDGEMENTS

A DBA Dissertation is a somewhat solitary undertaking fraught with obstacles and unexpected events combined with complex logical factors. Though the central task is individualistic, throughout the various phases of study other parties such as my wife and three children provided vital support and encouragement.

This dissertation is dedicated to my wife and children in the hope the resultant findings will in turn assist healthcare in general and thereby enrich their lives in the future. I offer my sincere thanks to my patient supervisor, Dr Antony Drew for his unique personality in conjunction with assertive encouragement and extensive experiential knowledge of business and academia.

In conclusion, I offer my sincere thanks to my family, and the chief information officer’s respondents and their assistants for their involvement. Without their contributions, insights, and at times complex logistics management, this dissertation would not have been possible.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE PAGE</td>
<td>i</td>
</tr>
<tr>
<td>STATEMENT OF ORIGINAL AUTHORSHIP</td>
<td>ii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>iv</td>
</tr>
<tr>
<td>SYNOPSIS</td>
<td>ix</td>
</tr>
</tbody>
</table>

## CHAPTER 1 - INTRODUCTION

1.0 Background to the research                                           1
1.1 Focus of this research                                               5
1.2 Justification for the research                                       8
   1.2.1 The third largest killer of US citizens in 2008                  9
   1.2.2 Transformational leadership within the physician community       9
   1.2.3 The lack of a comprehensive theoretical framework               10
   1.2.4 Increasing medical information access to all US citizens         11
   1.2.5 National benefits afforded by savings in the healthcare budget   11
   1.2.6 A need to improve clinical productivity and outcomes             12
1.3 Methodology                                                          12
   1.3.1 Research strategy                                               13
   1.3.2 Sample size and data collection strategy                         14
1.4 Dissertation outline                                                 14
1.5 Definitions                                                          15
1.6 Boundaries and delimitations of scope                                19
1.7 Conclusion                                                           21

## CHAPTER 2 - LITERATURE REVIEW

2.0 Introduction                                                         22
2.1 Leadership 24
2.2 Defining Transformational Leadership 24
2.2 The evolution of parent theories / classification models 25
2.3 Leadership and technology adoption in the USA physician community 27
2.4 Leadership and the role of the Chief Medical Information Officer 36
2.5 Theoretical framework 38

CHAPTER 3 - METHODOLOGY AND RESEARCH DESIGN 40
3.0 Introduction 40
3.1 Research philosophy 40
3.2 The interpretive social science paradigm 41
3.3 Alternative research methods in qualitative research 42
  3.3.1 Case study 43
  3.3.2 Grounded theory and substantive theory 43
  3.3.3 Focus group, survey, observation and interviews 43
  3.3.4 Focus groups 44
  3.3.5 Participation observation 44
  3.3.6 Face to face interviews 44
  3.3.7 Survey 45
3.4 Research implementation 45
  3.4.1 Sampling methods 45
  3.4.2 Respondents selection 47
  3.4.3 Interview protocol and process 47
  3.4.4 Pilot study 49
3.5 Reliability and validity 50
  3.5.1 Credibility 51
  3.5.2 Confirmability 52
  3.5.3 Dependability 53
  3.5.4 Transferability 53
  3.5.5 Triangulation 54
3.6 Limitations of research 54
CHAPTER 4 - ANALYSIS OF TRANSFORMATIONAL LEADERSHIP

4.0 Introduction 57
4.1 Demographic information 57
  4.1.1 Organisational uniqueness 59
4.2 Development of classification of codes 60
4.3 Nomenclature 65
4.4 Analysis 66
  4.4.1 Importance of idealized behaviour 66
  4.4.2 Importance of inspirational motivation 70
  4.4.3 Importance of individualized consideration 71
  4.4.4 Importance of intellectual stimulation 75
  4.4.5 Importance of ethics 77
  4.4.6 Importance of trust 78
  4.4.7 Analysis of impact of organizational uniqueness 78
  4.4.8 Analysis of the impact of leadership controversy 81
  4.4.9 Analysis of the quantitative capstone survey 81
4.5 Conclusion 83

CHAPTER 5 - DISCUSSION AND EXPLORATORY OUTCOMES

5.0 Introduction 84
5.1 The four pillars of transformational leadership 85
  5.1.1 Findings on idealized behaviour 85
  5.1.2 Findings on individualised consideration 86
  5.1.3 Findings on inspirational motivation 88
  5.1.4 Findings on intellectual stimulation 90
  5.1.5 The mediating role of trust 91
5.2 Variations in the findings by demographics 92
5.2.1 Gender 92
5.2.2 Region 93
5.2.3 Ethnicity 93
5.2.4 Educational background 94
5.3 Additional findings from analysis 94
5.3.1 Importance of ethics 95
5.3.2 Organisational uniqueness 96
5.3.3 The growing leadership controversy in the physician community 96
5.4 Implications for policy and practice 97
5.5 Implications for further research 98
5.6 Limitations of the study 99
5.7 Summary 100

Reference list 103

Appendices
Appendix A Interview protocol 120
Appendix B Ethical clearance approval 124
Appendix C Participant Information Statement sent to respondents 126
Appendix D Participant Consent form 131

List of figures
Figure 2.1 Factors contributing to information technology adoption 36
Figure 2.2 Simple diagrammatic representation of the I-P-O model 38
Figure 2.3 The theoretical framework developed for this research 39
Figure 4.1 Organizational uniqueness 60
Figure 4.2 Themes and nodes based on the theoretical framework 62
Figure 4.3 Graphical review and linkage of theoretical framework 63
Figure 4.4 CMIO clinical heritage percentages 69
List of Tables

Table 1.1 Summary of objectives of criteria for defining meaningful use 17
Table 2.1 Major reported causes of death factors in the USA in 2010 29
Table 3.1 Quantitative/qualitative comparative table 52
Table 4.1 Research environments and types of facilities 58
Table 4.2 Respondent demographics 59
Table 4.3 Interrelationship between questions and variables 64
Table 4.4 Nomenclature scale table 66
Table 4.5 Questions related to idealized behaviour 67
Table 4.6 Questions related to inspirational motivation 70
Table 4.7 Questions related to individualized consideration themes 72
Table 4.8 Questions related to intellectual stimulation 75
Table 4.9 Questions related to trust 78
Table 4.10 Uniqueness effect on physician adoption table 80
Table 4.11 Question related to the physician leadership controversy table 81
Table 4.12 Results of the quantitative survey table 82
Table 4.13 Compilation of qualitative and quantitative results table 83
Synopsis

Researchers, industry analysts and the broader medical fraternity generally agree that physician adoption of healthcare technology is vital to the advancement of healthcare outcomes and cost effectiveness. Accordingly, there is a vast body of research into technology design, implementation process methodology, total cost of ownership and many other technical factors. However, there is minimal research into the humanistic socio-medical components such as leadership, particularly transformational leadership. In general ‘leadership is one of the most observed and least understood phenomena on earth’ (Burns, 1978). The entrenched rigid hierarchical structure of the medical fraternity sets forth legitimized power and authoritative leadership by decree to the members of this complex web. This research has a focus on the efficacy of transformational leadership mediated by trust in relation to the adoption of electronic medical record technology. The purpose of this research is twofold. First, it examines the perceptions of transformational leadership by senior management in healthcare. Secondly, it explores if and how the practice of transformational leadership, mediated by trust, improves the adoption of electronic medical recording equipment by the physician community.

This dissertation presents a review beginning with parent, intermediate and specific literature of transformational leadership, across a range of organizations and industries in various stages of development. The chapter then identifies gaps in the extant literature and develops a theoretical framework to guide the research and close the gaps.

This research adopts a principally interpretive social science methodology. It involves a mixed-methods approach incorporating semi-structured interview protocol, augmented by a quantitative capstone survey. The research setting was across five geographic regions of the United States of America. The respondents were Chief Information Officers (CIO) of major teaching hospitals and large central hospitals, integrated delivery networks and single facility institutions. The transcripts from the interviews were analysed using NVivo 9 and Microsoft Excel to identify patterns and themes in the responses.

**Keywords:** transformational leadership; transactional leadership; physician adoption; electronic medical records; trust.
Change management within the physician community is vital to healthcare outcomes as vividly portrayed in pioneer leadership research in nursing, where ‘the transformational leader will be the catalyst for expanding a holistic perspective, empowering nursing personnel at all levels and maximizing use of technology in the movement beyond even patient centered health to patient directed health outcomes’ (Trofino, 1995 p.1).

CHAPTER 1 - INTRODUCTION

1.0 Background to the research
With 225,000 incidents per annum, iatrogenic or doctor induced death, is the third leading cause of death in the United States of America behind heart disease and cancer (Starfield, 2000). Doctor induced death is specifically due to errors caused by lack of information. This is stark contradiction to the posited beneficence concept of healthcare (Weimar, 2009). Furthermore the Hippocratic Oath, solemnly sworn by physicians, requires them to adopt all measures necessary to preserve human life, while avoiding overtreatment (AMA, 2010; Lasagna, 1964; Keränen, 2001, Rudnick, 2010). Yet, in 2012 the adoption rate of electronic medical information systems was still abysmally low. Adoption of such digital healthcare technology systems seeks to reduce medical errors and overtreatment, resulting in improved patient care, outcomes and productivity, therefore reducing the total cost of healthcare. Physician resistance to the acceptance of computerized physician order entry systems and electronic medical records is in essence a vivid example of the hypocrisy of the often-cited Hippocratic Oath.

Research into follower perceptions of the efficacy of transformational leadership is prevalent in a number of fields, such as tertiary educational (Founder, 1990); student perceptions (Rowold, 2006, 2008; Rowold & Rohmann, 2009); and transformational versus transactional leadership style in the clergy, martial arts and voluntary work. Bartone, Snook and Tremble, (2002) evaluated transformational leadership in the military, testing the transformational leadership efficacy of West Point graduates and deemed transformational leadership as a necessary aspect of the leader’s performance portfolio. However, there is a paucity of specific research into transformational leadership efficacy within the physician community and in particular in relation to the adoption of technology.
Therefore, this research critically analyses how transformational leadership may improve physician adoption rates of digital healthcare information technologies in the United States of America (USA). Specifically, it examines the impact transformational leadership has on the adoption of computerized physician order entry systems (CPOE) and electronic medical records (EMR) systems, a critical topic in healthcare management in the USA today Poon et al., (2006). At this juncture the reader should understand the computerized physician order entry system is the entry point and integral to the greater electronic medical record system. CPOE is the synonymous to an ATM is to the banking system and thereby to the physicians is the point of resistance to adoption, prior to even attempting the operation of input of clinical history and physician or the results into the Electronic Medical Record system. For the purpose of this paper the two may be used interchangeably because without CPOE the EMR is less than optimal. In the minds of sceptical physician community computerized physician order entry systems and electronic medical records are perceived as posing a threat to their clinical autonomy and a veritable big brother tracking their work as described by Walter and Lopez, (2008). Furthermore such digital technologies are perceived as a destabilizing factor to existing formal authority and power structures Morton and Wiedenbeck, (2009). This matter becomes further complicated by a complex matrix of human and organizational factors often hindering or accelerating the adoption of digital electronic or personal records (Farrell & Robbins, 1993).

This dissertation explores the construct of transformational leadership in conjunction with the mediating effect of trust. It investigates how both factors might influence physician adoption rates of technology (Bernstein, McCreless, & Côté, 2007). Unlike business sectors such as finance, banking, retail and manufacturing, integrated digital information systems are either infantile or non-existent in the healthcare realm (Gordon et al., 2009).

Kubick, (2009) demonstrates that the advent of the integrated computerized physician order entry systems and electronic medical records has the ability to reduce error and uncertainty therefore improving outcomes for all citizens, now and in the future. This research explores how the leadership style of Chief Medical Information Officers (CMIOs) might increase the adoption of computerized physician order entry systems and electronic
medical records by the physician community and thereby offer findings that may be of
merit to medicine and society as a whole.

This research adopts a mixed methods research methodology. This approach is not
uncommon to healthcare information technology professionals or physicians. The
philosophical platforms of both professions are steeped in positivist research, with vast
exposure to the qualitative interpretive research. The medical fraternity is accustomed to
compliance with qualitative and quantitative progressive research processes and resultant
clinical certification policies (Chou et al., 2004).

Integrated computerized physician order entry systems and electronic medical records
coalesce disparate and siloed clinical information data sources into a single relational
database. Integrated data allows for more information in a timely manner, thereby
improving decision support and overall clinical outcomes. Therefore any factor that assists
in improving the rate of physician acceptance of such technology should result in faster,
more accurate decisions. The ability to incorporate decision support or predictive
indicators, resident in digital healthcare systems, could potentially lead to a reduction in
medical errors across the board (Seeman & Gibson, 2009).

Regardless whether individual physicians have a dictatorial or benevolent manner,
leadership amongst the physician fraternity is assumed based upon the codified formalized
hierarchical structure in existence (Rogoski, 2009). Due to historical aspects, such as
superior tertiary entrance ranks and the halo effect, society bestows formal authority and
responsibility upon physicians. As one would expect, this creates an innate sense of societal
superiority, even prior to taking the Hippocratic Oath. Therefore, all physicians, by decree,
gain a specific location in society with the complex rigid medical fraternity hierarchy, upon
taking of the oath. The purpose of this dissertation is to better understand leadership in the
physician community and build on previous seminal transformational leadership research
by Bass (1985), as a means to reduce resistance to digital technology (Anol & Neset, 2007)
within the healthcare industry.

The central reactive philosophical stance in healthcare, views the patient as a machine
Kriel, (2003) and in line with the mechanistic ethos, technology is sought to potentially
provide the ultimate answer to the enhancement of clinical outcomes (Barling, Slater, &
Kelloway, 2000). However, though there are enormous potential tangible outcomes
possible, by implementing computerized physician order entry systems and electronic medical records, technology excellence and semantic interoperability alone will not singularly solve the physician resistance challenge. Even given the advent of state of the art technology integration, low adoption rates of computerized physician order entry systems (CPOE) and electronic medical record systems (EMR) are still widely reported (Adler & Karlsberg, 2011; Ash & Bates, 2005; Bernstein, et al., 2007).

This dissertation posits that human management skills are also required to improve the adoption of technology, rather than technological excellence alone and concur with Kaplan, Harris and Salamone (2009) that ‘most failures are failures to properly apply managerial wisdom that has been substantiated by research and experience’.

Traditionally, leadership in the physician community is transactional in nature and based on formal hierarchical credentials, strongly underpinned by a decreed zero tolerance approach to mistakes. Although the Hippocratic Oath clearly states ‘do no harm to patients’ (Lasagna, 1964), given the litigious nature of United States Healthcare, the medical profession believes computerized physician order entry systems and electronic medical records and associated data tracking, may bring forth the threat of unnecessary malpractice lawsuits. These fears, real or perceived, are impeding efforts to improve health care delivery and proposed quality of care improvements.

The threat of lawsuits due to data transparency may also encourage medical practitioners-providers to hide their mistakes. Research into transformational leadership in the medical practitioner arena is scant, contrary to the related medical field of nursing. Transformational humanistic leadership efficacy research in nursing has become more prevalent over the past decade (Al-Mailam, 2004; Bamford-Wade and Moss, 2010; Bowles & Bowles, 2000; Robles & Karnas, 2007; Stordeur, D'Hoore, & Vandenberghe, 2001).

Furthermore, in recent years, legal compliance requirements driven by the US Government, American Recovery and Reinvestment Act (ARRA, 2009) have set forth milestones for the mandatory use of computerized physician order entry systems and electronic medical records in a meaningful manner by physicians across the USA. These legal requirements provide rewards for compliance in the usage and sharing of digital patient data, while applying penalties for the non-compliant healthcare providers. These regulatory mandates further exemplify the need for research into the human factor, given
the current lack of adoption of technology in the physician community (Adler & Karlsberg, 2011; Ash & Bates, 2005). The nursing community research suggests that subordinates are more likely to adopt new technologies under a transformational leader; specifically highlighting the positive correlation when the leader is one the subordinates trust (Fuller, et al., 1999; Silver, 2004). Therefore, this research builds on previous work, by critically analysing how transformational leadership may improve physician adoption rates of digital healthcare information technologies. Specifically it examines the impact transformational leadership has on the adoption of emerging digital technology, such as computerized physician order entry systems (CPOE) and electronic medical records (EMR) systems, currently a critical topic in healthcare management in the USA (Poon, et al., 2006).

Electronic Medical records definitely do present unintended consequences in the minds of the sceptical physician community, by posing a threat to their autonomy Walter and Lopez, (2008) whilst also potentially destabilizing existing formal authority and power structures (Morton & Wiedenbeck, 2009). This is further complicated by a complex matrix of non-leadership human and organizational factors that can hinder or accelerate the adoption of electronic or personal records (Farrell & Robbins, 1993). This dissertation explores whether or not transformational leadership in conjunction with trust, has a tangible positive effect on the adoption rate of technology by physicians and builds on Bernstein, et al., (2007) who stated that leadership was one of five constants in the adoption of information technology in healthcare. The central research question in this study or dissertation is whether and to what extent, a transformational style of leadership, mediated by trust, increases physician adoption and acceptance of digital technology.

1.1 Focus of this research
This dissertation seeks to examine and assess the effect of transformational leadership in the adoption of technology in the physician community. This study also seeks to assess and review what role human factors such as leadership, may play in the current controversy and relative to low physician adoptions rates of computerized entry order (CPOE) and electronic medical records (EMR) in the USA, highlighted by Ash and Bates (2005). It builds on previous leadership research and develops a clearly defined theoretical framework to guide the analysis of physician adoption of technology in the context of
transformational leadership mediated by trust. As such, the following research problem is broadly presented at the outset, prior to a discussion of the research methods and analysis so it does not impose pre-emptive methodological assumptions on the reader (Perry, 1996).

**How does transformational leadership behaviour in Chief Medical Information Officers influence the adoption rate and acceptance of Electronic Medical Recording devices by physicians, when mediated by trust?**

The goal of the present study is threefold. First, to draw on earlier transformational leadership research in nursing, for example Bamford-Wade, & Moss, 2010) and apply the same concepts to examine the underlying effect and influence of transformational leadership when used by CMIOs and their physician followers. Secondly, to explore to what extent physician acceptance of computerized physician order entry systems and electronic medical records is driven by psychological empowerment (Fuller, et al., 1999) rather than by their technical adeptness alone. Thirdly, the research explores the mediating role of trust; that is from the multi-dimensional model of trust in healthcare presented by Egede and Ellis, (2008). This approach should provide insights into the specific trust physicians have in their CMIO and the relationship between transformational leadership, trust and technology acceptance.

The purpose of this research is equally twofold. First, this research elicits a distinct theoretical framework for this study and evaluates its suitability for guiding further empirical research into transformational leadership in medicine. The framework explores how attributes of transformational leadership; Individualized Consideration; Intellectual Stimulation; Inspirational Motivation and; Idealized Influence (Barbuto, 1997; Barling, et al., 2000b), in CMIOs and how such traits relate to physician acceptance of computerized physician order entry systems and electronic medical records systems. Secondly, to explore if transformational leadership management style training should be part of the general hiring and induction process of CMIOs and subsequently inform academics, payers, providers, vendor business people and policy makers of the findings.

A vast body of general leadership literature has been developed, since the initial work on transactional and transforming leadership was pioneered by Burns (1978). This early
transformational leadership research was later adapted for healthcare in a study, monitoring healthcare outcomes as related to transformational leadership (Davidson, et al., 2002). Then a number of researchers built on this work to investigate transformational leadership training in order to improve clinical healthcare management in nursing. Menaker and Bahn, (2008), investigated perceived physician behaviour and physician satisfaction on IT system acceptance and although this research evidenced the importance of leadership, no specific attention was given to the effect of transformational leadership on technology adoption within the physician community.

Many aspects of healthcare are well suited to transactional leadership based on the transactional nature of the realm, the hierarchical organizational structures, stringent positivist scientific research and detailed medical policies and procedures. However, some researchers now argue the need to encourage a more transformational style, if technology adoption rates are to improve Bernstein, et al., (2007). Effective clinical leadership as an aid to the adoption of emerging information technology systems has recently attracted increased scholarly attention, given government mandates such as the American Reinvestment and Recovery Act (ARRA, 2009). The intention of this legislation is to encourage the meaningful use of technology to assist in improving the comparative poor healthcare outcomes in the USA (Beiter, Sorscher, Henderson, & Talen, 2008).

Transformational leadership, in the specific physician centric arena has seen some broad quantitative analysis; however there is a distinct lack of research from a qualitative interpretative humanistic perspective. The laser focus on physicians and their slow adoption rates of computerized physician order entry systems (CPOE) and electronic medical record systems (EMR) now fuels the impetus for research in this area and several studies (for example (Ward et al. 2006) have touched on the human factor in leadership, but not specifically transformational leadership.

This study specifically explores the effect of transformational leadership, mediated by trust on improving physician adoption of digital technology and probes the proposition that the foundation stone of healthcare - the Hippocratic Oath - is being ignored, in as much as digital technology can assist in patient care (Cohn, 2006). Should transformation leadership improve physician acceptance of IT systems, patient outcomes will be vastly improved. As a consequence, the USA would experience a reduction in the cost of healthcare by
decreasing duplication of testing, overtreatment plus see a lowering of co-morbidity rates, due to iatrogenic or doctor induced deaths.

In summary, this dissertation makes six contributions. First, it defines what constitutes transformational leadership within the medical fraternity. Secondly, it clarifies the role leadership takes in the medical fraternity. Thirdly, it identifies that transformational leadership perceptions vary by demographics, psychographics and regional variations. Fourthly, it presents an evaluation of the use and efficacy of transformational leadership and a clarification of its relevance in the emerging role of CMIO in the USA, with possible applicability to similar healthcare systems globally. Fifthly, it examines the relevance and impact that the currently controversial topic, of the emerging physician executive movement. Whereby medical practitioners become chief executives in place of incumbent engineering, science or business professionals and what impact, if any this has on the transformational leadership in healthcare. Finally, it presents empirical evidence as to the suitability of the adapted theoretical framework developed for this study, as a mechanism for guiding future analysis of Computerized physician order entry systems (CPOE) and Electronic Medical Record (EMR) adoption in the context of the United States of America.

1.2 Justification for the research
Six interrelated factors are presented as justification for this research.

1. Whilst not commonly known, iatrogenic (doctor induced) death was the third largest killer of US Citizens in 2008 (Starfield, 2008) with a startling 225,000 fatalities. This overwhelming statistic rates iatrogenic death just behind heart disease and cancer as a cause of death. Key components of iatrogenic death are medical errors and lack of timely accurate information access, due to mainly paper-based systems (HHS, 2008).

2. The importance of understanding the transformational leadership construct within the highly transactional healthcare arena.

3. The lack of a comprehensive theoretical framework for analyzing transformational leadership as it applies to physician centric situations.

4. Increased access to high quality healthcare for all US Citizens.

6. A need to improve clinical productivity and outcomes leading to best patient care in accordance with the Hippocratic Oath.

Each of these factors is discussed in detail below.

1.2.1 The Importance of understanding transformational leadership

There are direct linkages between low adoption rates of electronic technology and mortality rates, medical errors and poor access to information. This position is a driving force behind the advent of government regulation to drive technology implementation (ARRA, 2009). This legislation has aggressive milestones, requiring the adoption of computerized physician order entry systems and electronic medical records by all 760,000 physicians across the USA by 2015. Combined, these factors present a clear mandate for current and further research into this disconcerting topic. The current government imperatives advocate meaningful use of patient data, compelling physicians to employ group leadership skills to inspire a shared vision, rather than the traditional individualistic culture of the medical profession. This courageous edict seeks to facilitate consensus amongst the physician fraternity, easing the transition to integrated systems, even though physician leaders are ‘accustomed to operating as captain of the ship’ (Farrell & Robbins, 1993).

Whilst Morton and Wiedenbeck (2009), constructed an E.H.R adoption predictability framework, scant research has been conducted into human drivers and the associated effect transformational leadership may have on the adoption rate of technology as called for by Simon, Rundall, and Shortell, (2005). Consequently, empirical exploratory research, using a suitable theoretical framework to analyze transformational leadership in the physician fraternity, could make a valuable contribution to community, business and government in the USA and potentially in other countries as well.

1.2.2 The importance of understanding the transformational leadership construct within the physician community in healthcare

Due to the complex nature of healthcare, two major factors, misreporting and conflicting reports of adoption rate statistics mar historical research into physician adoption of
technology. The reports are often biased by the self-interest of the manager reporting; fear of government compliance retribution, or inadequate methods defining actual physician acceptance of technology. In some cases, technology installation alone has been incorrectly passed-off as physician adoption or acceptance.

Nationally, there has been a single-minded focus on technology as the panacea to the challenging physician acceptance problem, rather than researching the human factor, whereby physicians often resist technology based on psychological or egotistical standpoints (Wakefield et al., 2007). Consequently, it is important that policy makers such as the Office of National Coordinator Healthcare Information Technology (ONCHIT), become aware of the possible benefits transformational leadership can provide in relation to faster adoption of computerized physician order entry systems and electronic medical records, rather than resting on the laurels of technological panacea (Adler & Karlsberg, 2011; Lukas et al., 2007).

1.2.3 The lack of a comprehensive theoretical framework for analyzing transformational leadership as it applies to physician centric situations

Although some scholars (Bowles & Bowles, 2000; Bromley & Kirschner-Bromley, 2007) have researched transformational leadership in healthcare from a nursing standpoint and have found some linkages between transformational leadership efficacy and outcomes, similar research into the physician community has remained absent. Therefore the gap remains. Furthermore, research to identify a relationship between transformational leadership, mediated by trust in the physician community, is also lacking. Consequently, the development of a specific theoretical framework that incorporates trust, as a potentially important mediating variable, is extremely important. This research builds an augmented theoretical framework, using well-researched tenets of transformational leadership as independent variables, but also adds the mediating variable of trust, to explore the real world human factor in relation to adoption of commercial IT systems as suggested by Protti, Bowden, and Johansen (2008a).
1.2.4 Increasing medical information access to healthcare by all US citizens
For decades, various US Administrations have unsuccessfullly attempted to grapple with a failing healthcare system, hampered by spiralling healthcare costs, coupled with a large percentage of uninsured citizens. Currently the USA is the only western economy that does not have a universal healthcare system. Over several decades both sides of the house, sought similar technological transformations in healthcare, based on a replication of electronic supply chain methodologies in other industries, but have underestimated differences in the healthcare realm. There was a belief that perceived technological excellence would simply bypass physician resistance and therefore all forces stood behind technology as the solution. ‘[w]e've got 21st century medical practices, but 19th century paperwork system...medical electronic records is going to be one of the great innovations in medicine’ (Bush, 2005) and ‘[o]ur recovery plan will invest in electronic health records and new technology that will reduce errors, bring down costs, ensure privacy, and save lives’ (Obama, 2009).

1.2.5 National benefits afforded by savings in the healthcare budget
Currently the USA spends 15.9 percent of Gross Domestic Product (GDP) on healthcare, compared to an average of eight percent in all OECD nations (OECD, 2009). This factor, coupled with comparatively lower than average life expectancy and a higher infant mortality rates, suggest all efforts to improve healthcare in the USA must be sought as a high priority. In acknowledgement of the dire health situation, the US Federal Government released US$49B of stimulus funds as part of the American Reinvestment and Recovery Act, (ARRA, 2009) focused at building a comprehensive an integrated digital healthcare information technology network ecosystem. The funds specifically target physicians’ meaningful use of electronic patient information systems across the nation. This government initiative was deployed in the hope of invigorating the adoption and acceptance of health information technologies, thereby leading to improved outcomes in healthcare for United States Citizens, based on improved, timelier holistic information for physicians and clinicians alike.

From a healthcare provider standpoint, each individual physician will be paid $44,000 over a four-year period, for showing meaningful use of digital information. The
government anticipated this fiscal payment would assist in driving technology adoption, starting in 2011 ending in 2015. However, even given the lure of financial incentives, the adoption rates have been abysmal. Local and State governments have also begun to enact over forty local or state-based health information exchanges (HIE) in an effort to kick-start the interaction of health information across the country, also with negligible effect, since the first draft enactment of the ARRA in 2007. The industry watchdog and customer advocate, KLAS, (acronym not specific, based on founders family initials Kent, Leonard, Adam, Scott), reported ‘don’t believe the hype’ with regards to statistics stating great improvements in adoption and technological interoperability (Hess & O’Neal, 2010). As a consequence, it is paramount that the healthcare payers, providers, government, business and the community succinctly understand the merits of any measures that will drive physician adoption of technology. Ignoring the possible effects leadership style brings may limit the ability to engage in appropriate and successful implementation of computerized physician order entry systems and electronic medical records.

1.2.6 A need to improve clinical productivity and outcomes in accordance with the Hippocratic Oath

Initially, physicians were encouraged to change from existing paper charting systems to electronic computerized physician order entry systems (CPOE) and electronic medical record (EMR) systems by technology experts, employed by the office of the Chief Information Officer (CIO) in their respective hospitals. This technologist driven transition was fraught with difficulties because the physicians had no reason to follow directives or suggestions given by technical staff. Physicians have specific hierarchical medical policy edicts they follow and technical staff has no authority over physicians, therefore the results were limited. Consequently, the CIOs and executive committees created the role of Chief Medical Information Officer (CMIO), in the hope that the greater physician community would react favourably to a likeminded and credentialed individual, inasmuch as they were both MDs. The major difference between the CMIO and the general physician is the master’s level degree in technical training that the CMIO brings to the situation. This allows him or her to act as an intermediary between physicians and the office of the CIO (Shaffer & Lovelock, 2010). It was anticipated that the implementation of the CMIO role
would improve healthcare technology adoption and thereby lead to timely access to medical information and decision support tools, incrementally effect clinical practice, changing the current reactive philosophical ethos towards a proactive predictive stance and thus deliver enormous societal beneficence (Vartak, Crandall, Brokel, Wakefield & Ward, 2009b).

1.3 Methodology
The researcher recognizes that in order to increase the probability of constructive valid findings, a pluralistic approach to research is required, drawing on whichever philosophical approach or theoretical perspective best suits the objectives of study. This may encompass results in an interpretative phenomenological philosophy mixed with combinations of radical humanist or positivist philosophy. The study employs a mixed method approach, although predominantly interpretative, with a positivist quantitative capstone survey to for triangulation purposes (Morgan, 2007).

The medical profession is scientific by nature and philosophically grounded in quantitative analysis with a bias or mild cynicism towards qualitative methodologies (Cutcliffe & Goward, 2000). Therefore a pragmatic design was selected using a checklist rigor to improve data validity and reliability of qualitative techniques (Barbour, 2007).

The method for analysing the qualitative data is based on the framework developed by Ritchie and Spence (1994) and involves a detailed cross concept analysis while actually preserving the individual verbatim narrative. To enable a comprehensive review of the results and enhance objectivity, the interviews were digitally recorded and transcribed.

The research methodology selected, links directly to the theoretical framework developed, in light of research gaps identified in Chapter 2.

1.3.1 Research strategy
Brannen, (1992) suggests pragmatic considerations should be taken into account in regard to a healthcare research strategy. In the case of this study, a mixed method approach was adopted, given the practical nature, complex environment and various causal effects of electronic medical records acceptance. Clearly, a mandatory requirement for the production of any research is that it is highly ethical, credible, and reliable. This is arguably even more important, given the positivist tradition of the medical profession, although it is important
to point out that even though healthcare is steeped in the positivist traditions of scientific research, qualitative interviews, surveys and focus groups are becoming more commonplace (Roberts et al., 2010; Vartak, Crandall, Brokel, Wakefield, & Ward, 2009a; Xirasagar, 2008).

1.3.2 Sample size and data collection strategy
This research comprised of a singular data collection strategy using semi-structured open-ended questions to gain deeper interpretive understanding of perceptions. This qualitative method was coupled with a short Likert scale quantitative questionnaire based upon a shortened multi factor leadership survey (MLQ) to testing current and desired states and to enhance (Hartog, Van Muijen, & Koopman, 1997). In each case, the open-ended questions preceded the questionnaire. According to Avolio and Bass, (1999) this method is best used when respondents are afforded time to prepare ahead of the interview and it likely that the researcher may only have one opportunity to interact with the respondent, which the researcher understood. The interviews were conducted on a one-on-one basis between researcher and each respondent with the average time taken for each interview, 60 minutes. To minimize the known attention bias in respondents, who are time conscious to the extreme, the interviews were explained and cast as a well-organized ‘conversation with a purpose’ (Gibson, 1998).

The sample consisted of 20 CIOs from large privately held academic medical institutions, integrated delivery network (IDN) central hub hospitals and large single facility hospitals, across five regions of the United States. CIOs were deemed the most appropriate people to interview in relation to gaining accurate data related to the leadership style of the CMIOs, as they are their direct superiors. The transcripts of the interviews content was analysed using NVivo 9 and Microsoft Excel. Chapter 4 of this dissertation presents the analysis and Chapter 5 presents the findings and conclusions of the analysis.

1.4 Dissertation outline
Chapter 1 introduces the overarching research problem, explains and justifies the importance of conducting this research and the necessity to do so using a well-developed theoretical framework. The chapter also provides an outline of the complex challenges
faced by the various stakeholders in healthcare, as they endeavor to drive physician technology acceptance in the USA.

Chapter 2 presents a review and synthesis of literature from a range of leadership fields and suggests that in addition to the four pillars of transformational leadership, variables including trust, ethics and organizational uniqueness need to be included in this study. Chapter 2 concludes by proposing a comprehensive theoretical framework for analysing transformational leadership, based on the focused literature. It further suggests that the theoretical framework be used as a mechanism for developing interview protocol questions to investigate the overarching research question in an empirical setting.

Chapter 3 delineates the research methodology and research design implemented for this study. The chapter opens with a discussion of the background to the philosophical orientation of the research. Secondly, it discusses the rationale for the social science paradigm adopted. It then argues for the research method adopted, before delineating the actual research design and implementation. Finally, the chapter concludes with an examination of validity issues, limitations and ethical issues pertinent to this research.

Chapter 4 discusses the overall analysis, analytical techniques and results of data obtained from adopting the research design, methodology and strategies identified in Chapter 3. Whilst this study addresses one major research question, the interview protocol developed, resulted in a number of unexpected key themes emerging. These are also discussed in Chapter 4 and Chapter 5.

Chapter 5 explains and discusses the findings drawn from the empirical analysis in Chapter 4 and the literature review in Chapter 2 and draws conclusions from these findings. This chapter also discusses implications of the findings for theory and practice, the limitations of this research and implications for future research.

1.5 Definitions
In a specific emerging research area it is critical to define key terms to aid respondents along the research journey (Lundberg, 2003) because confusion over meaning, may render the merit of research futile (Cooper & Emory, 1995). Furthermore a lack of definition of terms in the qualitative interpretative domain can impinge the ability to receive meaningful
responses and consequently findings (Burford et al., 2009). To provide clarity for the reader, the core definitions used in this research are discussed below.

**Acceptance**

The Macquarie Dictionary (*OECD, 2012*) defines acceptance as ‘the act of assenting or believing: acceptance of a theory’. However, in the case of defining what constitutes physician acceptance of computerized physician order entry systems (CPOE) and electronic medical record (EMR) technology, the term holds numerous meanings, often based on subjective individualistic perspectives or organizationally self-reported data and national registry databases. In each case, the term adoption and acceptance is based on different variables, further complicating the matter.

Most prominent EMR stakeholders, such as policy makers, have encountered the perils of using local, regional or national EMR physician adoption statistics, as a benchmark synonymously denoting physician ‘acceptance’. In fact, the two can vary dramatically. An experiential phenomenological process of computerized physician order entry systems and electronic medical records research often dramatically contradicts the numbers as reported by hospital leaders, due to the misalignment of adoption and acceptance. For all the excitement about hospital and physician adoption of electronic health record (EHR) systems, many CIOs of the nation’s leading health systems and hospitals are pessimistic about their organization’s ability to meet ‘meaningful use’ (MU) requirements by the year 2015, as reported by the Office of the National Coordinator for Health Information Technology (ONCHIT) as shown below in Table 1.1.
Table 1.1 Summary of objectives of criteria for defining meaningful use of EHRS

<table>
<thead>
<tr>
<th>Stage</th>
<th>Time Frame</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2011</td>
<td>To electronically capture health in coded format and use that information to communicate health information for care coordination, to track key clinical conditions, and to report key quality measure and public information.</td>
</tr>
<tr>
<td>2</td>
<td>2013</td>
<td>Same as phase 1 with expansion in areas of disease management, clinical decision support medications management, support for patients access to their information, transitions in care, quality measurement and research, and bi-directional communication with public health agencies.</td>
</tr>
<tr>
<td>3</td>
<td>2015</td>
<td>To achieve and improve performance and support care process and focus on key health system outcomes.</td>
</tr>
</tbody>
</table>

According to Don May, Vice President of Policy at the American Hospital Association (AHA), hospital leaders report a pessimistic outlook on their organization’s state of preparedness for adoption or acceptance of computerized physician order entry systems and electronic medical records by physicians. ‘To be honest, we don’t know. One healthcare provider told us they are shooting for 2012, another said they’re shooting for 2014, another said ‘our goal is 2012,’ but the way they said it, they thought they might be there a little later’ (Michel, 2011 p.1).

Consequently, this research defines ‘acceptance’ as the focal point where satisfaction meets usage of computerized physician order entry systems and electronic medical records, as defined by various scholars (Likourezos et al., 2004; Raths, 2008; Sibona, Walczak, Brickey, & Parthasarathy, 2011; Sittig, Kuperman, & Fiskio, 1999; Vishwanath, Singh & Winkelstein, 2010) rather than documented physical electronic medical record adoption statistics which are often based on software implementation milestones cited by government, consultants and ratings agencies (HIMSS, 2010; Kubick, 2009).
Chief Medical Information Officers and the Chief Information Officer

The role of Chief Medical Information Officers or (CMIO) is a relatively new position in the healthcare industry (Shaffer & Lovelock, 2010). This new role predominantly reports to the Chief Information Officer (CIO) and was created specifically to service the coincidence of technology needs between the office of the CIO and of the greater physician community, in accordance with medical policy set by the Chief Medical Officer (CMO). The role was specifically created to attempt to address the long-running battle, bridging the chasm between physicians and information technology professionals. The role of CMIO is growing both in prominence and importance in healthcare organizations, given the advent of the HITECH portion of the ARRA and the objectives identified in Table 1.

These objectives are segmented in three distinct sequential phases ending in 2015. The first stage and arguably most important phase, includes Computerized physician order entry systems (CPOE) and will impact each physician trying to meet meaningful use objectives. CPOE is still out of reach for most hospitals due to physician resistance (KLAS, 2010). Many CMIOs have clinical informatics staff and their role is increasing in importance and prominence, given government mandates whereby meaningful use of data is now upon us with yearly compliance dates 2011-2015.

Traditionally, the CIO reports to the Chief Financial or Chief Executive officer. Prior to the creation of the role of CMIO, the CIO dealt directly with the physicians and other clinical staff within the facility. Chief Information Officers are ‘predominantly’ of an engineering background with an undergraduate degree (BSc) and a Masters of Business Administration (MBA). They are typically white, middle-aged males in the middle to upper income bracket (CHIME, 2008).

United States of America - regions

Although the United States comprises 50 integrated United States, each state has different laws related to healthcare. Federal laws technically only apply to the control of printing money, the ability to wage war and cross-state jurisdiction such as drug trafficking (US Constitution, 1787). Therefore, although laws such as federal taxation and nationalized healthcare plans are actively in place or planned, the states have the ability to overrule these edicts from a legal technicality perspective. The USA is not one homogenous environment;
rather it can be broken down into five distinct regions, the North Eastern, South Eastern, Central Corridor, Central Atlantic, and West Coast. From a language perspective, although English is still the first language spoken, a vast sector of the South West prefers Spanish. Due to the immense geography, the study adopts a multi-regional perspective and includes all continental regions. Each of these regions is widely diverse in cultural heritage and in political, legal, social and economic capacity. Consequently, this study provides a snapshot of the nation, incorporating regional variations, seeking to improve generalizability and confirmability of the findings.

1.6 Boundaries of research
The researcher, setting, respondents and all factors involved in this research required methodological pragmatism, as opposed to a metaphysical approach (Morgan, 2007). The central goal of this research is to document interpretative findings, specifically related to the concept of physician acceptance. Given the subtle cynicism of the healthcare audience towards soft qualitative studies, this research attempts to overcome the prejudice and misunderstandings in health and health services research in relation to qualitative research (Bresnan & Ford, 2010; Burford, et al., 2009) by using stratified sampling, mixed-methods qualitative analysis, combined with and capstone quantitative survey and methodological triangulation. The boundaries of the research specifically relate to the availability of all stakeholder resources such as the CIOs and the researcher, given this is a part-time, resource strained self-funded exercise. Moreover, given the CIO respondents are elite executives, often working in chaotic, change prevalent, information overloaded environments, the strategic credibility of the researcher himself and subject matter are key (Collins, 2007). The researcher must be seen to deliver highly productive and ethical data collection methods in a suitably credible setting (Dunford, 2009).

Limited range of interviews of respondents Chief Information Officers
Given the resource constraints of this research, it was impossible to conduct semi-structured interviews with every CIO in the USA currently employing a CMIO. However, due to the fact the CMIO role is emerging, there are currently only a small number of CMIOs’ employed in the USA. The sample size of 20 is a worthy representation of the
estimated two hundred and fifty; especially given the broad demography and geography of the sample reflect that of the entire CMIO population. The large academic regional medical centres, hub hospitals in integrated delivery networks (IDN) and regional medical centres were specifically selected, given the complex nature and necessity for them to employ CMIO, perhaps earlier than less complex environments. Due to the early adopter nature of CMIOs, these larger organizations have the potential to provide current and reliable data in the midst of deeply resource-limited situations. ‘The challenge is: How do you change in the midst of being really busy and being mired in the [old ways of doing things]’ (Louise-Barriball & While, 1994).

**Regional variations related to ethnic origin**

Whilst this research uses a small sample of respondents, both regional generalizability and national generalizability are high, due to the homogenous role specificity of the sample set of subjects. However, the entire south-western region of the United States informally uses Spanish as first language and the Anglo Saxon nature of the researcher may provide challenges in the interview process, given long-running intra American racial challenges. Each region has specific etiquette and social norms based on cultural heritage, and observance of such etiquette throughout the entire research process is mandatory, from the initial contact through until research completion (Macnab, Worthley, & Jenner, 2010). Caution and preparedness on the part of researcher, must be taken into account, being cognisant that significant differences in perception of ethics, integrity and loyalty are possible within the sample set. This could thereby lead to distorted or skewed data based on perceived questions to the untrained eye.

**Interpretive method**

Whilst this research predominantly uses qualitative methods to analyse rich data from semi-structured interviews (Denzin, 2006), it also uses short, quantitative analysis in the form of a three question Multi-Factor Leadership Questionnaire. This mixed method approach allows for data triangulation and is aimed at enhancing the rigor and generalisability of the findings. These precautions should also assist in reducing limitations and improving validity and reliability, thereby reducing overall bias.
Australian researcher

The researcher is not natively born American. Therefore, this could affect the researcher’s interpretation of comments made by the respondents or the respondents’ interpretation of the questions. Further, the researcher must guard against a subconsciously imposed etic (Scott, Green, Blaszczynski, & Rosewarne, 2007) while also being cognisant of the context of dialect diversity in the Australian English, as opposed to the American English language. Vowel pronunciation in itself has the potential to interrupt, derail, stall or render the interview futile in certain regions of the United States (Bresnan & Ford, 2010; Collins, 2007; Scott, et al., 2007). This issue was illustrated in similar challenges in translating Ebonics slang (African American English Dialect) into written American English, in a previous study Davidson, et al., 1976). The researcher is highly aware of these issues and regional variations in the USA, due to the fact that he has had several years of extensive exposure to these regions and the interview techniques required. Experience was gleaned whilst carrying out marketing research. Therefore, the researcher is aware of the etic-emic dilemma (Davidson, et al., 1976) during the data collection phase.

1.7 Conclusion

This chapter presents the foundation and justification for the current research into transformational leadership, as it relates to physician acceptance of technology through a focused theoretical framework. The chapter has identified that there is a gap in the literature associated with the impact of transformational leadership on physician acceptance of computerized physician order entry systems and electronic medical records. This is evidenced by both a lack on empirical research and flawed assumptions and confusion between the concepts of technology adoption and technology acceptance. This chapter has also provided a brief background and overview of the research, defined key terms and established boundaries for the study, while defining the central research question and associated research strategy. The central research question for the study is:

How does transformational leadership behaviour in Chief Medical Information Officers influence the adoption rate and acceptance of Electronic Medical Recording devices by physicians, when mediated by trust?
CHAPTER 2 - LITERATURE REVIEW

2.0 Introduction
Since the 1980’s, management across all industries and disciplines has attempted to improve organizational effectiveness and performance, by engaging in restructuring and organizational process improvements. Information technology plays a key role in the drive towards smarter more effective and productive organizations. All modern organizations are forced to critically analyse internal resources and capabilities, in order to enhance sustainable competitive advantage, deliver growth and profitability in the face of market forces and other externalities (Porter, 1980).

Tangible organizational effectiveness methodologies, such as total quality management (TQM), in conjunction with the advent of digital information management systems such as Enterprise Resource Scheduling and Planning (ERP) and e-commerce, have allowed organizations to search for internal excellence, while thriving in market chaos (Barney, 1986; Hai Nam & Mohamed, 2011). Improved market effectiveness is achieved by augmenting a strong technology foundation whilst simultaneously seeking alternate intangible strategies and methods to survive.

Intangible capabilities such as strategic brand management, organization leadership, cultural evolution, emotional intelligence enhancement, employee empowerment, building teams and engendering trust amongst employees are just some of the capabilities required in the new millennium (Tosi, Misangyi, Fanelli, Waldman & Yammarino, 2004). Of the aforementioned intangible capabilities, transformational leadership has been researched across a number of industry fields and is purported to be a powerful driver of enhanced organizational performance. These claims are made as it encourages employee’s willingness to follow and enact the vision of the leader, rather than be compliant to commands as in the transactional leadership of the past. Even in virtual environments, visionary leadership is linked to work engagement and goal performance (Whitford & Moss, 2009). Viator (2001), indicated that transformational leadership vision is positively and directly related to role clarity, job satisfaction and organizational commitment, while indirectly related to goal performance in the accounting domain.
Whilst the impact of transformational leadership and the adoption of information technology has been researched across a range of industry fields, (Hai Nam & Mohamed, 2011; Barki, Paré & Sicotte, 2008), it has not been researched to date in relation to the impact of transformational leadership on the adoption of electronic medical recording equipment by physicians in the medical industry.

Research into this area is of vital importance as there are direct linkages between low adoption rates of electronic technology, medical errors and poor access to information and mortality rates. In the USA this situation is of such dire proportions, that the government has implemented top-down regulations to drive technology adoption and implementation by physicians (ARRA, 2009). This chapter identifies the attributes underpinning transformational leadership and explores them within the context of the complex socio-medical realm, as it applies directly to physician acceptance of computerized physician order entry systems and electronic medical records. It then develops a theoretical framework from the literature in order to explore the potential role that transformational leadership may have as a driving force in physician adoption of electronic technology, seeking improved organizational performance in healthcare (Kotter, 1996; Silvey, 2004).

This chapter succinctly defines the topic and the related research problems. It discusses the parent, intermediate and focused literature on transformational leadership and its impact on organizational performance. It illuminates research findings from various interdisciplinary articles with particular focus on mediating and moderating variables including Trust, Leader Member Exchange (LMX) and Organizational Citizenship Behaviour (OCB) and discussing controversies within the literature (Vecchio, Justin, & Pearce, 2008). The chapter then presents a granular critique of the previous focused research, specifically related to current research problems of transformational leadership in the healthcare realm, highlighting the research gaps.

Of particular interest, are specific studies with relevance to technology adoption and early emerging research into Computerized physician order entry systems (CPOE) technology and Electronic Medical Record (EMR) system adoption. Finally the chapter presents an augmented theoretical framework based on previous research in healthcare (Lunney, 2008; Robling et al., 2010; Szydlowski & Smith, 2009) and the four pillars of transformational leadership and an overarching research question.
2.1 Leadership

In general, leadership research has been dualistic, controversial, and conflicting due to the various, distinctly siloed, theoretical categories in the literature. Eight major theoretical leadership categories exist: the great man, trait, contingency, situational, behavioural, participative, management and relationship (Epitropaki & Martin, 2005; Mazzei, 2009). Of key interest and focus in this paper, is to further critique, extend and augment the controversial intersection of transactional and transformational leadership categories (Freidman, 2004; Roberts, et al., 2010). Transactional leadership extends theory X, the mechanistic human resource management contingent reward ‘carrot and stick’ approach. Conversely, transformational leadership espouses the importance of humanistic theory Y induced processes, whereby the leader has willing followers (Barbuto, Jr. & Burbach, 2006; Kopelman, Prottas, & Davis, 2008; Sweney, Fiechtner, & Samores, 1975).

2.1.1 Defining transformational leadership

The wide scale usage of the term ‘transformation’ became evident around the 1970’s in the United States. The word was used as a descriptive change or evolutionary term in relation to scientific, education, military, infrastructure, economic, religious, social, cultural and health transformation. Within the leadership realm, James Macgregor Burns first introduced the concept of transformational leadership (Burns, 1978), while researching political leaders. He distinctly divided leadership into transforming leadership and transactional leadership. Transforming leadership creates significant change in the lives of followers, a paradigm change in perceptions, values, aspirations, and the expectations of employees. Since the early research, the term has transcended into the organizational psychology domain, in which it is defined as a leadership approach that causes transformation or change in individual organizations and social systems. Idealistically, this form of leadership creates and promotes valuable, positive change for followers, leading to an endpoint that fosters and develops followers into a new breed of ‘led’ (Kuhnert & Lewis, 1987). Transformational leadership is argued to enhance motivation, morale, productivity, and performance. In the early literature, transforming and transactional leadership were depicted as mutually exclusive.
2.2 The evolution of parent theories/classification models

The study of transformational leadership evolved from earlier transactional research theories. There continues to be a controversial chasm between the two leadership categories. Hollander (1978), defined transactional leadership as ‘a two way influence; social exchange in both leader and follower [to] get something in return’. According to Cox, Pearce, and Perry (2003), there has been a long held management controversy as to which are the preferred or most effective methods of leadership, including transactional and transformational, and this continues. Following the work of House and Shamir (1993), more recent work by (Al-Mailam & Fahad, 2004; Atwater & Wright, 1996) provides many intersecting factors to give scholars and managers common points of reference between the transactional and transformational leadership.

Research into the efficacy of more charismatic, visionary, socially responsible and newly named transformational leaders, was led by Bass (1985). He vividly portrays transformational leaders impacting follower actions by building admiration, trust and respect, rather than using the carrot and stick mentality of the transactional leaders (Kuhnert & Lewis, 1987). Transformational Leadership was further classified into four pillars or components; (1) intellectual stimulation – encouraging creativity; (2) individual consideration – fostering relationships by direct recognition of unique contributions; (3) Inspirational Motivation – clear articulate vision that engenders passion and motivation and; (4) Idealized influence – role models to trust (Bass, Avolio, & Goodheim, 1987). Many threads of research have burgeoned from Bass’ (1985) inaugural work including work by Avolio and Bass (1999), Avolio, Waldman, and Einstein, (1988) and later research on the charismatic leader who inspires levels of acceptance, obedience, confidence and trust from followers rather than authoritarian compliance. Podsakoff, Ahearne, and MacKenzie, (1997) defined this transformational leadership as a covert approach to breaking down influence and political barriers while increasing organizational commitment behaviour (OCB).

Various scholars such as (Bass, et al., 1987; Jin, Seo, and Shapiro; 2004, Mandell and Pherwani, 2003) suggest transformational leaders, exhibiting high levels of emotional intelligence (EI), could better read emotions and thereby positively affect company performance. Drawing on a comprehensive longitudinal study, Nielsen, Randall, and
Yarkerc (2008) argue transformational leadership could be measured. Bass, et al., (1987) propose the ‘falling domino effect’ senior transformational leaders have on the success of world-class organizations, as transformational leadership diffuses throughout the organizational culture and behaviour. In addition, a plethora of further research studies, portray a consistent positive correlation between transformational leadership and a myriad of factors such as behaviour, general attitude, employee motivation, retention and job satisfaction, across numerous settings. Of key relevance to this research are studies specifically focusing on the positive relationship between transformational leadership and organizational performance and outcomes (Avolio, et al., 2004; Bass, Avolio, Jung & Berson, 2003; Bono & Ta, 2003; Hackett, et al., 2008; Kark, Shamir & Chen, 2003; Liao & Chuang, 2007; Piccolo & Colquitt, 2006; Schaubroeck, Liao & Chuang, 2007; Wang & Howell, 2010).

Positive relationships between transformational leadership and organizational performance and outcomes, are widely reported in a variety of sectors, for example, the tertiary educational domain (Founder, 1990). Research has also been conducted comparing the efficacy of transformational leadership against transactional leadership styles in the clergy, martial arts and voluntary sector (Rowold, 2006, 2008; Rowold & Rohmann, 2009). Furthermore, as a consequence of the testing of the transformational leadership efficacy of West Point graduates, it is now deemed a necessary trait for leadership performance in the military (Bartone, et al., 2002). The literature also highlights the need for a better understanding of the influence mediating and moderating variables such as identification, empowerment, trust, and efficacy have on performance. (Kark, et al., 2003 p.248) argue that:

empowerment of followers is often presented as one of the main features that distinguish such transformational leadership from transactional leadership, which does not seek to empower the followers but merely to influence their behaviour. To achieve these ends, transformational leadership includes empowering behaviours such as delegation of responsibility to followers, enhancing followers’ capacity to think on their own, and encouraging them to come up with new and creative ideas.

The positive impact transformational leadership has on organizational performance has been identified using a range of research designs and theoretical frameworks, some incorporating mediating or moderating variables. Researchers have used interpretative,
mixed method and quantitative analysis to conclude that transformational leadership is positively associated with increasing organizational performance when mediated by organizational commitment (Bono & Anderson, 2005; Chau & Hu, 2002; Dunham-Taylor, 2000; Lowe, Galen & Kroeck, 1996; Walumbwa & Lawler, 2003).

From a quantitative perspective, Idris and Ali, (2008) identified that the intersection and mediation between transformational leadership and TQM best practices has a direct correlation to financial performance of the company, further ratifying the connection between leadership and outcomes. Additionally, Kim (2002) quantitatively identified and reported that the idealized influence factor of transformational leadership alone results in incrementally improving participative management and job satisfaction with overall employee performance.

Studies adopting interpretive, constructionist and mixed method approaches, have uncovered a number of controversial issues. For example Jin, et al., (2004) identified a positive relationship between emotional intelligence and transformational leadership, demonstrating the moderating effect of emotional intensity. Other research by somewhat opposing path goal theorists such as Vecchio, et al., (2008), provided findings in support of House’s earlier controversial hypotheses that extrinsic contingent reward is negatively correlated to transformational leadership efficacy. These findings contradicted commonly held transformational leadership beliefs. Similarly, Herman, Lam, and Lam (2008) presented additional controversial findings postulating that transformational leadership was statistically insignificant in limiting employee turnover. Finally, the credibility and effectiveness of transformational leadership efficacy was undertaken by Cotton and Stevenson, (2007), in relation to firms investigated by the securities commission following the introduction of the Sarbanes–Oxley Act of 2002. The authors measured and reported positive corollary effect transformational leadership had on employee performance and overall company performance at a time of SEC investigation.

2.3 Leadership and technology adoption in the physician community in the USA
The previous sections of this chapter illustrate that there has been considerable research into the impact of transformational leadership and moderating and mediating variables on organizational performance. Within the healthcare realm authentic leadership hold immense
importance. Authentic individuals in healthcare will conduct themselves with their core, internalized values and beliefs and these will in turn be conceptualized along the continuum from ultra-authentic to lacking authenticity as mentioned in (Harvey, Martinko & Gardner, 2006).

It has also been briefly noted that information technology plays a key role in the drive towards smarter organizations. Whilst the impact of transformational leadership and the adoption of information technology has been researched across a range of industry fields, to date, it has not been researched in the medical industry, specifically in relation to the impact of transformational leadership and the adoption of electronic medical record systems by physicians. This section discusses how and why the uptake of information technology is vital to the improved performance of the medical industry. It also discusses why the topic of leadership in the context of the physician community is important and how the use of transformational leadership in the physician community might improve the uptake of information technology.

There are currently immense challenges occurring in the healthcare industry in the USA, specifically related to the inability to gain rapid physician adoption of new electronic medical record technology, even though improved adoption and acceptance would go a long way towards addressing preventable medical errors (Shea & Hripcsak, 2010). The issue of preventable medical errors is perhaps most clearly illuminated, addressed and detailed in the landmark publication: *Crossing the quality chasm, depicting the requirements for a new health system for the 21st Century* (ARQH, 2001). Based on the alarming statistics in this and similar articles, the government deemed it necessary to set forth legislation to force action. In 2007, the Federal Government of the USA enacted the first version of the American Reinvestment and Recovery Act (ARRA, 2007) in order to encourage various infrastructure projects, including the uptake of information technology in the medical industry. This act was revised in 2009 (ARRA, 2009) and as a consequence, large-scale government stimulus funds for rewards and penalties for non-compliance were proposed for individual physicians who adopt technologies, such as Computerized physician order entry systems (CPOE) in the first instance and then Computerized physician order entry systems and electronic medical records (EMR) at a later date (KLAS, 2010; Vartak, et al., 2009a, 2009b; Vishwanath, Singh and Winkelstein, 2010).
A number of sources (Adler & Karlsberg, 2011; Goldwater, 1918; Haugen & Woodside, 2010; Hess & O’Neal, 2010; HIMSS, 2010; Ilie, Van Slyke, Parikh, & Courtney, 2009; Morton & Wiedenbeck, 2009; Seeman & Gibson, 2009) have suggested that doctors, hospitals, insurance firms, government bodies, and the greater patient consumer community would welcome any method or process, technological or humanistic, such as leadership style, that aids the speed of adoption. However, continued physician resistance to the adoption of electronic patient data systems is still of great concern with no apparent end in sight.

In the USA, relevant federal government agencies such as the Health and Human Service (HHS), the Centre for Disease Control (CDC) and the office of the National Coordinator Health Information Technology (ONCHIT), reported evidence based statistics on causes of death, however the actual medical error statistic is not highlighted in such data. As Table 2.1 illustrates, cardiac, cancer, respiratory and cerebral diseases are high on the list (Sherry et al., 2012; HHS, 2008). Data on deaths due to medical errors are known, but are not well publicized.

Table 2.1 **Major reported causes of death factors in the USA for the year 2010**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Causes of Death</th>
<th>Number</th>
<th>Death Rate</th>
<th>Age-adjusted death rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2010</td>
<td>2009</td>
</tr>
<tr>
<td></td>
<td>All Causes</td>
<td>2,465,932</td>
<td>793.7</td>
<td>741.0</td>
</tr>
<tr>
<td>1</td>
<td>Diseases of Heart</td>
<td>595,444</td>
<td>195.0</td>
<td>179.0</td>
</tr>
<tr>
<td>2</td>
<td>Malignant neoplasm’s</td>
<td>573,855</td>
<td>185.2</td>
<td>173.6</td>
</tr>
<tr>
<td>3</td>
<td>Chronic Lower Respiratory Disease</td>
<td>137,789</td>
<td>44.7</td>
<td>42.2</td>
</tr>
<tr>
<td>4</td>
<td>Cerebrovascular Diseases</td>
<td>129,180</td>
<td>41.9</td>
<td>38.9</td>
</tr>
<tr>
<td>5</td>
<td>Accidents (unintended injuries)</td>
<td>118,043</td>
<td>38.2</td>
<td>37.0</td>
</tr>
<tr>
<td>6</td>
<td>Alzheimer’s Disease</td>
<td>83,308</td>
<td>25.7</td>
<td>23.4</td>
</tr>
<tr>
<td>7</td>
<td>Diabetes mellitus</td>
<td>68,905</td>
<td>22.3</td>
<td>20.9</td>
</tr>
<tr>
<td>8</td>
<td>Nephritis</td>
<td>50,472</td>
<td>17.5</td>
<td>16.2</td>
</tr>
<tr>
<td>9</td>
<td>Influenza and pneumonia</td>
<td>50,003</td>
<td>15.9</td>
<td>14.8</td>
</tr>
<tr>
<td>10</td>
<td>Intentional Self Harm Suicide</td>
<td>37,793</td>
<td>11.9</td>
<td>11.7</td>
</tr>
<tr>
<td>11</td>
<td>Septicaemia</td>
<td>34,843</td>
<td>11.6</td>
<td>10.9</td>
</tr>
<tr>
<td>12</td>
<td>Chronic Liver Disease</td>
<td>31,802</td>
<td>9.9</td>
<td>9.2</td>
</tr>
<tr>
<td>13</td>
<td>Essential hypertension/renal disease</td>
<td>26,577</td>
<td>8.4</td>
<td>7.7</td>
</tr>
<tr>
<td>14</td>
<td>Parkinson’s Disease</td>
<td>21,963</td>
<td>6.7</td>
<td>6.4</td>
</tr>
<tr>
<td>15</td>
<td>Assault (homicide)</td>
<td>17,001</td>
<td>5.4</td>
<td>5.5</td>
</tr>
<tr>
<td>....</td>
<td>All other diseases</td>
<td>488,954</td>
<td>158.5</td>
<td>...</td>
</tr>
</tbody>
</table>

Developed from Cause of Death Statistics, Center for Disease Control (CDC, 2012)
Starfield, (2002) presents a more granular analysis of causes of deaths in the USA in the prestigious Journal of the American Medical Association. His research suggests the following statistics:

- 7,000 deaths occur each year due to medication errors in hospitals
- 12,000 deaths occur each year due to unnecessary surgery
- 20,000 deaths occur each year due to other hospital errors
- 80,000 deaths occur each year due to nosocomial infections in hospitals
- 106,000 deaths occur each year due to adverse effects to properly prescribed medications

The USA does not have anywhere near the best healthcare in the world. In a recent comparison of 13 OECD countries (OECD, 2009), the USA ranks an average of 12th (second from the bottom) for 16 available health indicators. The rankings for the USA on the individual indicators are presented below:

- 13th (last) for low-birth-weight percentages;
- 13th for neonatal mortality and infant mortality overall;
- 11th for post neonatal mortality;
- 13th for years of potential life lost (excluding external causes)
- 11th for life expectancy at 1 year for females, 12th for males;
- 10th for life expectancy at 15 years for females, 12th for males;
- 10th for life expectancy at 40 years for females, 9th for males;
- 7th for life expectancy at 65 years for females, 7th for males;
- 3rd for life expectancy at 80 years for females, 3rd for males;
- Tenth for age-adjusted mortality

Although somewhat concealed in the data, iatrogenic death (doctor induced) cause of death, is the main story behind the above statistics. It places iatrogenic death as third leading cause of death in the USA, just behind heart disease and cancer, 225,000 incidents when compared to the data in Table 2.1 (Starfield, 2000). While there are many factors involved in this startling statistic, one of the leading preventable factors identified, is the lack of timely integrated clinical information. This is arguably due to the derivative factor, a lack of integrated information technology in the form of computerized physician order entry systems and computerized physician order entry systems and electronic medical
records (Chou, 2011; Hornberger, 2009; Taylor, 2008). As previously noted, recent
government intervention through the HITECH portion of the American Reinvestment and
Recovery Act (ARRA, 2009), mandating legislation to force healthcare providers and
associated licensed physicians to obtain technology sought to rectify this technological
issue. However, all regulatory and guiding agencies reported minimal progress on the
technology adoption and acceptance (HIMSS, 2010). The government promised to flood
the market with US$49 billion dollars in stimulus funds and associated programs, while
threatening to penalize physicians for non-compliance. However, adoption rates have
remained unchanged at less than fifteen percent across the country (HIMSS, 2010; Kubick,
2009).

Despite the promises that computerized physician order entry systems (CPOE) and
electronic medical records (EMR) offer greatly improved productivity, patient health care
outcomes and quality improvements, only a small minority of U.S. physicians have
embraced electronic health records (EHR) as a routine part of practice (Shea & Hripcsak,
2010). This article followed on from a previous national survey (Blendon, et al., 2008)
that noted that only 4 percent medical facilities have a fully functional EHR system and only
13 percent have a basic one. It would therefore appear that the government, healthcare
providers and insurance companies have vastly underestimated the resistance by the
physician community to adopting new technology. Physicians in general develop a socially
accepted social identity of leaders and self-regulate through the American Medical
Association producing an enormous task to overcome in the drive to physician adoption
(Day, 2009). This appears regardless of financial implications, increased productivity and
the associated clinical benefits that may follow. The issue of physician resistance became
clear to the researcher in a discussion with a Chief Medical Information Officer (CMIO)
from the Midwestern region of USA, who stated ‘physicians only adopt techniques,
procedures and policies, based on respect and trust in fellow thought-leading colleagues,
and hold a contemptful arrogance for administrators, government and other parties who
attempt to force us into action’.

When taking the Hippocratic Oath, each physician swears ‘to take or adopt all measures
required to preserve human life and while secondarily avoiding nihilism and overtreatment’
(Edelstein, 1943). Therefore, the lack of adoption of computerized physician order entry
systems and electronic medical records ignores the ability to adopt all measures to preserve human life. By using computerized physician order entry systems and electronic medical records the physicians gain timely, vital and holistic information and are therefore better able to provide superior, timelier holistic patient care, in line with the letter and spirit of the Hippocratic Oath. Not adopting such technology appears to present a form of epistemological nihilism and ignorance of the core of medicine, their sacred Hippocratic Oath. Avoidance of adoption of integrated computerized physician order entry systems and electronic medical records and meaningful use of information, results in disparate data sources and the requirement for multiple duplicates of treatments such as X-rays, blood tests, lab work and thereby, overtreatment. Physicians in general, have long used the patient care preservation clause within the Hippocratic Oath as a weapon against change in administrative of clinical policy or procedures, yet the tables appear to have turned, with the advent of the computerized physician order entry systems and electronic medical records.

Although there is a considerable body of literature reporting abysmal statistics in relation to adoption of EMR technology by physicians, there is a paucity of literature examining the human role of transformational leadership and the associated variable of trust may play in improving the statistics. For example, Poon, et al., (2006) reviews healthcare adoption of electronic medical systems in totality across the United States on a national statistical basis and Protti, et al., 2008a and Sy et al., (2009) undertook a statistical analysis of adoption rates within large physician groups in New Zealand and Denmark respectively. Aarts and Koppel (2009) explore adoption rates of technology similar to computerized physicians order entry (CPOE) and pharmacy systems. Wise and Bankowitz, (2009) began to explore and touch on the human factor reviewing the role change management plays as a key to engaging physicians in the adoption of technology, while Beiter, et al., (2008) undertook research into physician attitudes towards and against electronic medical record adoption rates, based upon different styles of products and product demonstrations. Chou, et al., (2004), touch on the human factor, by identifying various behavioural barriers physicians erect in opposition to adoption of EMR technology. Such factors range from procedural resistance to overall overt sceptical perception; however the study excludes an examination of leadership style effectiveness. Rogoski
(2009) focuses on leadership based on technology leadership rather than leadership management, whilst Barki, Paré and Sicotte, (2008) outline various technical and logistical challenges that need to be overcome in delivering information to physicians to improve adoption but did not discuss leadership issues.

Other recent studies identify leadership style as a factor hampering technology adoption in nursing (Ward & Schwartzman, 2009) and that leadership may be a factor in improving adoption rates in physicians who have scepticism (Kaliyadan, et al., 2009). One broad healthcare study reviewing leadership, depicted leadership as one of six strategies required, to ensure successful implementation of computerized physician order entry systems and electronic medical records (Venkatraman, et al., 2008) while studies analyse adoption rates of electronic medical records in specific departmental areas, such as emergency room (ER) and generally suggest leadership as a factor, but do not make specific reference to the leadership style (Vartak, et al., 2009a). Research by (Bernstein, et al., 2007) identifies five constants for successful adoption of EMR systems including the role of supportive leadership and Terrell and Terrell (2009) suggest leadership may be significant as a core factor to success as organizations move from paper to digital technologies such as computerized physician order entry systems and electronic medical records, yet neither specifically address the importance of leadership style. Pedersen and Gumper (2008) touched on the efficacy of healthcare leadership from a holistic perspective but not specifically related to computerized physician order entry systems or EMR systems. (Menaker, 1993; 2009) evaluated mentoring and other leadership strategies for physicians respectively, then and Menaker and Bahn (2008) suggest perceived transformational leadership positively affects physician satisfaction, although this research does not extend to computerized physician order entry systems and electronic medical records. Consequently, it would therefore appear that there is a gap in the research in relation to the effect of transformational leadership style on the adoption of digital technologies.

Although researchers and healthcare professionals alike predominantly seek to provide findings and methods to improve the adoption of electronic medical record systems, there are some controversial opponents to the concept. Gordon, et. al., (2009), highlights technology as a key inhibitor to adoption rather than the answer to physician adoption. They suggest the questionable technical accuracy of integrating various technologies,
coupled with increased time to practice medicine and reduced physician adoption, result in fatal medical mistakes. They also suggest that lacklustre technology further exacerbates any initial perceived mistrust physicians may have of these electronic record-keeping systems, thus erecting further barriers. Furthermore some detractors such as Browne and Cook (2011) report computerized physician order entry systems and electronic medical records deliver an inappropriate level of trust, or over-trust in technology by the physicians and clinicians, thereby creating a false sense of security and may lead to the possibility of causing harm rather than the benefit.

Of particular interest to this research are various studies in nursing management that specifically analyses transformational leadership efficacy in healthcare arena. Such studies identify that transformational leadership is positively related to clinical policy adherence and general nursing performance (Bowles & Bowles, 2000; Hendel, Fish, & Galon, 2005; Robles & Karnas, 2007; Davidson, et al., 2002). Such research has led to enacting a transformational leadership training strategy for clinical nurse educators. This strategy delivers outcomes that demonstrate continual improvement programs based on transformational leadership attributes have positive results. The significance of these studies is that the clinical nurse educator role is a direct analogy to the Chief Information Officer role in the medical fraternity.

Within the healthcare domain, trust is comprehensively illustrated as pivotal to the continuum of clinical efficacy (Bova, et al., 2006; Brown, et al., 2011; Egede & Ellis, 2008; Ellingsen, 2003; Gilson, 2006; Montague, 2010; Montague, Winchester & Kleiner, 2010; Moskowitz et al., 2011; Ortega Egea & Román González, 2011; Podsakoff, MacKenzie, Moorman, & Fetter, 1990; Robb & Greenhalgh, 2006; Ruston & Tavabie, 2010; Schwab, 2008; Skirbekk, 2009; Trybou, Gemmel, & Annemans, 2011; Ubachs-Moust, Houtepen, Van der Weijden, ter Meulen, & Vos, 2010; van den Brink-Muinen & Rijken, 2006; van der Schee & Groenewegen, 2010). Some scholars suggest a mixed method pragmatic approach is applicable, especially where trust is used as a mediator to transformational leadership (Jansen, George, Van den Bosch & Volberda, 2008; Morgan, 2007), thus providing useful insight for this research. Further, Nyhan and Marlowe Jr. (1997), Podsakoff, Mackenzie and Ahearne, (1997a) and Podsakoff, Mackenzie and Ahearne, (1997b) present workable designs for data collection and measurement methodologies in
relation to trust in the hierarchical health domain. This further suggests that trust should be
treated as a mediating variable in the current research. Leadership, in the context of the
physician community, is a challenging issue, yet a necessary area to research, due to the
potential health benefits such research may bring. The genesis of this challenge originates
in the fact that there is a perceived innate societal leadership bestowed upon doctors by the
community due to unique combination of high-level knowledge, skills and capabilities and
their role as autonomous decision makers in relation to patient care. One key intangible
variable and relevant concept to healthcare is that of authentic leadership. Within a study of
nurse student analogous to our doctor’s being trained by CMIOs the findings suggested that
“authentic leaders have the ability to enhance the engagement and satisfaction of followers
by strengthening their identification with the leader and organization and promoting hope,
trust, optimism and positive emotions” Giallonardo, Wong and Iwasu, (2010).

Notwithstanding this societal roadblock, complex human factors relating to the adoption
of information technologies by physicians must be addressed in order to better understand
physician reluctance in adopting information technologies, and strategies for overcoming
such reluctance. Adler and Karlsberg (2011), suggest the third and often forgotten factor
acting, as a barrier to success in the adoption of new systems is the human factor, as
illustrated in Figure 2.1. Exploring human factors such as individual physician motivation
and collective collaboration (illustrated in Figure 2.1) is an important area for further
research, as there is a paucity of research in this area in medicine. This is because the
previously discussed transactional change management methods to drive physician
adoption of information technology have resulted in little except for physician frustration
(Weimar, 2009). In summary Figure 2.1 extends previously held views that the major
barrier to adoption of technology by physicians was the technology in itself, rather than the
intersection of the right technology, mixed with training and support and most pertinent to
this study the right human factors such as motivation and collaboration.
Developed from Adler and Karlsberg (2011) for this research

2.4 Leadership and the role of the Chief Medical Information Officer

Bujak, (2008) discusses the requirement to get ‘inside the mind of the physician’ in order to gain acceptance of anything and in the case of this research, improving the adoption and acceptance of information technology. In the American hospital system, the role tasked with the responsibility of improving physician uptake of information technology is that of the Chief Medical Information Officer (CMIO). However, complicating the adoption factor is the hierarchical nature of the physician community, professional status within the physician community and high levels of risk aversion in relation to the adoption of innovative technologies. This suggests that one of the key challenges facing each hospital is the selection of a CMIO, with the appropriate expert medical and technical knowledge, in which colleagues can trust plus a leadership style that counteracts the aforementioned complicating factors. Transformational Leadership in particular, has been evaluated as a leadership style that builds trust in followers (Podsakoff, et al., 1990).

Healthcare and medicine have a profound research history in both the positivist and more recently interpretive domains. However, healthcare information technology (HIT) is a
relatively recent entrant into the research arena and as noted in the previous section, the research that has been undertaken in relation to (HIT) has been primarily centred on the technology aspects. Due to historical factors, physicians have a general warranted mistrust of the legal profession, insurers, product vendors and government organizations in the USA. This underlying mistrust has fuelled resistance to any electronic tracking mechanisms, including digital documentation systems such as Computerized physician order entry systems (CPOE) and Electronic Medical Record (EMR) Systems. Most senior physicians face the challenging dichotomy of being positioned at the pinnacle of medical community knowledge, yet inwardly fearful that the inability to operate unknown technology such as CPOE or EMR leaves them in an inferior position amongst subordinates. The perceived inability could result in loss of face, trust and respect of junior physicians (Kearney, 2008; KLAS, 2010; Vartak, et al., 2009a, 2009b). This dilemma is further exacerbated by the fact that continuing changes in healthcare technology now require ongoing physician training in the use of the technology (Lea, et al., 2008), which in turn eats away at their already limited time.

Healthcare information technology in the USA is in the dark ages in comparison to other supply chain managed industries, such as retail and banking, these industries have been digitally connected and managed for at least 15 years (Protti, Bowden, & Johansen, 2008b). As previously noted, within the USA, the adoption rate of all electronic medical record systems is around thirteen percent (HHS, 2008) and a major variable leading to the low adoption rate is physician reluctance to accepting technology, often avoiding it entirely for reasons discussed in previous sections. Undertaking research in order to explore ways to improve adoption rates of such technologies has human and dollar benefits and the literature suggests that leadership style may enhance such adoption. According to (Kleinman, 2004,p2) many researchers such as Bass and Avolio have shown considerable interest in the model of transformational leadership, because it has been shown that transformational leaders reduce conflict, turnover, and generate greater commitment from their followers than those who use other leadership styles’. Therefore, this research follows in the same tradition, exploring whether CMIOs who display a transformational leadership style actually enhance the speed of adoption of information technology by their physician community. This research critically analyses the possible incremental or additive role,
transformational leadership may have when mediated by trust, in increasing technology adoption rates of computerized physician order entry systems and electronic medical records (Poon, et al., 2006). In this study, the overarching research question is:

**How does transformational leadership behaviour in Chief Medical Information Officers influence the adoption rate and acceptance of Electronic Medical Recording devices by physicians, when mediated by trust?**

### 2.5 Theoretical framework

The theoretical framework for this research draws on the input-process-output (I-P-O) model and empirical applications of the I-P-O model demonstrate its utility (Campion, Medsker, & Higgs, 1993; Gladstein, 1984; Guzzo & Dickson, 1996). This cause and effect based framework incorporates a logical construction of dependent, independent and mediating variables, based on specific subjects and cases Hackett, et al., (2008), as illustrated in Figure 2.2.

**Figure 2.2 Simple diagrammatic representation of the I-P-O model**

Adapted from IPO Variable relationship diagram (Hackett, 2008)

Of specific interest to this research is a framework developed by Szydlowski and Smith (2009) that was applied to an examination of healthcare information technology in the
context of change management, leadership, and general management. The framework
draws on the Judge and Piccolo’s, (2004a) meta-analysis of data gathered from a
comprehensive examination of the full range of transformational, transactional, and laissez-
faire leadership style from 87 unrelated sources, examining whether leadership influences
technology adoption. The theoretical framework for this study draws on the Szydlowski
and Smith (2009) framework; the four categories attributed to transformational leaders:
idealized influence; inspirational motivation; intellectual stimulation and individual
consideration (Bass, 1985, 1997) and, the aforementioned mediating variable of trust.
Figure 2.3 illustrates the theoretical framework developed for this research. The theoretical
framework was the applied to guide the development of an interview protocol for this
research. Further discussion of the development of the protocol along with the research
methodology and design is contained in Chapter 3. The theoretical framework provides an
initial input of the variants of the four tenets of transformational leadership into the CMIO.
At that point the output of this Transformational leadership, mediated by the trust variables
transmits the output to the doctor who is being enticed to adopt the technology, eventually
affecting the outcome of the patient. In summary to framework shows the effect
transformational leadership factors have on moving the physician to the acceptance of
CPOE when mediated by trust.

Figure 2.3 The theoretical framework developed for this research
CHAPTER 3 - METHODOLOGY AND RESEARCH DESIGN

3.0 Introduction
This chapter discusses the research methodology, research design and research implementation developed for this research. It commences with a discussion of the philosophical stance adopted by the researcher. The chapter goes on to justify the paradigmatic approach and underlying principles of the research. It then discusses alternative approaches to qualitative research before identifying that the use of individual semi-structured interviews, coupled with a short quantitative capstone survey, was the most appropriate. The chapter then discusses issues pertaining to the design and implementation of this research, before concluding with a detailed assessment of reliability and validity issues, the inherent limitations of the research and ethical issues considerations.

3.1 Research philosophy
In the realm of social science there are eleven foundational paradigms, yet each only sheds light on a limited area of society (Tang, 2011). From the functionalist, constructionalist, critical and interpretive paradigms, none stands alone in the complex human study within the medical fraternity, Robles, (2009).

Robles and Karnas, (2007) argue that whilst qualitative interpretive methods have merit, due to the creativity, richness, depth and methodological process, a quantitative capstone survey may increase reliability credibility and validity through triangulation. Therefore, even though qualitative methods have the merits of depth and richness, in certain cases where human lives and social welfare are involved, such as this study; a more comprehensive multi factorial approach should be deployed, to enhance the rigour of the findings (Creswell, 2003).

Every tool, method and sensitivity criteria analysis available to the researcher should be applied to ensure all measure are taken to improve dependability and credibility of the study, no matter what the researcher’s epistemological and ideological perspective. The mixed-method approach, for example, ensures that maximization of objective validity and reliability (Duffy, 1987). Cognisant of these matters, the researcher acknowledges that in order to increase the probability of constructive findings, a pluralistic approach to research
design and implementation is also required, drawing on whichever philosophical approach or theoretical perspective best suits the objectives of study; be it interpretative, positivist or both.

In this research, the use of the term interpretivist refers to the exploration of new ground, based on strict criteria and coded classification, rather than subjective interpretations, and concurs with the following definitions:

- ‘Any qualitative data reduction and sense-making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings’ (Patton, 2002 p.453)
- ‘An approach of empirical, methodological controlled analysis of texts within their context of communication, following content analytic rules and step by step models, without rash quantification’ (Mayring, 2000 p.2)
- ‘A research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns’ (Hsieh & Shannon, 2005 p.1278)

### 3.2 The interpretive social science paradigm

The qualitative research domain is an emerging postmodernist area often trying to prove its worth in the shadow of the historically dominant quantitative positivist regime. Unlike quantitative research, there is currently no consensus on methods and process to ensure validity (Rubio, 2003). Given these factors and the emerging nature of leadership research in the medical fraternity, the interpretative research methodology provides an in-depth examination of a complex phenomenon, unhindered by limited scope. This allows for new theories and hypotheses to develop (Miles & Huberman, 1984). Building on research by Patton (2002) and Poggenpoel, Myburgh and Van Der Linde (2001), linking qualitative research to later quantitative research, this research seeks to lay a qualitative foundation for future qualitative medical leadership research in the future. Lomas (2005), highlights the requirement for a synthesis of research paradigms in the healthcare realm, due to the summative philosophical nature of the realm. Traditional research into technology adoption in healthcare has been predominantly statistical, positivist and quantifiable, therefore
special attention needs to be taken in interviewing healthcare professionals (Burford, et al., 2009).

Tan and Hall, (2007) highlight the fact that interpretivism has been gradually gaining ground in the technology arena and the use of methodological pluralism can leverage the inherent strengths of the interpretivist paradigm research. The interpretive method is therefore useful in the case of inquiry into the non-technical reasons for the current low adoption of computerized physician order entry systems and electronic medical records. This research seeks to build a more comprehensive data set inclusive of the human leadership factor, as opposed to earlier studies based on the technology adoption model (Seeman & Gibson, 2009) and therefore an interpretivist approach is appropriate.

Healthcare journals and research funders are mainly concerned with practical factual research, not with theory developing research. This misnomer is based on flawed assumptions, that research and facts can be separated from theory and that theories don’t have apparent immediate value (Alderson, 1998). Rossman and Wilson (1991) describe the core of positivism as based on scientific research and this is synonymous with the foundations of medicine. Therefore interpretive methodologies, although producing evidence-based outcomes, still set forth a degree of inescapable cynical scepticism. In order to address this scepticism, mixed method analysis is shown to better address research questions (Salehi & Golafshani, 2010). Indeed, Pope and Mays (2006) argue that that the rich description-generating ability of ‘alternative’ methodologies allows for social and cultural issues in the healthcare domain to be bought forth. Further, previous research (Ljungberg, Lindblad, & Tully 2009), has adopted a mixed methods approach in a related area, comparing current state with desired state of physician adoption in E-prescribing.

3.3 Alternative research methods in qualitative research

There are a number of different approaches to qualitative research and a number were evaluated in identifying the most appropriate for this research. This section discusses the advantages and disadvantages of each approach before discussing the rational for the approach adopted.
3.3.1 Case studies
A case study is an analysis of people, groups or organizations based on a relationship to a model. The case study could be related to a social phenomenon, medical, psychological or other areas of societies. When involved with an organization it can be an overview of why the division or conglomerate was either successful or unsuccessful in a given task. Case studies normally highlight the challenge, the method used, the conclusions and outcomes drawn from the research. Initially, the case study methodology was considered as the research method of choice due to the ability to develop in depth details around a complex situation (Tellis, 1997). Furthermore, a case study research approach been applied (Yang, et al., 2012) in related research on the Electronic Medication Administration System (EMAS) in healthcare. However, even though the current research is in a similar arena, the subject matter of this research is deeply humanistic in nature. Further, case study analysis requires considerable time and resources (Eiscnhardt, 1989). Therefore, due to the fact that this dissertation is resource and time constrained, a case study approach deemed not appropriate for this research.

3.3.2 Ground theory and substantive theory
Grounded theory is a widely used qualitative research methodology seeking to inductively define issues of importance to specific groups of people (Glaser & Strauss, 1967). Therefore this method gained initial consideration as this research is focused on understanding issues of importance to specific people, the physician community. Grounded theory is an inductive process, whereby the researcher has no preconceived ideas to prove or disprove (Morse, 2001). However, although the present research seeks to induce and define new information concerning leadership effects on physician adoption, there is already a plethora of parent and intermediate theory literature, providing a demonstrated grounding for the research question. Therefore, grounded theory was not adopted as the research method.

3.3.3 Focus group, survey, observation and semi-structure interviews
In healthcare research, the most common research methods used are surveys, observation and interviews (Law et al., 1998). These methods are reviewed in the following sections.
3.3.4 Focus group
The focus group method involves collecting information on a topic determined by the researcher from the collective perceptions of a group of individuals (Morgan, 2007). Other healthcare researchers such as such as Bova, et al., (2006), in assessing nursing – patient trust scales and Robb and Greenhalgh (2006) in examining trust, have used focus groups as a research method. However, as the focus of this research is to examine the leadership style of individual CMIOs, in order to build a picture of the most successful leadership style, in relation to the adoption of digital technology, the focus group approach was deemed unsuitable.

3.3.5 Participant observation
Participant observation is a research methodology commonly used in cultural anthropology, sociology and communication studies (DeWalt, DeWalt, & Wayland, 1998). As Cavana, et al., (2001) notes, it involves simple observations of research subjects engaging in activities in their natural environment. This research requires asking probing questions to draw information out of participants and hence participant observation is not an appropriate methodology.

3.3.6 Face-to-face semi-structure field interview
Face-to-face semi-structure interviews are flexible and capture the essence from the interviewee’s/participant’s viewpoint (Bryman & Bell, 2007). Many researchers in healthcare choose the semi-structured interview process, due to the flexibility and probing nature. For example, McSherry, Mudd and Campbell (2007) adopted this methodology in evaluating the perceived role of clinical nurse consultants, a role synonymous to the CMIO in the medical practitioner fraternity. The semi-structured interview is considered suitable for interviewing Chief Information Officers, as it facilitates topic focus with conversational two-way communication. Although the questions in the interview protocol are formulated ahead of time, the semi-structured format provides increased ability to probe for more information. Consequently, this research predominantly uses semi-structured interviews, coupled with a short, three question quantitative capstone survey. Semi-structured individual interviews are selected over focus groups for this study, as the individual nature
of the interview eliminates peer/group influence, enabling deep probing of ideas in relation to the controversial nature of the phenomenon being studied (Malhotra, Budhwar, & Prowse, 2007).

### 3.3.7 Survey

Surveys are often used in research, as they are relatively inexpensive, defined, and standardised, consequently allowing for precise measurement, producing quantitative outcomes. Survey tools reduce researcher subjectivity and have been used extensively in healthcare. In this research, a short three question survey was chosen for two reasons. First as a triangulation measure to improve the validity and reliability of the findings and secondly, to allow the researcher to contrast between CIOs, current perceived state of CMIO leadership, and the state they desire for the future.

### 3.4 Research design and implementation

This section discusses the key factors in the research design and implementation including the sampling method, respondent selection, the gaining of access, the interview protocol, recording and transcription, interview monitoring, the coding process and ethical considerations.

According to (Patton, 2002 p.228):

> No rule of thumb exists to tell a researcher precisely how to focus on a study. The extent to which a research or evaluation study is broad or narrow depends on purpose, the resources available, and the interests of those involved. In brief, these are not choices between good and bad but choices among alternatives, all of which have merit.

Research design specifies ‘the unit or units of analysis to be studied‘(Patton, 2002 p.228) and both research design and sampling strategies depend on decisions derived from the related literature on both the research question and the methodology (Miles & Huberman, 1984; Patton, 1990).

### 3.4.1 Sampling method

The aim of this research is to explore whether a transformational leadership style, mediated by trust, assists CMIOs in improving physician adoption and acceptance rates of digital
technology. The CMIO has a multi-faceted role encompassing clinical policy, technology liaison, and attempting to change and improve the adoption of a mixture of specialists and primary care physicians across their enterprise. The CMIO role does not bring forth formal authority; rather it involves an informal collaborative approach, constantly sharing ideas on training and attempting engagement and acceptance of specialist and general physicians. CMIOs are predominantly practicing medical practitioners and therefore members of the physician fraternity. Yet the medical fraternity is a multivariate, clinical web of formal authority and a well-defined ‘pecking order’. The CMIO may have no clinical or administrative relationship to the physicians except in the area of training and adoption of EMRs. Time is everything in the clinical area of healthcare however there is a general chasm of understanding between personnel from clinical and IT departments (Forster, et al., 2008).

It was determined that information about the leadership style and technology adoption might best be sought from their immediate supervisor, the CIO as the CIO has the greatest depth of knowledge and understanding of the role of the CMIO. Another reason for selecting CIOs as respondents, as opposed to the physicians who use the services of the CMIOs, is due to the sceptical nature of the physician community. The US administrative and medical professionals are generally suspicious of independent surveys, due to insurance companies continually surveying and defining ways of reducing reimbursements to administrators and physicians alike (Terrell & Terrell, 2009). Physicians hold valid scepticism as to any merit possible in non-medical research and are therefore generally resistant to any notion of non-structured intangible leadership capability, as purveyed in transformational leadership (Wise & Bankowitz, 2009). Furthermore, unlike universal healthcare environments, in the USA, physicians are predominantly private fee-for-service entities and time is money. Therefore surveys are an opportunity cost (Bernstein, et al., 2007).

Due to the limited number of CIOs employing CMIOs in the US health system, it was decided to adopt a stratified, purposeful (judgemental) sampling strategy in order to develop a sample of CIOs reflective of the general constituency of CIOs across the USA. Stratified sampling has been previously deployed in research into transformational
leadership in nursing (Bowles & Bowles, 2000; Buddhakulsomsiri & Parthanadee, 2008; Koyuncu & Kadilar, 2010), and has been shown to improve the generalisability of findings.

3.4.2 Respondents selection
In order to conduct this research, it was first necessary to identify healthcare facilities that have CIOs and CMIOs from a range of regions. Institutions were identified across the continental USA in five distinctly different regions: the North East, South East, Central Corridor, Central Atlantic, and Western Regions. CIOs from these regions were then invited to participate in the research on the following conditions. First, the institutions must be greater than 500 licensed beds, either an Academic Medical Centre or Large Central Hub facility to a large integrated delivery network or large regional single hospital centre. Secondly, the centre must be multi-disciplinary by nature and employ the combination of Chief Information Officer and Chief Medical Information Officer. Finally, the facilities must be engaged or in the throes of deploying enterprise-wide Computerized Order Entry and Electronic Medical Record Systems. Twenty such facilities were identified and serendipitously, the twenty CIOs collectively, closely mirrored the demographics of the general CIO population, as discussed in Chapter 4.

3.4.3 Interview protocol and interview process
In an overarching sense, the study attempts to interpret and classify current perceptions of the effect leadership style has on physician adoption of digital technology. In the process, it should also provide insights into the perceived current efficacy of transformational leadership in medicine, against the desired state efficacy. Specifically however, the research needs to uncover what type of leadership style CMIOs should adopt in order increase the rate of physician adoption and acceptance of the specific technologies of Computerized physician order entry systems (CPOE) and Electronic Medical Record (EMR) systems.

The interviews will be conducted face-to-face with the CIO of each medical facility, in line with proven qualitative methods of semi structured questionnaire methods. The questions in the interview protocol are sculpted around thematic nodes related to the four pillars of transformational leadership with variables of idealized influence, inspirational influence, intellectual stimulation, and individualized consideration. These questions are
augmented by others questions relating to trust, ethics, organizational uniqueness and the controversial emerging physician executive topic. The interview protocol has been developed to explore certain areas of interest, without limiting the scope for alternative opinions or pre-empting directions (Eisenhardt, 1989). The interview process (see Appendix A) consists of 20 open-ended questions with a short three question quantitative capstone survey and it is envisaged that each interview will take approximately 60 minutes. All interviews are to be digitally recorded to ensure that the researcher is able to focus on building rapport and conversation with the participants and to allow the researcher to observe any unusual body language on the part of the participants. In order to enhance respondent attention and reduce recall bias, the researcher determined to use the critical incident technique, where possible to draw out various themes. Use of this method allows capture of richer information and themes that might not be uncovered by posing semi-structured interview questions, based solely on the theoretical framework.

Following the interview session, the digital data will be stored confidentially using pseudonyms in accordance with Newcastle University protocol. As soon as possible after each interview, the recording will be transcribed to a Word document and uploaded to NVivo 9 for detailed classification and storage within appropriate nodes for later content analysis. NVivo 9 has been used in a number of other qualitative studies (Andrew, et al., 2008; Bergin, 2011; Welsh, 2002) has been shown to provide meaningful construct validity. However the researcher needs to be cognisant of factors, such as restricted generalisability across construct validity (Gordon, et al., 2009), or the threat to internal validity in resource limited settings (Forster, et al., 2008). The use of NVivo 9 also reduces the reliance on reduction and intuition in the analysis of the data and this assists in better ensuring the reliability and validity of the study (Giorgi, 1985; Giorgi, 1997).

The content analysis will involve exploring themes in the data related to the variables in the theoretical framework and explore any unexpected themes in the data that may arise from which the researcher may make valid inferences (Lillis, 1999). The data is to also be coded using a nomenclature and interpretatively rated, to test strength of attitude, first using an 11-point scale, then segmented into five simple strength of attitude stages, in order to better quantify the interpretive data. To improve validity and reliability, triangulation will occur by comparing the findings with the findings of the three question capstone survey. In
order to undertake this comparison, all data will be normalised to percentage scores for comparison.

The quantitative capstone survey is aimed at measuring the respondents’ desired state perceptions of transformational leadership, if it was applied. This current and desired state seeks to highlight the research gap, and pinpoint the challenges in physician adoption of technology. The survey focuses on the major variables of transformational leadership, trust, and transformational leadership mediated by trust. The survey uses a 5-point Likert scale, as has been previously applied in numerous healthcare and educational leadership research studies (Dunham-Taylor, 2000; Korkmaz, 2007; Louis, Dretzke & Wahlstrom, 2010; Moolenaar, Daly, & Sleegers, 2010; Rouf, Chumley, & Dobbie, 2008; Xirasagar, 2008).

3.4.4 Pilot study
In the case of this research, the researcher did not conduct an official pilot study for the following reasons:

- Researcher time and budget constraints
- Respondents are at senior executive level and their time is precious
- Respondents would not agree to interview unless an official study, not just a pilot study
- Respondents in the USA interpret the word ‘pilot’ as a financial cost

Finally, the researcher has had years of interaction with, medical CIOs and more recently CMIOs and it has been these interactions that ignited the researcher’s interest in researching this topic; so in essence, a pseudo pilot study has been conducted over the past decade.

3.4.5 Main study
According to Bernhard, (1988) the use of semi-structured interviews is best used when respondents prepare ahead of time. Consequently, the Participant Information Statement (see Appendix C) provided prospective respondents with an overview of the types of questions they would be asked in the interview. This is even more relevant in this case due to the exceedingly time constrained environments in which CIOs operate. In this research, the actual interview is quite possibly the one and only chance the researcher may have to glean information, due to elite executive time compression (Welch, et al., 2002).
The interviews were conducted one-on-one basis between researcher and respondent, to minimise attention bias, and improve efficiency. As noted, CIOs are time conscious to the extreme; therefore the approach to each interview is a conversation with a purpose (Gibson, 1998). As previously noted, the researcher intended to use critical incident techniques as part of the interview strategy and this was successful in the interviews. Healthcare has a number of critical incidents, thereby providing the researcher with directive and focus tools to ensure the respondent does not stray from focal topic or timing, but still allows flexibility, should an interesting trend begin to occur.

All 20 respondents were CIOs from large privately held academic medical institutions in five regions of the USA and all regions were easily accessed by the researcher either by road or air. Although the CIOs came from competing healthcare institutions in the region, there is informal camaraderie and regional pride amongst CIOs, against other regional groups with a strong interest by all in physician adoption of digital technology. Therefore, all respondents were very open and frank in responding to the questions and often offered further information that they perceived might be of interest to the research. All interview participants were asked to respond to 20 questions based on drawing perception of the four major tenets of transformation leadership in idealized behaviours, inspirational motivation, intellectual stimulation and individualized consideration (Bass, 1985, 1997). This lays the foundational platform for respondents to provide any further thoughts they wished to add in relation to the open ended questions posed in the interview such as uniqueness and the rise of the physician executive as it applies to driving or hampering physician acceptance of technology.

Research should be carried out in an environment with the least chance of distraction (Bryman & Bell, 2007), such as a meeting room. However, in the case of CIOs, distraction is generally more related to time scarcity. Therefore, whilst there was an attempt to conduct the interviews away from the immediate workplace (the CIOs office) it was generally necessary to conduct the interviews in meeting rooms on the hospital grounds.

3.5 Reliability and validity

Qualitative methods have merit due to the depth and richness of data that can be obtained, coupled with analysis tools that can provide dependability, credibility, transferability and
confirmability. However, even given this merit, in cases where human lives and social welfare are involved, as in this healthcare research, a more comprehensive and multi-factorial research methodology, or mixed method, should be deployed to enhance the rigour of the findings (Tashakkori & Tedlile 2003; Vishwanath, Singh & Winklestein, 2010). The mixed-method approach better ensures the maximization of objective validity and reliability (Duffy, 1987). Patton, (2002) describes the ‘the researcher is the instrument’ and therefore validity and reliability relies depends on the credibility of the researcher themself. ‘Reliability and validity are tools of an essentially positivist epistemology’ (Watling, cited in Winter, 2000 p.7). Within the realm of qualitative research, reliability and validity are not viewed separately, from terms such as credibility, transferability, and trustworthiness (Winter, 2000). Trustworthiness is also a vital component in qualitative research to ensure reliability. (Seale, 1999 p.266) believed ‘Trustworthiness of a research report lies at the heart of issues conventionally discussed as validity and reliability’ suggesting that the ‘usual canons of good science’…require redefinition in order to fit the realities of qualitative research’ (Strauss & Corbin, 1990 p.250). According to Creswell, (2003) validity is affected by the researcher’s perception of validity and choice of paradigmatic approach; therefore many authors developed specific models and terms such as quality, rigor and trustworthiness (Brannen, 1992; Cavana, et al., 2001; Giorgi, 1997; Lincoln & Guba, 1985; Stenbacka, 2001; Winter, 2000). In the case of this research, there is a high level of trustworthiness and credibility in the data as it is provided by respondents with intimate industry knowledge. Furthermore, the mixed methods approach increases the trustworthiness of the findings.

3.5.1 Credibility

Johnson (1995), states that in order to have a ‘credible and defensible result’ in qualitative study, validity or trustworthiness needs to be maximized. Research is credible when the researcher and the data are trustworthy and recognised research methods are deployed. Hoepfl, (1997) notes the qualitative researcher seeks illumination, understanding and extrapolation to similar situations; rather than causal determination, prediction and generalization of findings. This research enacts transparency of detail across the continuum of the research method and process, through documenting an audit trail and using well
known research tools such as Nvivo 9 (Welsh, 2002). Finally, credibility is achieved through rigorous crosschecking of repetitive standard protocols and methods ensuring the theoretical framework central to the dissertation is followed diligently.

3.5.2 Confirmability

Authors Lincoln and Guba (1985), simplify and illustrate alternative criteria for judging the soundness of research. Their proposed criteria and the ‘analogous’ quantitative criteria are listed in the Table 3.5.

Table 3.1 Quantitative/qualitative comparative table

<table>
<thead>
<tr>
<th>Traditional criteria for judging quantitative research</th>
<th>Alternative criteria for judging qualitative research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal validity</td>
<td>Credibility</td>
</tr>
<tr>
<td>External validity</td>
<td>Transferability</td>
</tr>
<tr>
<td>Reliability</td>
<td>Dependability</td>
</tr>
<tr>
<td>Objectivity</td>
<td>Confirmability</td>
</tr>
</tbody>
</table>

The concept of confirmability speaks to the objectivity of the researcher, thus delivering the ability for others to confirm the method, findings and recommendations. Throughout the current study, a continual data audit has been ongoing and constant debate between the researcher and supervisor playing the ‘devil’s advocate role’ was evident and prevalent. Within the current research the following methods were enacted;

- The supervisor reviewed samples of the data and analysis (Marshall & Rossman, 1995)

- This research was subjected to a peer review process by senior colleagues within the Faculty of Business and Law at the University of Newcastle, prior to the research being approved as appropriate and achievable. Transcripts were produced from audio-recorded interviews for data analysis. Audio recording increase the accuracy of data collection and preserve details in a perfect condition.

- Alternatives views were sought through the literature to assess rival explanation and reflections (Glaser & Strauss, 1967).
An audit trail was established for future use in replication or similar studies (Lincoln & Guba, 1985).

### 3.5.3 Dependability

The quantitative view of reliability assumes replicability, but in the qualitative realm, conducting the same measurement of data multiple times, is not possible. Therefore qualitative researchers set forth the idea of dependability; inasmuch that the researcher is able to articulately account for the changes (Briesch, Chafouleas, & Riley-Tillman, 2010; Chafouleas, et al., 2007). A number of scholars endorse the concept of dependability synonymously with the concept of reliability used in quantitative research (Clont, 1992; Lincoln & Guba, 1985; Seale, 1999). Dependability focuses on the process of the research project. Specifically, that the process is logical, traceable and well documented (Schwandt, 2007).

- Logical interview and survey protocol and process
- Traceability using multiple recording methodologies.
- Well-documented procedural schedules and milestones.

### 3.5.4 Transferability

In qualitative research such as this, the main purpose is replication (literal or theoretical). Transferability means other researchers can apply the findings of this report Lee, et al., (2010). Representativeness and generalisability are not always crucial in qualitative research, hence enabling the ability to use a non-probability sampling methodology. Transferability or external validity is often expected to be low in qualitative research (Bryman, 2007). However in this research, the researcher deployed the following factors to increase transferability and generalisability.

- Thick descriptions
- Stratified sampling method
- Homogenous representative national sample
- The logic and method are transferable to other studies
- Triangulation using mixed methods improved transferability
3.5.5 Triangulation

Triangulation in research is analogous to triangulation in mathematics whereby crosschecking occurs. In research, this may be achieved by having multiple researchers interview the same person. It may also be achieved by using both qualitative and quantitative methods, based on a credible theoretical framework, in order to source data (Duffy, 1987; Hinds & Young, 1987; Montague, 2010). According to Hinds and Young (1987):

> Triangulation combines independent yet complementary research methods to: identify a chronology of events; provide evidence for internal validity estimates; enhance the description of a process or processes under study and; serve as a corroborating or validating process for study findings. Thus, an expanded understanding and contextual representation of the studies phenomena result.

Methodological triangulation was used in the dissertation to increase reliability and validity of data and to maximise the limited budget and time frame (Patton, 2002).

- Mixed methods approach
- Qualitative interviews on the same questions with 20 independent respondents
- The application of a quantitative capstone survey

3.6 Limitations of research

As with many time and resource limited studies, this research contains some inherent limitations that could be overcome in future studies. First of all, future research could be extended into wider geographic coverage including smaller regional cities and rural community settings. This research was principally confined to large-scale urban Academic Medical Centers in cities such as New York, San Francisco, Chicago, Los Angeles, Seattle and Boston to mention a few. Secondly, the current research lacked direct access and data gathering from medical practitioners or CMIOs. These additional informants may provide other insights into factors influencing the rate of physician adoption of computerized physician order entry, and electronic medical records systems in the USA. Thirdly, the current research focus is on the role of leadership in relation to the rate of adoption of electronic medical technology, from the perspective of CIOs. Future research could be extended to the multi-disciplinary clinical care team to give a more 360-degree view of the effectiveness of the Chief Medical Information Officer.
3.7 Researcher credibility

The researcher has substantial research experience in business and marketing. The researcher holds an MBA (with merit) from the University of Newcastle, Australia and a Bachelor of Business (with credit) from the University of Technology, Sydney. Additionally pertinent to this technical area, the researcher holds an Electronics Engineering Certificate (EEC) and a Green Belt Six Sigma Qualification. This researcher is a well-known and respected individual in the CIO community in the American medical industry and highly cognisant of the highly professional behaviour expected in the medical field. The researcher has carried out multi-method international marketing research, including focus group interviews and personal and online semi structured interviews. Furthermore, he has been involved with research in the specific arena of the study. The researcher’s industry experience, research background, knowledge of regional similarities and differences plus his extensive exposure to CIOs of leading US medical facilities, provides him with the skills, knowledge and capabilities to undertake this research.

3.8 Ethical considerations

Kipp and Leiding (2008), suggest ethical trust is vital in the medical fraternity and the choice of researcher is crucial in achieving this objective. As noted in the previous section, the researcher is known professionally to the CIOs and has developed a strong level of ethical trust with them over a number of years. To further enhance the ethics of this research, participation will be voluntary with no contingent reward for involvement.

In both the quantitative and qualitative research, general ethics are accomplished using constant awareness, anonymity, confidentiality and obviously, informed consent (Bryman & Bell, 2007). Ethical clearance was obtained from the Human Ethics Review Panel of University of Newcastle, Australia. A copy of this authority is provided in Appendix B. All research subjects were advised as to their rights as related to the semi-structured interview process and capstone survey and the fact their participation was voluntary and that they were entitled to withdraw from the interview process at any point, should they chose to do so. A Participation Information Statement was sent to each respondent (see Appendix C), to fully inform them of the research and to request their voluntary consent to participate. Further, as Pedersen and Gumpper (2008) suggest, in some cases, the consent letter was
reviewed by the internal organizational ethics board within some of the institutions. Respondents were also required complete a Consent Form (see Appendix D) prior to participating in the research. At the outset of each interview, the participant was verbally reminded of their rights.

In addition, the researcher was aware of the potential that the researcher may be asked to sign a business associates non-disclosure agreement or confidentiality agreement with the healthcare institutions. A non-disclosure agreement is often required in large academic institutions, given the competitive nature of the private healthcare competitive landscape. These agreements are common place with researchers, physicians and healthcare institutions in the USA, to ensure information security and organizational and individual anonymity by using pseudonyms (Cutcliffe & Goward, 2000; Kipp & Leiding, 2008; Lilja, Ordell, Dahl, & O. Hellzén, 2004). Finally, in order to maintain ethical integrity and to avoid any form of misrepresentation in the future, the researcher will not publish any material from this research that is directly attributed to respondents (even if anonymous), without first seeking the approval of the respective respondents.

3.9 Conclusion
This chapter has discussed the research methodology, research design and research implementation developed for this research. The chapter commenced with a discussion of the philosophical stance adopted by the researcher. It then justified the paradigmatic approach and underlying principles of the research. It went on to discuss alternative approaches to qualitative research, before identifying that the use of individual semi-structured interviews, coupled with a short quantitative capstone survey was the most appropriate. The chapter then discussed issues pertaining to the design and implementation of this research, before concluding with a detailed assessment of reliability and validity issues, the inherent limitations of the research and ethical issues considerations.
CHAPTER 4 - ANALYSIS OF TRANSFORMATIONAL LEADERSHIP

4.0 Introduction

This chapter analyses the research data gathered using the research methodology, design and implementation methods discussed in Chapter 3. The analysis seeks to answer the central research question stated in earlier chapters:

How does transformational leadership behaviour in Chief Medical Information Officers influence the adoption rate and acceptance of Electronic Medical Recording devices by physicians, when mediated by trust?

The prime objective of this research is to provide healthcare leadership stakeholders with an informed narrative, to shape policies relating to the implementation and acceptance of computerized physician order entry systems and electronic medical records in the USA. The purpose of this analysis is to seek expert perspectives on a very under-researched area, and yet an area that could have important human and financial implications for healthcare leadership in the USA. Specifically, to better understand the role and efficacy of transformational leadership exhibited by CMIOs, as they attempt engagement, adoption and acceptance of clinical digital technology systems by the specialist and general physicians.

Section 4.1 provides a background to the demographics of the respondents and the research environments in which the research was undertaken and discusses the concept of organizational uniqueness. Section 4.2 discusses the development of classification codes developed for this research and the linkages between the theoretical framework and questions from the interview protocol. Section 4.3 discusses the nomenclature developed for this research and the rationale for the nomenclature. Section 4.4 provides a comprehensive discussion of the qualitative and quantitative analysis of the data and section 4.5 concludes the chapter with a summary the findings of the analysis.

4.1 Demographic information

As noted in Chapter 3, research was conducted in 19 cities and 20 settings across the continental USA. To improve the generalizability and validity of research, subjects were randomly selected from the available pool of medical facilities matching the study criteria
in North-eastern, South-eastern, Western, and Central regions of the United States. To attain further granularity, a range of medical facilities were selected including those in large urban cities, rural remote networks, large central hubs and integrated delivery networks. Table 4.1 illustrates the regions in which respondents, the percentage of the total sample of respondents by region and the types of facilities.

Table 4.1 Research environments and types of facilities

<table>
<thead>
<tr>
<th>Region</th>
<th>State</th>
<th>Percentage of sample from state/region</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>IL</td>
<td></td>
<td>Academic</td>
</tr>
<tr>
<td>Central</td>
<td>IL</td>
<td></td>
<td>Academic</td>
</tr>
<tr>
<td>Central</td>
<td>TX</td>
<td></td>
<td>IDN</td>
</tr>
<tr>
<td>Central</td>
<td>WI</td>
<td></td>
<td>IDN</td>
</tr>
<tr>
<td>Central</td>
<td>WI</td>
<td></td>
<td>Facility</td>
</tr>
<tr>
<td>Central</td>
<td>WI</td>
<td></td>
<td>Academic</td>
</tr>
<tr>
<td>Central</td>
<td>WI</td>
<td>40%</td>
<td>IDN</td>
</tr>
<tr>
<td>Northeast</td>
<td>NY</td>
<td></td>
<td>IDN</td>
</tr>
<tr>
<td>Northeast</td>
<td>MA</td>
<td></td>
<td>Academic</td>
</tr>
<tr>
<td>Northeast</td>
<td>NY</td>
<td>15%</td>
<td>IDN</td>
</tr>
<tr>
<td>South East</td>
<td>MS</td>
<td></td>
<td>IDN</td>
</tr>
<tr>
<td>South East</td>
<td>AL</td>
<td></td>
<td>IDN</td>
</tr>
<tr>
<td>South East</td>
<td>FL</td>
<td>15%</td>
<td>Facility</td>
</tr>
<tr>
<td>West</td>
<td>ID</td>
<td></td>
<td>IDN</td>
</tr>
<tr>
<td>West</td>
<td>CA</td>
<td></td>
<td>IDN</td>
</tr>
<tr>
<td>West</td>
<td>CO</td>
<td></td>
<td>Facility</td>
</tr>
<tr>
<td>West</td>
<td>OK</td>
<td></td>
<td>IDN</td>
</tr>
<tr>
<td>West</td>
<td>WA</td>
<td>30%</td>
<td>IDN</td>
</tr>
</tbody>
</table>

Notes:
- Facility: Large regional centre generally servicing disparate population
- IDN: Integrated delivery network with a large central hub hospital
- Academic centre: Large urban teaching hospital connected to a medical school

To determine the potential for generalisability of the findings of this research, the researcher examined secondary data from the College of Healthcare Information

58
Management Executives (CHIME, 2008) and Dunford (2009) on the demographics of CIOs in the US healthcare industry. Fortuitously, the collective demographics of the respondents closely match the general population of CIOs in the USA and this suggests that the generalisability of the CIO perceptions gathered in this research should be relatively high. CHIME is a non-profit group dedicated to education and enhancement of the role of Chief Information Officers in the USA (CHIME, 2008). Table 4.2 illustrates the demographics of the individual respondents in this study and broadly shows CIOs are predominantly male - 85%; Caucasian - 95% and Masters or Doctorate educated - 75%.

Table 4.2 Respondent demographics

<table>
<thead>
<tr>
<th>ID</th>
<th>Gender</th>
<th>Age Range</th>
<th>Education</th>
<th>Ethnicity</th>
<th>MD Unique</th>
</tr>
</thead>
<tbody>
<tr>
<td>WE00001</td>
<td>Female</td>
<td>55-65</td>
<td>M. Psychology</td>
<td>Caucasian</td>
<td>CEO MD JD</td>
</tr>
<tr>
<td>WE00002</td>
<td>Male</td>
<td>55-65</td>
<td>Bachelors</td>
<td>Caucasian</td>
<td>MD Voluntary</td>
</tr>
<tr>
<td>CE00003</td>
<td>Male</td>
<td>45-55</td>
<td>Masters</td>
<td>Caucasian</td>
<td>Dual CMIO</td>
</tr>
<tr>
<td>SE00004</td>
<td>Male</td>
<td>55-65</td>
<td>Masters</td>
<td>Caucasian</td>
<td>CMIO Newly hired</td>
</tr>
<tr>
<td>CE00005</td>
<td>Male</td>
<td>35-45</td>
<td>Masters</td>
<td>Caucasian</td>
<td>MD Owned</td>
</tr>
<tr>
<td>CE00006</td>
<td>Male</td>
<td>45-55</td>
<td>Masters</td>
<td>Caucasian</td>
<td>MD Training</td>
</tr>
<tr>
<td>CE00007</td>
<td>Male</td>
<td>55-65</td>
<td>M. Psychology</td>
<td>Caucasian</td>
<td>MD Voluntary</td>
</tr>
<tr>
<td>NE00008</td>
<td>Male</td>
<td>35-45</td>
<td>Masters</td>
<td>Caucasian</td>
<td>MD Mature Adopters</td>
</tr>
<tr>
<td>CE00009</td>
<td>Male</td>
<td>45-55</td>
<td>Bachelors</td>
<td>Caucasian</td>
<td>MD Competitive</td>
</tr>
<tr>
<td>WE00010</td>
<td>Male</td>
<td>45-55</td>
<td>Doctorate</td>
<td>Caucasian</td>
<td>Multiple CMIOs</td>
</tr>
<tr>
<td>WE00011</td>
<td>Male</td>
<td>35-45</td>
<td>Bachelors</td>
<td>Caucasian</td>
<td>MD Ageing</td>
</tr>
<tr>
<td>SE000012</td>
<td>Female</td>
<td>55-65</td>
<td>Masters</td>
<td>Caucasian</td>
<td>CMIO Self Appointed</td>
</tr>
<tr>
<td>NE000013</td>
<td>Male</td>
<td>45-55</td>
<td>Doctorate</td>
<td>Caucasian</td>
<td>MD CMIO</td>
</tr>
<tr>
<td>NE000014</td>
<td>Female</td>
<td>55-65</td>
<td>Masters</td>
<td>Caucasian</td>
<td>MD CMIO Physician</td>
</tr>
<tr>
<td>CE000015</td>
<td>Male</td>
<td>55-65</td>
<td>Bachelors</td>
<td>Caucasian</td>
<td>CMIO CMIO Vision</td>
</tr>
<tr>
<td>WE000016</td>
<td>Male</td>
<td>55-65</td>
<td>Bachelors</td>
<td>Hispanic</td>
<td>CMIO Not Practicing</td>
</tr>
<tr>
<td>CE000017</td>
<td>Male</td>
<td>55-65</td>
<td>Doctorate</td>
<td>Caucasian</td>
<td>MD CEO</td>
</tr>
<tr>
<td>SE000018</td>
<td>Male</td>
<td>45-55</td>
<td>Masters</td>
<td>Caucasian</td>
<td>CMIO Region Specific</td>
</tr>
<tr>
<td>CE000019</td>
<td>Male</td>
<td>45-55</td>
<td>Masters</td>
<td>Caucasian</td>
<td>CMIO New</td>
</tr>
<tr>
<td>WE000020</td>
<td>Male</td>
<td>45-55</td>
<td>Masters</td>
<td>Caucasian</td>
<td>Community Ownership</td>
</tr>
</tbody>
</table>

4.1.1 Organizational uniqueness

Throughout the data analysis, the theme of organizational uniqueness was raised by respondents on a number of occasions, and the researcher noted it as an important and relevant factor in relation to the overarching research question. The respondents identified that even though all healthcare providers deliver healthcare, clearly no two institutions have
the same physician leadership, general executive leadership style, culture, structure or processes, roles or allocation of roles. This organizational uniqueness, illustrated in Figure 4.1 reflects that respondent organizations range from single facility institutions, academic teaching facilities to integrated delivery networks (non-profit and for-profit). From a methodological perspective, it should be noted that undertaking research in multi-variant organization types, further enhances external validity and therefore improves generalizability (Judge & Piccolo, 2004b; Lomas, 2005).

Figure 4.1 Organizational uniqueness

4.2 Development of classification of codes

Whilst very limited research has been undertaken in relation to this study’s specific research problem, Andrews et al., (2008) applied NVivo 8 in conducting a mixed methods
approach in healthcare related research. Based on the similarities between the research methodology used in this study and that of Andrews, et al., (2008); this research adopted NVivo 9 for qualitative analysis. The program was initially configured with themes and nodes based on the key variables in the theoretical framework. These themes were the four pillars of transformational leadership and trust. During the interview process, three other themes became evident as potentially important and these were also added as initial nodes. These themes were ethics, organizational uniqueness and the emergent physician executive movement. The last theme relates to changes in senior management in the US healthcare system. Historically, CEOs in US healthcare have been from business backgrounds yet over the past few years, CEOs are increasingly being drawn from the physician community.

The researcher used all tools available within NVivo 9, including staging, auto coding and re-coding, and new nodes into free-nodes after thorough analysis process. The segmentation process assisted in facilitating initial auto-coding of transcripts upon upload of the Word document transcripts to the program. The auto coding process greatly improved research process productivity. Figure 4.2 illustrates the themes and nodes initially configured in NVivo 9.

After auto-coding occurred, the researcher analyzed the auto-coded transcripts in order to identify any other themes that related to the research problem. When other themes were identified, the researcher created additional nodes through free coding in order to better identify a range of additional factors that may relate to the research problem (Bergin, 2011). A number of free-coding iterations occurred during the analysis process and this assisted the researcher to identify how additional themes uncovered in the data related to the theoretical framework (Jackson, 2003).
Figure 4.2 **Themes and nodes based on the theoretical framework**

Figure 4.3 illustrates the linkages between the theoretical framework and the themes derived from the semi-structured interview questions. Figure 4.3 was adapted from a similar illustrative figure used by Lunney (2008) in nursing research. The top box in Figure 4.3 indicates the interview questions that link to the four tenets of transformational leadership and their related sub-themes. This graphical overview allows the reader to review the theoretical framework in action. The shaded circle at the top depicts the sub-themes related to the four tenets of transformational leadership.
Figure 4.3 Graphical review and linkage of theoretical framework to data analysis
The central section highlights the use of the three question quantitative survey adapted for this research, from healthcare research by Menaker and Bahn, (2008). This quantitative survey links the interpretive strength of attitude of the qualitative study, to the mediating variable of trust, uniqueness, ethics and the physician executive movement. The map is cognisant and representative of the theoretical framework, inputs, outputs, interactions, linkages and mediating variables (Cho and Dansereau, 2010).

The questions posed at each interview were developed in order to test the factors highlighted in the theoretical framework. Table 4.3 illustrates which questions relate to which factor and how both relate back to the four underpinning themes from the transformational leadership literature. It should be noted that questions 21 and 22 were not in the original interview protocol; rather, they evolved during the interview process.

Table 4.3 Interrelationship between questions and variables

<table>
<thead>
<tr>
<th>Leadership Coding Tabulation</th>
<th>Factor</th>
<th>Code</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situational Uniqueness S-U</td>
<td>Uniqueness</td>
<td>TL-SU</td>
<td>1</td>
</tr>
<tr>
<td>Role Model</td>
<td>IB-RM</td>
<td>2, 17</td>
<td></td>
</tr>
<tr>
<td>Profession</td>
<td>IB-PR</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Respect</td>
<td>IB-RS</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Inspirational Motivation IM</td>
<td>Vision</td>
<td>IM-VS</td>
<td>8, 16</td>
</tr>
<tr>
<td>Motivation</td>
<td>IM-MT</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Team</td>
<td>IM-TM</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Intellectual Stimulation IS</td>
<td>Innovation</td>
<td>IS-IN</td>
<td>15, 18</td>
</tr>
<tr>
<td>Creativity</td>
<td>IS-CR</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Challenging</td>
<td>IS-CH</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Individualized Consideration IC</td>
<td>Empathy</td>
<td>IC-EM</td>
<td>3, 20</td>
</tr>
<tr>
<td>Coach</td>
<td>IC-CO</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Goals</td>
<td>IC-GO</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Trust - Mediating Variable</td>
<td>Trust</td>
<td>TL-TR</td>
<td>14, 19, 21</td>
</tr>
<tr>
<td>Ethics - Environmental Variable</td>
<td>Ethics</td>
<td>TL-ET</td>
<td>10</td>
</tr>
<tr>
<td>Leadership Controversy - Role Flip</td>
<td>Role Flip</td>
<td>TL-RF</td>
<td>22</td>
</tr>
<tr>
<td>Quantitative Survey</td>
<td>TL</td>
<td>ML-Q!</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Trust</td>
<td>ML-Q2</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>TL&amp;Trust</td>
<td>ML-Q#</td>
<td>25</td>
</tr>
</tbody>
</table>
A key function of the table is to link the variables to the theoretical framework and thereby address the central research question. This approach allows the researcher to build on previous transformational leadership studies, simultaneously testing the variables and other themes that emerged in the analysis process. The two major themes that arose during the interview process were the importance of the CMIOs ethical standards and what this research defines as the ‘role flip controversy’. Historically in the USA, CEOs have been business people without any medical credentials and CIOs have been technical experts without any medical credentials. Today however, this situation is changing and there is an increasing trend for medical practitioners with additional business qualifications or technical qualifications to take on CEO and CIO roles. As a consequence, it is becoming more likely that in the future, todays technically qualified CIOs may actually become subordinate to the technically and medically qualified CMIO. The role-flip is a subset of the greater physician executive movement in which medical practitioners are increasing filling positions in the ‘C’ Suite (CEO, CIO, CFO, CMO, CMIO).

Furthermore as discussed in Chapter 3 and illustrated in Figure 4.3, a three-question quantitative capstone survey using a five-point Likert scale (strongly disagree to strongly agree), was presented to each respondent at the end of each interview session. This was done as a triangulation method to improve the validity and accuracy of the qualitative data, as suggested by Vishwanath, Singh and Winklestein (2010). A discussion on the findings of the capstone survey is in Section 4.4.9 of this chapter.

### 4.3 Nomenclature

As part of the analysis process, a nomenclature was developed to identify strengths of attitudes in themes identified by respondents. The nomenclature was used as a method of ensuring consistency, regarding measuring respondents’ strength of attitude in relation to themes. The nomenclature is a five-stage scale, adapted from Purchase (1999), and is used to classify strength of attitude from very slight to very strong. This five stage scale was collapsed from an initial percentage based eleven point granular scale. Table 4.4 illustrates the eleven-point scale adjusted to five stage scale.
4.4 Analysis of data

Of key significance from the analysis of the data is that there is a gap between what the respondents hope for, in terms of the leadership performance in their CMIOs, in relation to physician acceptance of information technology and the perceived current situation. What is significant is that this gap is analogous to the research problem at the base of this study. Across the population of respondents, there was a strong to very strong consensus of the core necessity for effective leadership in the role of CMIO. Certain scores reflect the current poor adoption of computerized physician order entry systems (CPOE) and electronic medical records (EMR), while other scores provide a clear roadmap as to what has been successful. Consequently, this analysis uncovers lacking transformational attributes, thus building a platform for recommendations for future growth in the area of leadership and physician adoption with acceptance of digital technology.

4.4.1 Importance of idealized behaviour – strong

Central to this study is the deeper analysis of the four tenets of transformational leadership; of which idealized behaviour is the first factor to be analysed. The analysis of idealized behaviour provides results that contradict previous research, specifically that related to the importance of charismatic attributes (Waldman and Yammarino, 1999). The data suggest a strong negative relationship between charismatic leadership and leadership effectiveness in the medical fraternity. As illustrated in Table 4.5 in relation to question 17, charismatic leadership is not perceived tenable in terms of training and engaging physicians in technology. This single factor inordinately skewed the overall impact of idealized behaviour.

Table 4.4 Nomenclature scale table

<table>
<thead>
<tr>
<th>Eleven Point Scale</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0%</td>
<td>10%</td>
<td>20%</td>
<td>30%</td>
<td>40%</td>
<td>50%</td>
<td>60%</td>
<td>70%</td>
<td>80%</td>
<td>90%</td>
<td>100%</td>
</tr>
<tr>
<td>None</td>
<td>Very Slight</td>
<td>Slight</td>
<td>Strong</td>
<td>Very Strong</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4.5 **Questions related to idealized behaviour**

<table>
<thead>
<tr>
<th>Question number</th>
<th>Question description</th>
<th>Pillar code</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Would you say that your CMIO lead by example? (If yes) could you give me an example?</td>
<td>IB-PR</td>
<td>70.5%</td>
</tr>
<tr>
<td>13</td>
<td>To what extent does your CMIO encourage physicians to extend their creativity in relation to trying new procedures, practices or equipment?</td>
<td>IB-RS</td>
<td>74.5%</td>
</tr>
<tr>
<td>17</td>
<td>To what extent do you believe that the level of adoption of new technologies by physicians is directly correlated to a CMIOs charismatic leadership style?</td>
<td>IB-RM</td>
<td>35.5%</td>
</tr>
</tbody>
</table>

**Role model theme**

Deeper analysis demonstrates the importance and need for a role model leadership style or ‘leading by example’ when attempting to attain physician acceptance. Two phrases highlighting the immense importance of CMIOs leading by example were repeated in forty percent of the interviews and were free coded within the miscellaneous nodes: ‘Walk the Walk’ and ‘Eat their own dog food’. In the USA, based on military and sporting culture, these powerful colloquialisms denote that the concept of doing what you are asking others to do is a powerful motivator. Physicians are generally sceptical (Weimar, 2009) and the concept of a charismatic leadership approach is not workable in the medical environment thus contradicting a vast body of previous research highlighting charisma as determinant of organizational effectiveness (Binning, 1990). This is key to the CMIOs ability to be perceived, as a role model is their clinical and technical heritage. Across all interviews more than sixty percent of respondents made comments similar to those below as barriers to gaining ‘pied piper’ status:

- ‘Let’s just say no one would see a pathologist or dermatologist as a role model’
- ‘Geek-oid CMIOs don’t have a chance with the larger physician community’

One example of failed CMIO appointment was demonstrated in the following anecdote given to the researcher by a Midwestern CIO.

‘We hired the CMIO due to his strong medical credentials and technical prowess rather than leadership skills and we are paying the price. His approach is to
patronize and mock those who are slow to adopt. This CMIO created repulsion rather than attraction with the physicians and I need to make a change.’

Another Chief Information Officer in the South Eastern Region echoed the sentiment:

‘They all ran in the opposite direction when they see our Chief Medical Information Officer coming’.

**Charismatic leadership theme**

As previously noted question sixteen, directly relates to the negative impact of charismatic leadership style and negatively skewed the overall average for the idealized behaviour node. This question relates to transformational leadership and the efficacy of charismatic attributes in engaging physicians and gaining adoption. It returned the lowest score of thirty five percent. Conversely and interestingly two of the three female respondents contradicted their male colleagues by perceived charismatic leadership qualities in a positive light. The female respondents saw the charismatic attributes as valuable, specifically in terms of charismatic communication, in direct opposition to the majority of male respondents. The data also illustrates that the CMIOs clinical career history may be fundamental for them to be deemed a purveyor of idealized behaviour. Responses unanimously indicated that CMIOs displaying the following characteristics were most successful as role models:

- Practicing physician
- Personally uses the products they want others to adopt
- Internal medicine generalist with a hospital background, rather than a specialist from fields such as pathology and dermatology

Comments from all respondents strongly suggested that the most successful CMIOs continued practicing medicine, had personally used computerized physician order entry systems (CPOE) and electronic medical records (EMR); only at that point where they were ‘allowed’ to act as role models due to their clinical heritage. These finding support recent related research by Shaffer and Lovelock (2010), see Figure 4.4, who find that internal medicine and primary care hospitalists are most likely to become CMIOs.
Developed from Shaffer and Lovelock (2010), for this research

**Respect theme**

Respondents with an education in medicine or psychology, as opposed to those with an education in business or engineering IT, had a different strength of attitude in relation to the human nature of their CMIOs. The CIOs with psychology or education backgrounds strongly suggested that CMIOs who understand the physician mindset are better able to gain respect and this in turn leads to higher physician acceptance of CPOE and EMR.

This finding concurs with Bujak (2008) who suggests physicians respect those who both understand the complexity of the physician’s mind and the intricacies of the levels of professional respect, based on the medical hierarchy. Forty five percent of respondents reported institutions led by a CEO supportive of electronic medical record technology and a top down culture, had markedly higher level of physician acceptance of technology. Across the board, the highest levels of perceived physician adoption and satisfaction were in institutions where the CEO, the CIO and the CMIO were all MDs.

This finding suggests support for the current movement towards the physician executive in that there may be merit in a move towards C-Suites led by physicians, rather than stakeholder focused CEOs and IT focused CIOs.

In conclusion, from an idealized behaviour perspective, charismatic leadership is generally perceived negatively within healthcare. Conversely, CMIOs who address the physician’s psychological and humanistic requirements, and act as role models through
leading by example, positively link to physician engagement, adoption and acceptance of technology.

### 4.5.2 Importance of inspirational motivation – very strong

The second of the four tenets of transformational leadership is the concept of inspirational motivation. This section presents an analysis of the themes uncovered in response to questions related to this concept. As Table 4.6 illustrates, the focus of the questions posed in relation to inspirational motivation were vision, teamwork and motivation.

<table>
<thead>
<tr>
<th>Question number</th>
<th>Question description</th>
<th>Pillar code</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>When addressing a group of physicians regarding the benefits of adopting some type of information technology, does your CMIO communicate in a matter of fact manner or do they tend to be more inspirational?</td>
<td>IM-TM</td>
<td>81.5%</td>
</tr>
<tr>
<td>5</td>
<td>Could you give me an example of how your CMIO motivates physicians to experiment with and adopt innovative techniques, equipment or procedures?</td>
<td>IM-MT</td>
<td>71.5%</td>
</tr>
<tr>
<td>8</td>
<td>Does your CMIO inspire physicians to adopt electronic medical records by explaining their vision or do they take more of a compliance approach?</td>
<td>IM-VS</td>
<td>74.0%</td>
</tr>
</tbody>
</table>

#### Vision theme

Eighty-one percent of the respondents agreed presenting a vision was important. However, respondents equally noted subtle yet powerful differences in the method and presentation of the vision, when compared to the business literature on presenting a vision.

Respondents were adamant that the concept of a ‘big picture’ vision was not workable in the medical fraternity. Rather, a clear vision needs to be implemented incrementally and in a ‘matter of fact manner’, rather than a theatrical manner. This finding is analogous with the finding in the previous section in relation to charismatic leadership and suggests that,
although the big picture approach is often appreciated in the corporate world, it is not appreciated in the medical world.

**Motivation theme**

The literature suggests that physicians adopt change one brick at a time but as a group, the majority is dragged along behind and this has been characterized by the slinky analogy (Bujak, 2008). Once innovators and early adopters are in line with adoption of policy or technology, the tension pulls along the laggards in their own time, in line with transformation change theory (Silvey, 2004). The following themes were identified in relation to question five on what motivates physicians:

- Peer group pressure to change
- CEO Electronic Medical Record support
- Executive physician leadership in the ‘C’ suite
- Government compliance forcing them to adopt technology
- Financial incentives to go digital and punishment for non-compliance

**Team theme**

Although the researcher recorded a strong message about the deeply individualistic mindset of the physician, the data presented moderate level of support for the concept of teamwork, in relation to the adoption of technology. Various groups were inspired differently, based on their comfort level within the different technology adoption phases. Innovators and early adopters were prepared to be stretched as a group, whereas the latent majority tended to be pulled along. Although the results presented support in response to inspirational motivation for group adoption, this attribute was supported in concept only.

**4.4.3 Importance of individualized consideration - strong**

The third of the four tenets of transformational leadership is the concept of individualized consideration. This section presents an analysis of the themes uncovered in response to questions related to this concept. Of all four tenets, individualized consideration was the most strongly supported by respondents as being a leading success factor in the adoption of
IT by physicians, although many saw the shortcomings in the current performance of their CMIOs.

The percentages noted in Table 4.7 were derived from respondents’ perceptions of the current performance of their CMIOs and suggest some CMIOs may have low levels of emotional intelligence. This is perhaps not surprising, as medicine has been based on a model in which doctors are trained to deal with individuals, not organizations and to take personal responsibility rather than delegate. In essence doctors do their best for each patient, rather than make trade-offs in a resource constrained environment (Edwards, Kornacki & Silversin, 2002).

Table 4.7 Questions related to individualized consideration themes

<table>
<thead>
<tr>
<th>Question number</th>
<th>Question description</th>
<th>Pillar code</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>To what extent would you say that your CMIO has empathy with the medical practitioners with whom they work? (if yes) Do you believe that their empathic approach impacts on the speed of adoption of information technology?</td>
<td>IC-EM</td>
<td>66.5%</td>
</tr>
<tr>
<td>11</td>
<td>To what extent does your CMIO focus on the personal needs or concerns of individual physicians when encouraging them to adopt new technology?</td>
<td>IS-GO</td>
<td>72.0%</td>
</tr>
<tr>
<td>7</td>
<td>Could you describe any behaviors or techniques that your CMIO might use to get his or her point across to each doctor at an individual level?</td>
<td>IC-CO</td>
<td>72.0%</td>
</tr>
<tr>
<td>13</td>
<td>To what extent does your CMIO encourage physicians to extend their creativity in relation to trying new procedures, practices or equipment?</td>
<td>IB-RS</td>
<td>74.5%</td>
</tr>
</tbody>
</table>

Question thirteen used critical incident technique to measure strength of attitude in reaction to the question due to the fact the interview process was at the midway point. The traditional transactional physician adoption model is problematic because today forcing mechanisms backed by legal requirement to adopt Computerized physician order entry
systems (CPOE) and Electronic Medical Record (EMR) Systems are dragging physicians rather than enticing them, to become part of the organization rather than remain autonomous. Consequently, it may be that physician education in general and CMIO education in particular needing to incorporate leadership training. The data suggests such leadership training needs to focus on emotional intelligence in order to enhance the level of individualized consideration from CMIOs towards physicians.

**Empathy theme**
Throughout the analysis, the data indicates empathy, as the leadership attribute respondents identified most strongly with, in the drive to overcome the physician adoption challenge. Additionally, most respondents reported that empathy in their CMIOs was sub-optimal and a reliance on the technology *selling itself* by administrators and CMIOs was central to the adoption problem.

Seventy-five percent of respondents saw limited success in the adoption of technology singularly relying on the segmented transactional technology adoption lifecycle approach. This approach is depicted as engaging innovators then early adopters, in order to eventually gain mainstream acceptance. Further, 75% of respondents suggested that an individualised one on one approach with physicians was the best way to gain acceptance of the technology. Respondents who reported success factors in leadership and physician adoption made comments such as, the ‘CMIO needs to live a day in the life of the resisting physician’ and the CMIO must adapt the techniques to the individual’.

**Goals theme**
Within the medical profession, execution of goals based on strict repetitive policies and procedures is the norm. Given this backdrop, the data highlighted strong strength of attitude, in relationship to CMIOs using goal-based scenarios, customized by physicians groups, such as order sets in CPOE. In the case of individuality, the data suggests CMIOs who used one-on-one incremental goal based training had far superior outcomes. Interestingly, the older respondent demographic group comprehensively reported goal-based methods as key to success in driving adoption. However, they also suggested that the use of broad organizational compliance goals would meet immovable resistance, except in
the case of external government compliance via the HITECH portion of the ARRA and the meaningful use objectives.

**Coach theme**

The analysis suggests that the challenge for CMIOs is being seen as an empathetic fellow physician and not a mouthpiece for the administration or government. The physicians will ignore if they are perceived as a mouthpiece for the empathic approach. Some provided success and failure, related to an empathic, versus non-empathic behaviour follow:

**Successful goal based individualized consideration techniques**

‘CMIO understands the physician resistance is actually resulting from fearful ageing physicians and screen font visibility’

‘CMIO understands and address the financial aspect so that the unexpected consequences of EMR adoption slowing workflow don’t inadvertently reduce income to physicians’

**Failed goal based individualized consideration techniques**

‘Dictating that the use of CPOE and EMR systems is mandatory by using autocratic patronizing tactics, while also ignoring specialty groups’

‘Use contemptful explanatory methods’

‘Have the Chief Medical Information Officers tagged as a ‘geekoid’

In summary, the empathic leadership factor strongly supports previous research in other studies related to transformational leadership efficacy. This analysis illustrates the need to train CMIOs as to the power of gaining ‘one doctor at a time’ given the slinky effect in technology adoption in healthcare. As one CIO MD respondent stated:

> In order to provide empathic physician engagement, within the highly sceptical ultra-resistance physician world, the Chief Medical Information Officers requires a more *self-deprecating approach* in stark contrast to how one may think of empathy. Doctors have an inherent inability to fail based upon the real or perceived pedestal they are place on by society and medical fraternity based on seniority or clinical prowess. Therefore any changes in technology, policy or practice, raise fear of failure and possible loss of face amongst their peers or worse subordinates. When the CMIO appears to be a listener, rather than a dictator, the adoption rate will dramatically increase.

*CIO of Large Academic Medical Centre in the North Eastern Region*
In conclusion, the lacking attention to the humanistic factor of leadership was evidenced as a core and yet somewhat hidden challenge, facing organizations with low adoption rates of digital clinical technology. Many organizations had hired the CMIO based on their clinical or technical prowess rather than their leadership or human resource management skills. One respondent encapsulated the current clinical leadership chasm in regards to physician resistance/acceptance in the following poignant phrase: ‘Physicians by default lead themselves not others’.

4.4.4 Importance of intellectual stimulation – very strong

The fourth tenet of transformational leadership is intellectual stimulation. Table 4.8 presents the findings of the questions in relation to the sub-themes on intellectual stimulation: innovation, creativity and challenge. In line with other variables from the theoretical framework, intellectual stimulation is integrally linked to the leadership style of the CMIO.

<table>
<thead>
<tr>
<th>Question number</th>
<th>Question description</th>
<th>Pillar code</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Does your CMIO set tasks or encourage behaviors that force the physicians to move outside their comfort zone? (If yes) could you give me an example?</td>
<td>IC-TM</td>
<td>64.5%</td>
</tr>
<tr>
<td>12</td>
<td>Could you describe the types of behaviors or actions your CMIO might use in gaining clinical acceptance of technology by medical practitioners?</td>
<td>IS-CH</td>
<td>71.5%</td>
</tr>
<tr>
<td>15</td>
<td>Do your CMIO use different types of motivational techniques to encourage individual doctors to adopt new technologies? (If yes) could you give me an example?</td>
<td>IS-IN</td>
<td>73.0%</td>
</tr>
<tr>
<td>9</td>
<td>Tell me if and how your CMIO intellectually stimulates doctors to use creative methods to adopt technology</td>
<td>IS-CR</td>
<td>71.5%</td>
</tr>
</tbody>
</table>

**Innovation theme**

The respondents reported that clinical leaders, such as CMIOs, must espouse their plan and be more of a helping hand, rather than an aloof ‘clinical elitist’ or ‘geekoid’. Respondents
suggest that without taking a helping hand approach, coupled with being ethical and trustworthy; the concept of physicians even being open to intellectual stimulation is null and void. However, even though CMIOs who embody these attributes have a greater chance of engagement, the respondents suggested on multiple occasions that adoption would only take place if the CMIOs first engaged innovator and early adopter physicians to drive innovation. The main theme identified was that first engaging innovators and early adopters would lead to Gladwell’s (2000) construct of the tipping point, where the laggards will succumb to pressure and join the rest. From this point forward it was suggested that all members would then be open to innovative stimulation.

Creativity theme
More than 60% of respondents stated that even though physician resistance to technology and change remains, to intellectually stimulate physicians the CMIOs tactics need to vary, based on the user in question. This finding also reinforces the tenet of individualized consideration discussed previously. Some of the successful creative approaches CMIOs used were reported as follows:

• ‘Surgeons and specialists most often require one on one attention’
• ‘Early adopters seek technology early; such as testing iPads’
• ‘Referral physicians need to understand shortcuts to order entry only’

Whilst the above mentioned approaches may obviously not apply to all 760,000 physicians currently practicing in the USA, it would appear that creativity in the method of approach is a key success factor for the most effective CMIOs.

Challenging theme
The concept of training by ‘see-one-do-one’ was constantly reported in the interviews as a success factor. In the USA, this powerful colloquialism, denoting that people learn by observing another, perhaps based on the US education system, appears to be a powerful motivator. Examples provided by respondents on ‘see-one-do-one in action included one-on-one training, focus groups, exhibitions and demonstrations of workflow. Customizing order sets was also described as an effective method of challenging and enticing physician adoption. The use of demonstration exhibitions by early adopter physicians to other
physicals in the community, coupled with a CMIO transformational leadership style was reported to rapidly change the overall rate of adoption and acceptance.

4.4.5 Importance of ethics

Although ethics is external to the theoretical framework within this study, the analysis reveals a definite direct impact on the rate of adoption or rejection of digital technology by physicians, based on perceived or real ethical issues. Apart from one respondent not answering this question conclusively, because they found it confronting, all other respondents perceived to be of the utmost importance.

The level of importance respondents gave to the construct of ethics was also evident in the length and breadth to which this question was answered. Chief Information Officers decided to interpret and segment ethics into organizational, professional and personal categories to varying degrees. Analysis of this question provided emotive and rich data sets for future research. Some respondents cited the hierarchy of ethics (organizational, professional, personal) as inextricably linked to one another and from that position stated that trust based on the ethics of the (CMIO) are directly linked to gaining physician acceptance and adoption of technology. Seventy Five percent of respondents stated physicians are most attracted to medical facilities with strong reputations for high ethical standards as they are seeking an ethical framework in which to practice medicine. The importance of ethics was also highlighted in the analysis of the miscellaneous nodes created in NVivo 9. These words ‘crucial’ and ‘vital’ were consistently associated with the construct of ethics. One hundred percent of respondents stated personal ethics as ‘crucial’ and 85% stated professional ethics rule supreme from the physician standpoint. Eighty percent of respondents rated that lacking, or a perceived lack of professional ethics as the death knell for the CMIO. It would appear from the comments that in the medical profession, professional medical ethics override all other ethical standpoints. The following are examples of what several respondents sae as unethical CMIO behaviour.

- CMIO perceived to be driving administration plans in absence of physician and patient needs
- CMIO forces technology on physicians leading to uncertainty and inability to deliver patient care or billing.
• CMIO has personal association with key software vendors

Lacking ethics in healthcare is simply not a salvageable factor. It would appear that the moment once CMIOs perceived integrity or ethics are in question that CMIO is ignored.

4.4.6 Importance of trust

The respondents reported trust underpins the concept of healthcare and overshadows transformational leadership attributes or exemplifies it in the case of a combination of both factors. As the findings in Table 4.9 illustrate, trust between colleagues in medicine is inextricably linked to the rate of adoption and acceptance of clinical digital technology.

In summary, interview questions related to trust evoked a plethora of descriptive words such as ‘crucial’ ‘vital’ ‘showstopper’ and these are clear indications as to the importance of trust in healthcare.

Table 4.9 Questions related to trust

<table>
<thead>
<tr>
<th>Question number</th>
<th>Question description</th>
<th>Pillar code</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>How important do you think the physicians’ level of trust in the CMIO is, when it comes to clinical adoption of technology?</td>
<td>TL-TR</td>
<td>98.5%</td>
</tr>
<tr>
<td>19</td>
<td>Could you describe any relationship you see between your CMIOs leadership style and the level of trust they have engendered in their medical colleagues?</td>
<td>TL-TR</td>
<td>95.5%</td>
</tr>
<tr>
<td>21</td>
<td>Could you explain whether or not trust between colleagues is important in the field of medicine? (if yes or no) why is it/is it not important?</td>
<td>TL-TR</td>
<td>95.0%</td>
</tr>
</tbody>
</table>

4.4.7 Analysis of impact of organizational uniqueness

The concept of organizational uniqueness was tested in order to draw out any linkages between organizational uniqueness and the rate of physician adoption of technology. Deeper analysis of individual response ratings reported higher general strength of attitude in relation to physician adoption and acceptance in settings where the CEO was a medical professional rather than a traditional business administrator. Table 4.1 illustrates the findings. The arrows represent the direction of attitude (up for positive adoption and down
for negative adoption) whilst the bar indicates an unknown effect. These findings tend to suggest that the current situation in which medical practitioners are increasing filling positions in the ‘C’ Suite may be a positive influence on physician adoption of digital technology. Furthermore, the strength of attitude towards the importance of all transformational leadership attributes, other than charismatic visionary personalities, was greater in these institutions than in other institutions. These findings suggest that physician led facilities, have the greatest success in achieving adoption and acceptance of technology.
Table 4.10 **Uniqueness effect on physician adoption table**

<table>
<thead>
<tr>
<th>Uniqueness Factor</th>
<th>Direction of attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>New CMIO</td>
<td></td>
</tr>
<tr>
<td>CEO MD JD</td>
<td></td>
</tr>
<tr>
<td>Dual CMIOs</td>
<td></td>
</tr>
<tr>
<td>Early Adopters</td>
<td></td>
</tr>
<tr>
<td>MD MBA CMIO</td>
<td></td>
</tr>
<tr>
<td>MD CIO no CMIO</td>
<td></td>
</tr>
<tr>
<td>Teaching Hospital</td>
<td></td>
</tr>
<tr>
<td>Physician Owned</td>
<td></td>
</tr>
<tr>
<td>CMIO Psychiatrist</td>
<td></td>
</tr>
<tr>
<td>Self-appointed CMIO</td>
<td></td>
</tr>
<tr>
<td>Region Specific CMIO</td>
<td></td>
</tr>
<tr>
<td>Multiple Regional CMIOs</td>
<td></td>
</tr>
<tr>
<td>MD Competitive environment</td>
<td></td>
</tr>
<tr>
<td>CMO is a Transformational Leader</td>
<td></td>
</tr>
<tr>
<td>MD Ownership of Healthcare System</td>
<td></td>
</tr>
<tr>
<td>CEO MD and CMIO reports to the CMO</td>
<td></td>
</tr>
<tr>
<td>CMIO challenged by ageing MD Population</td>
<td></td>
</tr>
<tr>
<td>Region Specific CMIO with no central Authority</td>
<td></td>
</tr>
<tr>
<td>CMIO unable to practice medicine due to state law</td>
<td></td>
</tr>
<tr>
<td>Region Specific Clinical Directors</td>
<td></td>
</tr>
<tr>
<td>Reporting the CMIO</td>
<td></td>
</tr>
</tbody>
</table>

Developed from this research
4.4.8 Analysis of the impact of leadership controversy

During the interview and analysis processes, the researcher became aware that there was a deep seated and yet rarely spoken about controversy within healthcare in the USA, what might in some circles be described as “the elephant in the room”. As noted towards the end of Section 4.2 and alluded to in the previous section, this controversy relates to physicians encroaching on traditional executive business leadership positions in medical facilities. This issue was raised by the respondent in the first interview, this led to question 22 being posed to all respondents. As Table 4.11 illustrates, the CIOs have a very strong perception that this situation is likely.

Unlike the situation in countries such as Australia, where it is the norm for the CEO, Chief Medical Officer (CMO) and CIO to be medical practitioners, in the USA these roles have traditionally been undertaken by management and technical specialists. Physicians in the USA may have been involved in assisting the CMO to develop policy relating to medical procedures, but their primary roles have been in the general provision of patient care and medical research. The findings of this study suggest the elevation of medical practitioners to executive positions in healthcare may become an imperative rather than an organizational structure of choice because they indicate that medical facilities with MDs in the ‘C’ suite have much better physician adoption and acceptance of digital technology than those operating under the more traditional structure.

Table 4.11 Question related to the physician leadership controversy table

<table>
<thead>
<tr>
<th>Question number</th>
<th>Question description</th>
<th>Pillar code</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>What do you think about the current controversy where the CMIO and CIO may actually swap roles in the future and how likely do you think this might be?</td>
<td>TL-RF</td>
<td>75.5%</td>
</tr>
</tbody>
</table>

4.4.9 Analysis of the quantitative capstone survey

The three question capstone survey is modelled on Bass & Avolio’s Multi-Factor Leadership Questionnaire and serves as a triangulation measure to test the qualitative findings on the importance of transformational leadership mediated by trust in relation to
physician adoption of digital technology. As with the nomenclature used in the qualitative analysis, the scale measures the continuum from none – very slight – slight - strong – very strong. As illustrated in Table 4.12 there was very strong agreement to all three questions. However what was most interesting from the analysis is that trust alone, scored higher than the other two options at 93% and transformation leadership in combination with trust in the CMIO scored second highest at 88%. The fact that transformational leadership alone, whilst still scoring at very high 85% came in below the other two scores, supports the findings of the qualitative analysis. Specifically, that whilst a transformational leadership style in the CMIO is very important to physician adoption and acceptance of digital technology, trust in the CMIO is ultimately perceived as the most important factor.

Table 4.12 Results of the quantitative survey table

<table>
<thead>
<tr>
<th>Question number</th>
<th>Question description</th>
<th>Pillar code</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Transformational leadership</td>
<td>ML-Q1</td>
<td>85%</td>
</tr>
<tr>
<td>24</td>
<td>Trust</td>
<td>ML-Q2</td>
<td>93%</td>
</tr>
<tr>
<td>25</td>
<td>Transformational leadership and trust</td>
<td>ML-Q3</td>
<td>88%</td>
</tr>
</tbody>
</table>

Following is a concise tabulation of the analysed results. Table 4.13 presents a compilation of scores of respondents’ strength of attitude to the questions. Four questions from the interview protocol were posed in relation to each of the four pillars of transformational leadership for two reasons. The first reason was to explore any variations between the extant literature on transformational leadership and perceptions of transformational leadership in the physician community. The second reason was to facilitate triangulation in the findings and hence provide additional rigour. The percentage for each of the four questions is listed in columns Q1 to Q4. Three questions were posed in relation to trust and the percentage for each are listed in columns Q1 to Q3. As previously noted, as a consequence of discussion in the first interview, a question was also included on ethics and one on the ‘leadership controversy. The results for these questions are summarised in the table below the findings for trust. The last three percentages relate to the findings from the quantitative capstone survey.
Table 4.13 Compilation of qualitative and quantitative results table

<table>
<thead>
<tr>
<th>Major Research Themes</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Average</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Four Pillars of TL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Idealized Behaviour</em></td>
<td>68.0%</td>
<td>70.5%</td>
<td>74.5%</td>
<td>35.5%</td>
<td>62.1%</td>
<td>Strong</td>
</tr>
<tr>
<td><em>Inspirational Motivation</em></td>
<td>81.5%</td>
<td>71.5%</td>
<td>74.0%</td>
<td>70.5%</td>
<td>74.4%</td>
<td>Very Strong</td>
</tr>
<tr>
<td><em>Individual Consideration</em></td>
<td>66.5%</td>
<td>72.0%</td>
<td>72.0%</td>
<td>64.5%</td>
<td>68.8%</td>
<td>Strong</td>
</tr>
<tr>
<td><em>Intellectual Stimulation</em></td>
<td>71.5%</td>
<td>71.5%</td>
<td>73.0%</td>
<td>70.0%</td>
<td>71.5%</td>
<td>Very Strong</td>
</tr>
<tr>
<td><strong>Trust</strong></td>
<td>98.5%</td>
<td>95.5%</td>
<td>95.0%</td>
<td>96.3%</td>
<td></td>
<td>Very Strong</td>
</tr>
<tr>
<td><strong>Additional questions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ethics</em></td>
<td>96.0%</td>
<td></td>
<td></td>
<td></td>
<td>96.0%</td>
<td>Very Strong</td>
</tr>
<tr>
<td><em>Leadership Controversy</em></td>
<td>75.5%</td>
<td></td>
<td></td>
<td></td>
<td>75.5%</td>
<td>Very Strong</td>
</tr>
<tr>
<td><strong>Capstone survey</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Transformational Leadership</em></td>
<td>85.0%</td>
<td></td>
<td></td>
<td></td>
<td>85.0%</td>
<td>Very Strong</td>
</tr>
<tr>
<td><em>Trust</em></td>
<td>93.0%</td>
<td></td>
<td></td>
<td></td>
<td>93.0%</td>
<td>Very Strong</td>
</tr>
<tr>
<td><em>TL &amp; Trust</em></td>
<td>88.0%</td>
<td></td>
<td></td>
<td></td>
<td>88.0%</td>
<td>Very Strong</td>
</tr>
</tbody>
</table>

4.5 Conclusion

In conclusion, the use of a semi-structured interview strategy coupled with the critical incident technique and embedding narrative within the transcripts, has yielded deep and rich responses for content analysis. Furthermore, the use of the capstone survey as a triangulation method has proven very useful as a tool for verifying the strength of themes identified in the interpretive analysis. Through the analysis process, the researcher was able to extract a more granular appreciation of which aspects of transformation leadership are most effective in gaining physician adoption and acceptance of clinical digital technologies and which aspects of transformational leadership may not be appropriate in the physician community. In addition, a number of unexpected threads and trends on the leadership controversy, organizational uniqueness and the importance of ethics were uncovered and these may provide fertile ground for future research into leadership and technology adoption in the physician community.
To lead people, walk beside them … As for the best leaders, the people do not notice their existence. The next best, the people honour and praise. The next, the people fear; and the next, the people hate … When the best leader’s work is done the people say, we did it ourselves!

Lao-Tsu (570-490BC)

CHAPTER 5 - DISCUSSION AND EXPLORATORY OUTCOMES

5.0 Introduction

The prime objective of this research is to provide healthcare leadership stakeholders in the USA with an informed narrative on what CMIO leadership style might be most conducive to improving physician adoption and acceptance rates of Computerized physician order entry systems (CPOE) and Electronic Medical Records (EMR) technology. By reviewing the findings of this research it is hoped that healthcare leadership stakeholders in the USA may be able to develop a more appropriate policy, training and hiring of CMIOs to further improve technology adoption rates and concomitantly reduce iatrogenic (doctor induced) deaths.

This chapter discusses the findings yielded from the analysis presented in Chapter 4. The discussion draws conclusions and implications for transformational leadership theory, practical implications for real world medical institutions in the USA and opportunities for further research.

Chapter 1 introduced the overall physician adoption problem and a background to the limited understanding of the efficacy of leadership as it relates to medical technology adoption and a discussion on the importance of undertaking this research.

Chapter 2 presented a detailed interdisciplinary and multi-sector review of a large body of leadership literature. The review depicted contrasting transactional and transformational leadership styles and resultant outcomes within the armed forces, clergy, government, and business, before narrowing its focus to the healthcare literature. This narrowing of focus revealed clear gaps in our understanding of leadership in the physician centric healthcare realm. Chapter 2 concluded by proposing a theoretical framework to guide a mixed-methods analysis of the overarching research question:
How does transformational leadership behaviour in Chief Medical Information Officers influence the adoption rate and acceptance of Electronic Medical Recording devices by physicians, when mediated by trust?

Chapter 3 defined the research methodology and research design implemented for this study. The chapter briefly discussed the philosophical perspective of the research. It explained the rationale for the social science paradigm adopted and argued for the research method adopted, before explaining the actual research design and implementation. Finally, the chapter concluded with an examination of credibility, dependability, reliability and validity issues, as well as limitations and ethical issues pertinent to this research.

Chapter 4 discussed the data analysis processes and the resultant findings obtained by adopting the research design, methodology and strategies from Chapter 3, thereby answering the overarching research question posed in Chapters 1 and 2.

5.1 The four pillars of transformational leadership
This section discusses the findings of the analysis in relation to the four pillars of transformational leadership: (1) intellectual stimulation – encouraging creativity; (2) individual consideration – fostering relationships by direct recognition of unique contributions; (3) inspirational motivation – clear articulate vision that engenders passion and motivation and; (4) idealized influence – role models to trust (Bass, Avolio, & Goodheim, 1987), in the context of the American physician community.

5.1.1 Findings on idealized behaviour
The findings suggest that the CMIO acting as a role model is ‘vital’ to the adoption of computerized physician order entry systems and electronic medical record systems in the USA. The findings also indicate that the CMIO is in an unenviable role. Five of the twenty respondents likened the role to being similar to that of ‘herding cats’. It was strongly suggested that the CMIO should be both a practicing physician and actively use the electronic medical record system and work alongside the physicians, in order to improve adoption and acceptance rates. This perception was supported by the three examples of CMIO failure. These CMIOs were endowed with excellence in technical or clinical
attributes but failed because they took an instructional approach rather than working alongside their colleagues. Similarly, CMIOs who were clinical or technical elitists, delivering often-patronizing methods of training and/or forced compliance methods, were immediately shunned.

Forty percent of respondents identified that that CMIOs who act as a ‘champion’, expert leader or coach were most likely to be successful. These successful CMIOs deployed an approach of ‘getting to understand the needs’ of the physician on a one-on-one basis. Successful CMIOs acted as a role model and ‘lived a day in the life of the physicians’ as a method of developing adoption and acceptance of digital technology. By way of example, one respondent noted:

Our department had low physician adoption rates. Our new CMIO spent time with doctors in their clinics and discovered that the underlying reason the older colleagues were resisting adoption of CPOE and EMR was simply that due to aging eyesight - they were unable to read smaller computer tablet screens - but they didn’t want this to be known publicly.

Many other similar examples were reported of successful CMIOs who used a ‘self-deprecating’ or ‘chameleonic’ role model approach to ‘blend in’ with the physicians to improve adoption of digital technology, rather than the adopting a transactional ‘carrot and stick’ approach.

5.1.2 Findings on individualised consideration

The findings suggest that individualized consideration in the physician community is the pivotal factor in the drive to improve physician adoption of electronic medical record technology. The results also depicted that an empathic leadership style was necessary in order to engage physicians as a first step along the road to success in physician acceptance of technology. The findings highlighted the chasm between the desired state, and the current state, in relationship to empathic leadership. Respondents provided numerous examples of CMIOs lacking empathy and the disastrous impact on morale, engagement and overall physician adoption and acceptance of technology. Furthermore, CIOs heralding from technical and business backgrounds stated they personally often relied too heavily on technology as the panacea, in the absence of empathic leadership. Throughout the analysis, empathy was the leadership attribute respondents identified most strongly with, overcoming the physician adoption challenge, however most CIOs noted that empathy in their CMIOs
was sub-optimal and reliance by administrators and CMIOs on the technology *selling itself* was part of the adoption problem. The most commonly used descriptors reported as necessary for empathetic leadership were ‘the requirement to work one-on-one’, ‘live a day in the life of the physician’ and ‘deliver tailor solutions based on the needs of the individual physician’. The most successful CMIOs were depicted as mediators between the physicians and the information technology professionals, selling the concept of value added technology to the physicians whilst simultaneously helping the information technology professionals identify the unique needs of physician from different groups.

In organizations where empathetic leadership coexisted with an emerging physician led executive culture, increased rates of physician adoption and acceptance were evident. The research findings strongly support the requirement for incremental physician goals, rather than a big bang theory of adoption, when engaging physician. This individualized theme reverberated throughout the study in accordance with the large body of leadership research previously discussed in Chapter 2. Furthermore institutions, in which individual goals were in lockstep with the greater organizational goals, experienced positive adoption outcomes when compared to institutions that adopted top-down, forced compliance using government regulations as a ‘big stick’. Indeed, 70% of respondents suggested that the application of broad organizational compliance goals, in absence of individual level goals, met immovable resistance; except in the case of having to comply with government edicts such as the HITECH portion of the ARRA. The findings continually echoed the importance of the CMIO as the physician champion or coach. Synonymous with the sporting analogy, the findings suggest physician coaches are favoured as leaders and counsellors in the often-fearful physician fraternity. Unable to lose face and the credibility of peers, physicians often suffer in silence against a backdrop of fear of change, litigation and failure. Authors such as Peche and Thomas (1994) introduced the concept of ‘love’ in their research of sports coaches, as a requirement for legendary leadership. This ‘love’ concept, or at least a deeper level of emotional care, is clearly needed in the move towards comprehensive adoption of healthcare technology. The lack of the human factor, mixed with fear, builds impenetrable barriers in the physician fraternity and thereby may thwart the end goal of physician adoption of technology.
In summary, the study suggests that the most successful Chief Medical Information Officers (CMIO) spend time setting goals based on the individual and sub-groups within the greater physician community. Furthermore, the theme of coach or champion as a success factor was raised by more than three quarters of respondents. CMIOs who coached physicians in the drive to increase adoption of technology achieved more rapid engagement and physician adoption of technology. Individualised consideration carries specific implications for future change management in the healthcare domain, due to the individualistic and individually responsible paradigm held by medical practitioners.

5.1.3 Findings on inspirational motivation

Previous research (House & Shamir, 1993), suggests espousing a vision is a successful leadership attribute. This research however finds that in the context of the medical fraternity, such an approach fails to motivate and that a more matter of fact approach was more successful. The findings strongly suggest that physicians need to incrementally participate in a shared vision, rather accepting a big picture in one instance. Physicians are accustomed to being ‘captains’ of the ship (Farrell & Robbins, 1993); therefore, the vision must be delivered in a more subtle and focused manner in the medical profession. This research also contradicts the visionary leadership depicted in the corporate sporting world by Niehoff, Enz, and Grover (1990). Rather, the findings of this research are more aligned with research on the role of physician champions proposed by Yackanicz, Kerr, & Levick, (2010), who described the importance of the type of physician leadership personality as vital to adoption of technology. Respondents reported CMIOs with higher empathy, as more able to deliver the correct vision based on the needs of the physicians. Success was reported in sculpting the correct vision, mindful of the time compressed and change resistant nature of the physician or physician group in question. As suggested in the marketing concept, the message may be decoded differently to the intention of the senders. Most respondents recanted specific events in which a big picture vision resulted in larger barriers to physician adoption, based on the perception that a big picture leads to big time and time is money in this capitalistic healthcare system.

The findings strongly supported the implementation of an incremental vision by the CMIO. From a motivational aspect, non-leadership factors such as organizational culture
were reported as crucial prime motivators in the drive for physician engagement and adoption of technology. Findings suggest the CMIOs most likely to succeed evolve and adapt motivational tactics and strategies, based upon given audiences and situations. The reported profile of the successful CMIOs depicted strengths in psychology rather than excellence in clinical or technical skills. Indeed, the findings suggest that the most successful CMIOs came with psychology or psychiatry backgrounds, a clear understanding of the importance of leadership style and high levels of empathy. This contrasts the current recruitment approach of seeking technically minded CMIOs and lays a foundation for a review of recruitment requirements in the future.

This study finds technology adoption by physicians is most likely when they experience incremental success in using the digital technology and that this is a powerful motivator. Outcomes improve positively when the knowledge level of the physician coincides with the technology adoption lifecycle. The most successful programs reported that an increased emphasis on motivation of early adopters led to a domino effect on mainstream physicians through a form of referred motivation. The findings also strongly suggest that CMIOs who adopt a ‘reluctant leader’, as opposed to a ‘techie leader’, ‘whiny leader’, or ‘mature leader’ style, achieved more successful motivational outcomes than other types, refuting many findings in previous studies of leadership.

Interestingly, even though physicians in the USA tend to be individualistic due to situational factors, from a motivational perspective, the theme of team involvement was perceived as critical by more than 60% of respondents in relation to physician adoption of technology. This tends to support Gladwell’s (2000) tipping point concept, a concept mentioned in many of the interviews in which CIOs suggested that joining the team becomes easier than dogmatic resistance. Perhaps the physician fraternity could also learn more from the nursing world about the positive correlation between team success and organizational motivation and effectiveness (Morrison, Jones, & Fuller, 1997). Poor physician motivation and adoption failures were particularly identified in circumstances in which CMIOs attempted to describe the entire continuum of technology and adoption to the end-point. Failures also occurred when CMIOs used passionate speeches, while ignoring the innovative role model techniques discussed previously.
Successful CMIOs were also perceived as team leaders, fulfilling a physician advocacy role in relation to health administrators, rather than being seen as administration puppets; for example, being a strident advocate against external policies or procedures that could lead to the detriment of the physician community. In summary, successful CMIOs need to use an understanding of the psychology of leadership, a context-dependent, incremental vision, a self-effacing style and team oriented motivational strategies.

5.1.4 Findings on intellectual stimulation
Respondents strongly suggested intellectual stimulation is a necessary component in driving clinical adoption technology, although as noted previously, physicians in general prefer incremental innovation rather than big bang innovation. Physicians are typically high in cognitive intelligence; however this research finds that the CMIOs who failed were low in empathy. Although technology acceptance is central to the core of the research question in this study, the findings repetitively, yet ironically suggest CMIO success is aligned with intellectually stimulating the physicians using ‘non-geek’ perspectives. Indeed, some CMIOs used war story tactics highlighting their own vulnerabilities rather than technical superiority. Real world stories, especially those based on the CMIO’s trials and tribulations in relation to technology, strongly encouraged physician engagement and technology adoption. Other CMIOs were reported to use other mentally engaging practices. Seven of the twenty respondents reported CMIOs using psychoanalytic techniques to better understand the reasoning behind resistance and several respondents suggested that their CMIOs used multi-variant techniques based on trustworthy leadership, to engage and drive adoption.

The findings also indicate higher rates of physician engagement and adoption occur when individual physician requests are built into the computerized physician order entry systems and electronic medical records systems. This perhaps illustrates that adoption is more likely, when the individual physician’s needs and ideas are part of the innovation and thereby allow the physician intellectual buy-in.

Creativity is critical to intellectual stimulation and the findings illustrate that creativity has a situational component. Twenty five percent of respondents used financial creativeness in demonstrating the benefits of adoption of computerized physician order entry systems.
and EMR systems with great success. Similar to other transformational leadership attributes, creativity relevance was reported as matching the physician’s position on the technology acceptance lifecycle. Creativity with early adopters resembled pilot testing iPad technology, whereas the mainstream were excited with the execution of a singular innovative order set in the computerized order entry system that they had been involved in producing. In summary creativity is an essential attribute as the CMIO attempts to engage some of the most cognitively intelligent members of society, but the assumption that one size of creativity fits all is doomed to failure.

More than 70% of respondents were strident in reporting that assertively challenging physicians to move outside their comfort zone is not productive or borderline impossible. ‘Challenging doctors just isn’t workable’. Over 50% of respondents vividly portrayed horror stories in which healthcare organizations attempted to deploy heavy-handed internally based tactics to achieve compliance in the use of technology. In addition, there are documented cases of administrators attempting to use a transactional ‘stick’ approach to force physicians to adopt policy, workflow or technologies, only to experience uproar and revolt. However, a number of respondents did suggest that targeting early adopters - challenging and stretching these physicians outside their comfort zone - was an effective measure to drag the mainstream more rapidly, somewhat akin to the slinky analogy or Gladwell’s (2000) tipping point. In summary, the findings clearly demonstrate the positive significance of intellectual stimulation in engaging physicians, rather than the draconian use of force and legislative compliance.

5.1.5 The mediating role of trust

In addition to exploring the four pillars of transformational leadership in relation to physician adoption of digital technology, this research was also designed to investigate the role of trust as a mediating variable in relation to physician adoption and acceptance. As discussed below, the findings suggest that without trustworthiness and ethical behaviour, the four pillars of transformational leadership are either weakened or completely nullified.

From a qualitative perspective, the findings related to trust in the CMIO evoked a plethora of descriptive words such as ‘crucial’, ‘vital’ and ‘showstopper’, highlighting the significance of trust in relation to physician adoption and acceptance. From a quantitative
perspective, the mini - Multi-Factor Leadership questionnaire illustrated that 93% of respondents’ perceived trust in the CMIO as essential to physician acceptance and adoption of digital technology. Although all factors tested (transformational leadership, trust and transformational leadership mediated by trust) were strongly supported, trust achieved the highest score, suggesting that trust alone is perceived as the single most important determinant of physician adoption and acceptance. These findings suggest that trust in isolation, overshadows the four pillars of transformational leadership, in relation to any form of physician engagement. The respondents unanimously perceived that trust between colleagues in medicine surpassed any form of leadership style. This suggests that a perception of trust in the CMIO is directly related to physician adoption and acceptance of technology. This research has also found that any CMIO with a perceived self-interest, such as being a mouthpiece for the technology vendor or healthcare administration would lack trust and therefore possessed little ability to entice physician engagement, adoption or the acceptance of computerized physician order entry systems or electronic medical records.

5.2 Variations in the findings by demographics
The analysis suggests that the younger cohort CIO were more cognisant of the humanistic aspects of transformational leadership than were the older respondents. As a group, they placed greater emphasis, or themes related to individualized consideration and idealized behaviour. They were also more cognisant of the need for a pro-active management style (Ackoff, 1999) and the need for the CMIO to engage in more rapid dynamic responses in order to cope with factors underpinning physician resistance and ever-changing regulatory variables. However, they were in steadfast agreement with older colleagues concerning the greater impact of the mediating variable of trust. The older cohorts, whilst more transactional and reactive in relation to their perceptions of physician acceptance, deployed more strategic thinking approaches. They were more cognisant of segmenting physician groups into more manageable segments based on the technology adoption lifecycle

5.2.1 Gender
The analysis in Chapter 4 suggests some variations in perception by gender. Whilst the sample only contained three females, two of the three perceived charismatic leaderships
attributes as positive, whereas most of the male respondents perceived such attributes negatively. The female respondents also perceived individualistic consideration and general communication ability as more important than did male respondents. Finally, the female respondents were more encouraging of a ‘subtle big bang’ vision than their male counterparts were. These contradictory results actually support previous research by Alimo-Metcalfe (1995), who identified that females tend to use transformational descriptors in relation to leadership, whereas males tend to use transactional descriptors. In this research, female respondents were more cognisant of transformational leadership concepts such as team, coach, participative management and empowerment than the male respondents were. This study also supports Schein & Mueller (1992), who noted that American females do not sex-type managerial positions as other cultures may, rather, they see men and women equally and that both are likely to hold necessary characteristics for success. This research also supports an earlier study linking transformational leadership and intuition as a predictor of emotional intelligence in females (Downey & Papageorgiou, 2006), given that the word intuition was used multiple times by female respondents in relation to understanding and leading people.

5.2.2 Region
The analysis identified regional ethnicity as a factor in CMIOs engaging adoption and acceptance of digital technology. Thirty percent of respondents suggested being a local was ‘showstopper’ in gaining physician adoption or engagement of any type. Others mentioned phrases such as ‘if he isn’t from here it wouldn’t work’ or ‘if it’s not made here it’s not any good and that goes for people too’. The level of regional ethnicity was more influential than anticipated by the researcher. The result of research suggests that xenophobia may also be a problem in physician adoption and acceptance of digital technology and that this factor needs to be further explored in order to improve physician adoption rates.

5.2.3 Ethnicity
The analysis suggests that in addition to gender disparity there may be racial inequity or lack of diversity in the CIO and CMIO roles, when compared to the general US physician population. Although within the general population, Hispanics and African Americans are
among the fastest growing segments at a combined 25%, they are greatly underrepresented minorities at only six percent of the physician fraternity (AMA, 2006). The respondent sample was representative of the greater community of CIOs and CMIOs, so if change is deemed necessary, it needs to occur at the medical school induction level, perhaps encouraging Hispanic, African-American and Asian students to consider future roles as CMIOs.

In summary more diversity with the hiring of chief information and chief medical information officers is required and more research needs to be covered around regional ethnicity to be discussed in the next section.

5.2.4 Educational background
The analysis in Chapter 4 and findings discussed earlier in this chapter suggest that the educational backgrounds of CIOs and CMIOs impact on their leadership style. Respondents with a psychology background perceived successful CMIOs to adopt a chameleonic or self-deprecating approach to improve physician adoption of digital technology. Conversely, respondents from technical education background perceived excellence in transactional processes, coupled with vendor technical solutions of more importance than the less tangible human factor. The findings from this research indicate that CMIOs who adopt a humanistic, transformational leadership style, gain higher levels of adoption and acceptance than those adopting a more technical or transactional style. Therefore, this research suggests senior managers in healthcare should focus on employing CMIOs with such traits and initiating training and development programs to enhance such attributes in existing CMIOs.

5.3 Additional findings from content analysis
Content analysis of the verbatim responses raised several additional findings and these are discussed in this section. The historical plight of the healthcare CIO was not having sufficient funds to improve information technology. Today however, whilst they have federal funding to roll out digital technology, they face resistance from physicians in relation to the adoption and acceptance of the technology. Content analysis suggests the
reason for the poor adoption rates is that there appears to be a general perception in the physician community that the CMIO is merely a mouthpiece for the health administration. The analysis suggests that the CMIO is employed to assist the physicians but the physicians perceive the CMIO to work for the administration. Consequently, CMIOs are depicted as administration mouthpieces by other physicians, whilst administration perceives them as recalcitrant.

5.3.1 Importance of ethics
The analysis strongly suggests that ethical behaviour is of utmost importance in the medical domain. Various respondents quoted the hierarchy of ethics (organizational, professional, personal) as inextricably linked to one-another. Multiple statements denoted ethical behaviour as a starting point. Therefore, the ethics of the CMIO and their role in gaining any engagement or physician adoption of technology are directly linked. Seventy percent of respondents stated that it is the ethics of the organization that actually attract physicians. Physicians understand the value of ethics to such an extent that they seek out organizations with a mission based on an ethical framework in which to practice medicine. Nine of the twenty respondents stated professional and personal ethics allow or negate the physician to gain access to the institution. Respondents from a number of religiously affiliated organizations blurred the lines between ethics and religion in their responses. Responses to the ethics question evoked deeply emotional responses and two words; ‘crucial’ and ‘vital’ in relation to the CMIO on numerous occasions. All respondents reinforced the importance of ethics in medicine, stating personal ethics as ‘crucial’ and 95% stated professional ethics rule supreme from the physician standpoint. Eighty percent of respondents rated lacking professional ethics or a perceived lack of perceived professional ethics as the death knell for CMIOs. Respondents noted that lacking professional medical ethics instantly call to question all other personal ethics. Within this the medical community, unethical behaviour was variously described as:

- CMIO being perceived to be driving administration plans in the absence of caring for physician and patient needs
- CMIO forcing technology on physicians leading to uncertainty and an inability to deliver patient care or billing
- CMIO favours certain physician groups over others based on personal alliances
- CMIO vaguely attempts to drive acceptance by embodying nihilism
- CMIO has a personal association with key software vendors or drug companies

Lacking ethics in healthcare is simply not a salvageable factor. If the CMIO’s integrity or ethics are called into question, their role will be ignored. The findings that suggest selecting a CMIO based on transformational leadership, trust or any other variable in absence of a critical analysis of ethics is prone to dangerous results. Hiring a transformational leader without ethics is simply counterproductive to the mission.

5.3.2 Organizational uniqueness
Throughout the study organizational uniqueness emerged as an influential factor in relation to the rate of physician adoption of technology. The organizational uniqueness factor varied such as whether or not physician held executive management roles, top-down leadership style, culture, structure, processes and the allocation of roles. Respondents from institutions where CMIOs had psychology credentials, medical practitioners in the ‘C’ suite or had female CIOs reported strong levels of adoption of computerized physician order entry systems and electronic medical records technology. Further, organizations in which physicians owned the facility, also reported favourable levels of physician adoption of technology. Conversely, organizations in which these uniqueness factors were lacking, reported less than favourable levels of adoption.

5.3.3 The growing leadership controversy in the physician community
The study uncovered a controversial issue in which more medical practitioners are being hired into executive’s positions such as CEOs. Although current controversial leadership power struggle within the executive branch of healthcare organizations became immediately evident in the first interview, a further extension of a concept coined ‘role-flip’ began to emerge in all following interviews as a critical issue within the medical community. In general the medical fraternity is beginning to encroach into the walnut suites of healthcare organizations as well as insurance and vendor domains. Respondents also indicated the changing of reporting structures inasmuch as CMIOs are now reporting more to CMO rather than CIOs. Seven of twenty respondents perceived that as time progressed,
CMIOs might climb the ‘corporate ladder’ and possibly oust the non-medical CIO and CEOS. These findings suggest that the nature of senior management in the US healthcare industry is changing and this may provide fertile ground for further research into medical leadership in the USA.

5.4 Implications for policy and practice
This section discusses the implications of this research for policy and practice in relation to physician adoption and acceptance of digital technology. It is suggested that should the following implications be acted upon, the long term outcomes will be an overall reduction in iatrogenic deaths and major financial savings in national and regional health budgets.

The Federal Government has enacted legislation to enforce the adoption of digital technologies in medical facilities with the express purpose of reducing iatrogenic deaths. However, it has not paid sufficient attention as to how to gain physician adoption and acceptance of such technology. This research finds that a slightly modified form of transformational leadership is more effective in engaging physicians in the adoption process than a transactional leadership style. Therefore, it is suggested that the Federal Government develop policy to create the opportunities for CMIOs to undergo training and development in the practice of transformational leadership, in order to increase physician acceptance and adoption of the new digital technology. It is also recommended that regardless of whether or not the Federal Government takes such actions, medical facilities should introduce training and development for CMIOs and CIO in transformational leadership. It is also strongly recommended that medical schools place a stronger focus on management training for medical students in addition to clinical practice.

This research has also found that medical facilities employing medical practitioners in senior management roles have higher technology adoption and acceptance rates than those employing business and technical staff in such roles. This research indicates that a key reason for such success is that medical practitioners have a much higher level of trust in other medical practitioners than they do in technical experts or administrative specialists. Furthermore, this research has found that there is presently a quiet revolution-taking place in healthcare management in the USA, resulting in more medical practitioners taking on senior roles. Given the positive impact that this research shows, associated with medical
practitioners in senior medical management positions and technology adoption plus the
importance of trust, it is suggested that USA healthcare stakeholders explore this recent
development more openly, rather than treating it as the ‘elephant in the room’.

This research has also found that regional biases are evident in the healthcare industry in
the USA and that such biases may detract from the effectiveness of out of region CMIOs in
gaining physician acceptance and adoption in digital technology. Whilst such biases are not
easy to overcome, this problem may be partially overcome over time, by introducing a
national curriculum in all USA medical schools on the importance and use of such
technologies. Such a strategy should at least have all future medical practitioners perceiving
these technologies in the same light.

Finally, this research suggests that there may be an imbalance between the ethnicity of
the general population of medical practitioners and the ethnicity of CMIOs and CIOs. Whilst not explicit in the findings, the lack of ethnic diversity in these key roles may be a
factor in the physician adoption problem. Consequently, it is recommended that greater
information be provided to current and future medical students of the importance of the role
of CMIO in an attempt to better match the diversity of CMIOs with that of the general
medical practitioner community.

5.5 Implications for further research
In Chapter 2 it was noted that there is a large volume of extant empirical research on
transformational leadership. It was also noted that a number of studies into transformational
leadership have been conducted in nursing. However, after a comprehensive review of the
literature, it was noted that there is a paucity of transformational leadership literature in
relation to medical practitioners and none specifically focused on how transformational
leadership, mediated by trust might impact on physician acceptance and adoption of digital
technology. This exploratory empirical study has been undertaken in an attempt to provide
initial insights into this research question. This research has found that a modified form of
transformational leadership, mediated by trust is much more effective that a transactional
leadership approach in enhancing the adoption and acceptance of computerized physician
order entry systems and electronic medical records, rather than a transactional approach.
This research therefore builds an exploratory empirical foundation for future qualitative and
quantitative leadership research, specifically related to medical practitioners. Further this study complements other studies regarding transformational leadership in other healthcare sectors (for example, LaPenna, 2009).

Understanding the limitation of this research in the mainly qualitative subjective nature of the critique and the relatively small sample set another implication of the paper is to spur more valuable research into this important area. Further studies should enhance and expand using other quantitative measures such as the MLQ 5 Full Leadership questionnaire to the five physician sponsors, and incorporate measures such as the Thomas Kilman conflict measurement tool. Both were used successfully in a study of clinical nurse managers in Israel (Hendel, Eshel, Traister, & Galon, 2006). Also using the charting analytical charting methodology of (Vartak, et al., 2009a) due to the easy large-scale graphic snapshot of the sample or possibly considering case study or longitudinal studies. Given the wide-ranging implications of this research, including improved patient care, reduced co-morbidity and in time national security, the qualitative method is somewhat subjective, time consuming and is a relatively small sample highlighted in Kubick, (2009). In summary the major implication of this study is to generate a proliferation of study of the mind of a physician rather than the single-minded concept of technical interoperability.

5.6 Limitations of the study

As noted in Chapter 3, a number of potential limitations of this study have been identified relating to sample size, using a single type of respondent (CIOs) and differences between the cultural and psychological profiles of researcher and respondents. Below are the major limitations.

- Sample size - the number of the units of analysis for this research was small in size and this limits the study’s generalizability
- Lack of available and/or reliable data – given the highly litigious area of US healthcare mixed with the self-regulated nature of medical practitioners, low levels of secondary data are available.
- Lack of prior research studies on the topic – inability to cite numerous prior research studies limited aspects of the literature review.
• Limited measures used to collect the data may have limited the depth of data collected. Future studies should therefore develop a more broad ranging survey based on the findings of this research in order to acquire richer findings.

• Self-reported data – the use of self-reported data from single sources (CIOs) cannot be independently verified and this may result in issues relating to individual biases, selection recall, the halo effect and recency effect.

• Access – gaining access to this C level community, their organizations were incredibly difficult and onerous and limited the number of units of analysis.

• Longitudinal effects – The time period in which this research was undertaken was short and there was no ability to study whether the perceptions of the CIOs may change over time.

• Single researcher – whilst the author attempted to maintain an objective and professional approach to the research, it is possible that the researcher may hold subconscious biases towards the respondents.

• Fluency in a language – the Australian Accent presented more of a limitation than one would imagine in the Southern and Central Midwestern arenas. It led to either a time distraction in the first part of the interview or a number of re-takes on asking questions.

In summary, the fact that this research was undertaken by a single researcher, self-funded, time-constrained and under resourced is another limitation of the research. However, as also noted in Chapter 3, stringent steps were followed in this research in order to enhance the rigour, validity and generalizability of the findings.

Notwithstanding these limitations, this research developed and applied a theoretical framework and incorporated a sound mixed method technique for analysing transformational leadership. In turn, the research has demonstrated new insights the effectiveness of a modified form of transformational leadership in the physician community and revealed the extreme importance of trust and ethics within this community. It has also uncovered insights into current changes in senior healthcare management and the concept of organizational uniqueness.
5.7 Summary

The concept of leadership in itself within the medical profession is complicated at best and this study attempts to demystify it for future researchers. Business, government and the community ordain and bestow leadership on medical professionals as a general ritual and norm (Cromie, 2011), yet leadership of physicians has not previously been well defined from the humanistic aspect. In stark contrast to the collaborative team effort required for the meaningful use and computerized physician order entry systems and electronic medical records, medical training is inherently based upon a social doctrine that advocates professional autonomy of physicians in social actions related to patient care (Kinghorn, 2010).

This research builds on and extends our understanding of transformational leadership raise in the extant literature on transformational leadership in healthcare in other contexts (Al-Mailam, 2004). Furthermore, it builds on various nursing studies (Bowles & Bowles, 2000) and later work related to physician executives (Xirasagar, 2008). This research provides a clearer understanding of the importance of the transformational leadership attributes required for medical practitioners serving as CMIOs in US medical facilities and specifically in relation to physician adoption of clinical digital technology. It also highlights the high level importance of trust and ethics in relation to the adoption of such technologies and the changing nature of senior healthcare management in the USA.

The USA Federal Government has enacted legislation to enforce the adoption of clinical digital technologies such as EMR and CPOE in medical facilities with the express purpose of reducing iatrogenic deaths. However, it has not paid sufficient attention as to how to gain physician adoption and acceptance of such technology. This research finds that a slightly modified form of transformational leadership, mediated by trust is more effective in engaging physicians in the adoption process than a transactional leadership style. It further finds that trust in CMIOs by physicians is the most important factor in physician adoption and acceptance of such technology.

This research has also found that medical facilities employing medical practitioners in senior management roles have higher technology adoption and acceptance rates than those employing business and technical staff in such roles. Given the positive impact this research shows is associated with medical practitioners in senior medical management
positions and technology adoption; it is suggested that US healthcare stakeholders explore this recent development more openly, rather than treating it as the ‘elephant in the room’.

This research finds that regional biases are evident in the healthcare industry in the USA and that such biases may detract from the effectiveness of out of region CMIOs in gaining physician acceptance and adoption in digital technology. Whilst such biases are not easy to overcome, this problem may be partially overcome over time, by introducing a national curriculum in all US medical schools on the importance and use of such technologies. Such a strategy should at least have all future medical practitioners perceiving these technologies in the same light.

Finally, this research suggests that there may be an imbalance between the ethnicity of the general population of medical practitioners and the ethnicity of CMIOs and CIOs. Whilst not explicit in the findings, the lack of ethnic diversity in these key roles may be a factor in the physician adoption problem. Consequently, it is recommended that greater information be provided to current and future medical students of the importance of the role of CMIO in an attempt to better match the diversity of CMIOs with that of the general medical practitioner community.
Reference list


Barbour, R. (2007). Checklists for improving rigor in qualitative research: a case of the tail wagging the dog. *Department of General Practice, University of Glasgow, Glasgow G12 0RR*


CHIME. (2008). Demographics for CIOs in the United States. *CHIME Fall Forum*


Lasagna, G (1964) Hippocratic Oath.


APPENDIX A – INTERVIEW PROTOCOL

Briefing to the participants
To facilitate personal introductions and to develop a congenial atmosphere on phone or in person, it is a requirement of the research that the researcher arrive at the host location prior to the allotted time. The researcher will personally thank the respondent for participating in the research project and clearly explain the process of the interview. Once the respondent appears comfortable, the researcher will reiterate the Participant Information Statement to remind them of why the study is being undertaken:

*The aim of this research is to better understand whether the leadership style of Chief Medical Information Officers (CMIOs) improves the rate of adoption of information technology by physicians. To address the central research question, the project adopts an interpretive research methodology using open-ended, semi-structured interview questions, concluding with three quantitative capstone questions.*

Where the study is being undertaken:
*This study includes Chief Information Officers CIO’s, just like yourself, living in five regions of the United States, North East, South East, Central Corridor, West Coast and Central Atlantic. The interviews are being conducted over an eight-week period so that the responses from each group are effectively being taken at the same time.*

In addition, the ethical considerations of the study in relation to their rights:
*Ethical considerations that the interviewer will be following:*
1. Respondents will be asked to identify their name – they will be informed that this will not be disclosed to any other party and will only be known to the researcher.
2. No names will be mentioned in the dissertation or any publications arising from this research.
3. All information given will be treated in the strictest confidentiality.
4. The participants will be informed that the interview will be recorded using a voice recorder.
5. The participants will then be notified that they may ask for the voice recorder to be turned off at any time.
6. The participants will be also informed that if they wish to stop at any stage of the interview, they may freely do so without any explanation.
7. At the end of the introductory briefing, the participant will be asked whether they have any questions that need clarification.

After explaining the purpose of the study and the ethical considerations, the researcher will suggest the interview, begin and will then commence posing the questions, taking breaks as required until completion.
Qualitative Section

1. Would you say that your CMIO acts as a role model in their dealings with other medical practitioners? (If yes) could you give me an example of how they might do this?
2. To what extent would you say that your CMIO has empathy with the medical practitioners with whom they work? (if yes) Do you believe that their empathic approach affects the speed of adoption of information technology?
3. When addressing a group of physicians regarding the benefits of adopting some type of information technology, does your CMIO communicate in a matter of fact manner or do they tend to be more inspirational?
4. Could you give me an example of how your CMIO motivates physicians to experiment with and adopt innovative techniques, equipment or procedures?
5. Would you say that your CMIO lead by example? (If yes) could you give me an example?
6. Could you describe any behaviours or techniques that your CMIO might use to get his or her point across to each doctor at an individual level?
7. Does your CMIO inspire physicians to adopt electronic medical records by explaining their vision or do they take more of a compliance approach?
8. Tell me if and how your CMIO intellectually stimulates doctors to use creative methods to adopt technology
9. Could you explain what impact ethical behaviour by your CMIO has on adoption of technology.
10. To what extent does your CMIO focus on the personal needs or concerns of individual physicians when encouraging them to adopt new technology?
11. Could you describe the types of behaviours or actions your CMIO might use in gaining clinical acceptance of technology by medical practitioners?
12. To what extent does your CMIO encourage physicians to extend their creativity in relation to trying new procedures, practices or equipment?
13. How important do you think the physicians’ level of trust in the CMIO is, when it comes to clinical adoption of technology?
14. Do your CMIO use different types of motivational techniques to encourage individual doctors to adopt new technologies? (If yes) could you give me an example?
15. How does your CMIO explain their vision regarding electronic medical records?
16. To what extent do you believe that the level of adoption of new technologies by physicians is directly correlated to a CMIOs charismatic leadership style?
17. How well does your CMIO communicate their vision and associated goals for the adoption of new technologies to individual physicians?
18. Could you describe any relationship you see between your CMIOs leadership style and the level of trust they have engendered in their medical colleagues?
19. Does your CMIO set tasks or encourage behaviours that force the physicians to move outside their comfort zone? (If yes) could you give me an example?
20. Could you explain whether or not trust between colleagues is important in the field of medicine? (if yes or no) why is it/is it not important?
Quantitative Section

Briefly ask respond as a capstone quantitative survey to the interview assessing desired state

At the conclusion of each interview session:

- Ask follow up questions and probe further where appropriate and necessary.
- Ask the respondent if it they will agree to being contacted by the researcher by email with possible follow up questions and to verify the transcript of the session.
APPENDIX B ETHICS CLEARANCE APPROVAL
APPENDIX B ETHICS CLEARANCE APPROVAL

HUMAN RESEARCH ETHICS COMMITTEE

Notification of Expedited Approval

To Chief Investigator or Project Supervisor: Dr Antony Drew
Cc Co-investigators / Research Students: Mr Paul Markham
Re Protocol: The relationship between transformational leadership and physician acceptance of electronic medical records and the role of chief medical informational officers, CMIOs

Date: 28-Jul-2011
Reference No: H-2011-0195
Date of Initial Approval: 27-Jul-2011

Thank you for your Response to Conditional Approval submission to the Human Research Ethics Committee (HREC) seeking approval in relation to the above protocol. Your submission was considered under Expedited review by the Chair/Deputy Chair. I am pleased to advise that the decision on your submission is Approved effective 27-Jul-2011.

In approving this protocol, the Human Research Ethics Committee (HREC) is of the opinion that the project complies with the provisions contained in the National Statement on Ethical Conduct in Human Research, 2007, and the requirements within this University relating to human research. Approval will remain valid subject to the submission, and satisfactory assessment, of annual progress reports. If the approval of an External HREC has been ‘noted’ the approval period is as determined by that HREC.

The full Committee will be asked to ratify this decision at its next scheduled meeting. A formal Certificate of Approval will be available upon request. Your approval number is H-2011-0195.

If the research requires the use of an Information Statement, ensure this number is inserted at the relevant point in the Complaints paragraph prior to distribution to potential participants; you may then proceed with the research.

Professor Alison Ferguson
Chair, Human Research Ethics Committee
For communications and enquiries:
Human Research Ethics Administration

Research Services
Research Integrity Unit
APPENDIX C – PARTICIPANT INFORMATION STATEMENT
APPENDIX C – PARTICIPANT INFORMATION STATEMENT

Mr Antony Drew
Newcastle Business School
Faculty of Business and Law
The University of Newcastle
Level 3, University House
Auckland Street, Newcastle, NSW 2300
Ph. 61 2 4921 2099; Fax 61 2 4921 7398
Email: antony.drew@newcastle.edu.au

Information Statement for the Research Project:
The role of Chief Medical Informational Officers in physician acceptance of electronic medical records

Document version IS02 - 21/07/2011

You are invited to participate in the research project identified above which is being conducted by Mr Paul Markham, a DBA Doctorial candidate from the Newcastle Business School at the University of Newcastle. The research is part of Mr Markham’s studies at the University of Newcastle, supervised by Mr Antony Drew from Newcastle Business School at the University of Newcastle.

Why is the research being done?
The purpose of the research is to develop a better understanding of whether the leadership style of CMIOs impacts on the adoption of information technology such as electronic medical records. To date, research has been published on transformational leadership across a range of industries including nursing; however, such research has not been conducted with medical practitioners. Given the current United States government mandates in relation to information management, it is imperative that we better understand factors that may increase the speed adoption of technology by the medical fraternity.

Who can participate in the research?
You are eligible to participate in this research if you meet the following selection criteria:

1. You are a Chief Information Officer (CIO) in a large teaching hospital with a Chief Medical Information Officer (CMIO) employed to improve informatics and interoperability challenges inherent with healthcare information technology.

2. You are able to speak English and currently reside in the region of your institution
3. You are, or have been involved in implementing electronic medical records and are well acquainted with the ARRA 2007 imperatives including the importance of clinical adoption of technology.

4. You have worked for at least three years within healthcare IT.

**What choice do you have?**
Participation in this research is entirely your choice. Only those people who give their informed consent will be included in the project. Whether or not you decide to participate, your decision will not disadvantage you. If you do decide to participate, you may withdraw from the project at any time without giving a reason and have the option of withdrawing any data, which identifies you.

**What would you be asked to do?**
If you agree to participate, you will be asked to engage in a confidential interview comprising of 20 open-ended questions. The interview will be conversational in style and the interviewer (Mr Paul Markham) will ask you a range of questions related to the topic of leadership and adoption of technology. The interview will be digitally recorded, as this will assist the interviewer in terms of recall and accuracy. The responses to the questions posed in the interview will be transcribed and sent back to you for your comments and any possible corrections. You have the right to withdraw from the research project at any time and should you do so, all of your data will be erased. Examples of questions you will be asked are listed below to allow you to consider your participation.

Would you say that your CMIO acts as a role model in their dealings with other medical practitioners? If so, could you give me an example of how they might do this?

To what extent would you say that your CMIO has empathy with the medical practitioners with whom they work? Do you believe that their empathic approach impacts on the speed of adoption of information technology?

When addressing a group of physicians regarding the benefits of adopting some type of information technology, does your CMIO communicate in a matter of fact manner or do they tend to be more inspirational?

Could you give me an example of how your CMIO motivates physicians to experiment with and adopt innovative techniques, equipment or procedures?

**How much time will it take?**
The interview will be held at your place of work or a mutually suitable alternative location and will take between 45-60 minutes. Review of the transcription of your interview is voluntary but would take approximately an additional 15 minutes.

**What are the risks and benefits of participating?**
The interview is conversational in style and is therefore meant to be relaxed and non-invasive. The interviewer will guide you but it is very much a case of allowing you to tell your story and offer your insights. The material gathered from the interviews will be used to inform the healthcare information community as to the extent different leadership styles may assist in clinical adoption of healthcare information technology, such as electronic medical records. There are no risks anticipated through your participation in this research.
**How will your privacy be protected?**
The data gathered from the recorded interviews will be stored on the researcher’s digital Dictaphone and copied to a personal laptop computer after each interview. A backup CD will also be burned when each interview has been completed to ensure no loss of data. All transcripts will be stored on the researcher’s personal laptop computer until their return to Milwaukee WI USA, at which time the transcripts will be downloaded to the researcher’s home desktop computer. Access to both the researcher’s personal laptop computer and home desktop computer is through a password known only to the researcher (note: Norton virus software and firewalls are used to protect the data). The backup CD will be kept in the researcher’s home office draw (locked with their access key). The material on the Dictaphone and personal laptop computer will be erased as soon as the transcripts have been checked. The data gathered from the interview will be stored for a minimum of five years after the interview phase (1/12/2016), in accordance with University of Newcastle policy.

**How will the information collected be used?**
The data will be analysed in order to determine how leadership style may affect the adoption of technology. The findings, along with the methodology used in obtaining the data will be included in the researcher’s doctoral thesis. The results of the analysis may also be incorporated in future academic journal articles that the researcher may write in order to broaden the understanding of the topic by academics, the medical fraternity and policy makers. A summary of the findings will be forwarded to participants for their information. In the event that the researcher wishes to incorporate company names or the names of individuals in the thesis or any other publication, the researcher will first contact the respective individual to seek their signed permission and will not divulge any company or individual names without such explicit permission.

**What do you need to do to participate?**
Please read this Information Statement and be sure you understand its contents before you express an interest in participating. If there is anything you do not understand, or you have questions, contact the researcher. If you would like to participate, please contact the student researcher at C3050834@uon.edu.au or by phone on +1 414 687 0272 to confirm your interest. On the day of the interview, you will be required to provide the researcher with a signed copy of the attached Consent Form acknowledging your willingness to participate.

**Further information**
If you would like further information, please contact the student researcher on the phone number or email address listed above or the Project Supervisor at Antony.Drew@newcastle.edu.au or on +61 2 4921 2099. Thank you for considering this invitation.

Antony Drew  
Project Supervisor

Paul Markham  
DBA Candidate

*Complaints about this research*
This project has been approved by the University’s Human Research Ethics Committee, Approval No. H-2011-0195

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone +61 2 49216333, email Human-Ethics@newcastle.edu.au.
APPENDIX D – PARTICIPANT CONSENT FORM

Mr Antony Drew
Newcastle Business School
Faculty of Business and Law
The University of Newcastle
Level 3, University House
Auckland Street, Newcastle, NSW 2300
Ph. 61 2 4921 2099; Fax 61 2 4921 7398
Email: antony.drew@newcastle.edu.au

Consent Form for the Research Project:

The role of Chief Medical Informational Officers in physician acceptance of electronic medical records

Document Version CF02- 21/07/2011

I __________________________ (name of respondent) agree to participate in the above research project and give my consent freely. I understand that the project will be conducted as described in the Information Statement, a copy of which I have retained.

I understand I may withdraw from the project at any time and do not have to give any reason for withdrawing.

I consent to be involved in a conversational style interview that is digitally recorded.

I understand that my personal information will remain confidential to the researcher but that some citing of my comments is possible – I therefore give my consent to be quoted anonymously in the reporting of the research.

I understand that I have the opportunity to review and edit the transcript of my interview.

I have had the opportunity to have questions answered to my satisfaction.

Print Name: ____________________________________________________________

Signature: __________________________ Date: __________