AN INTERNATIONAL CROSS-CULTURAL STUDY OF THE ROLE OF CHIEF INFORMATION OFFICERS IN HEALTHCARE

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In Partial Fulfillment of
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by

Wallace Sanford Saunders

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2000

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The introduction and utilization of Information Systems (IS) in the hospital environment has had a significant and lasting impact on the practice of medicine. The development of this dissertation will attempt to explore a widely overlooked area: The comparison of Chief Information Officers (CIOs) in the United States and the United Kingdom.

Aspects of CIO experiences relating to assumed roles, CIO challenges, skills, frustrations, success, failure, leadership, management, involvement and perceptions about the role of Information Technology (IT) in healthcare are discussed with a comparative global model. This study investigates the managerial roles of the Chief Information Officer based on Mintzberg's classical managerial role model.

To be successful, CIOs need to have relation-building skills, managerial skills, a broad knowledge of technology, and management, technical and business degrees along with certain personal traits and backgrounds.

While high technology has emerged as an important economic issue in all advanced industrial countries, there is much variation between countries in the success of their high technology industries, and in government efforts to encourage high technology in the healthcare sector.

This research will attempt to demonstrate that CIOs as a whole believe IT to be indispensable in effective realization of the healthcare mission in a global, information-intensive civilization, and that IT can positively impact the quality, cost and medical issues of healthcare.

The overall objective of this study is to examine the following: (1) will an increase in global information technology expand awareness of appropriate differing styles? (2) does global information technology have a positive and significant relationship within the international community?

Finally, this study calls for more interdisciplinary research integrating insight from organizational behavior, international business and information technology.

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This dissertation is dedicated with the highest honor and affection to my wife Judy. She has been my mainstay throughout this doctoral program. Without her faithful loyalty as a wife and friend, none of this would be possible. Her encouragement and counsel to "stay the course" has rung in my ears almost daily. She is a living example of the "virtuous woman" described in Psalms 31, which says: "Who can find a virtuous woman? For her price is far above rubies. (Psalm 31:10).

Without the prayers of a faithful wife and a Christ-centered home, the success in the completion of this degree program also would not have been fulfilled. To the Lord I give my highest praise for His loving kindness. To my wife I give my deepest respect and loving devotion.

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CHAPTER ONE: THE PROBLEM

The Problem

The demands put upon the Chief Information Officer (CIO) or the Information Technology (IT) manager in today's high tech/high touch society are reaching critical proportions. The roles of these senior-level positions, especially in the healthcare industry, are being critically examined today in light of emerging technology and managerial expectations for the delivery of significant information systems in an already information-rich environment. Thus, it becomes imperative that a more in-depth qualitative approach to the dilemmas facing the managing of information be examined.

Healthcare has been getting more than its share of prophetic pronouncements lately. Even with the currently stalled legislative initiatives, forecasts of radical shifts in the fundamental structure and nature of the US medical service system still abound. All medical professionals and healthcare administrators know that dramatic change is in the wind. However, no matter what aspects of health care the organization provides and no matter how dramatically the medical service landscape may change, one important fact remains the same, because new technology represents radical changes to people and their jobs, the risks are great (Prager, 1994).

For example, if top management decides to implement a fully integrated clinical information system, the organization undergoes a fundamental philosophical shift from which management can map the required changes. Thus, new systems and technologies must be put in place to measure, support, and enhance the changes. In many situations,

information systems (IS) professionals and IS management are the driving force behind change.

The healthcare industry relies on an increasing volume of continuous, complete, timely, accurate, appropriate, trustworthy, and often confidential information to provide the highest level of professional service, to produce top quality products, and to maintain financial viability. Management in the 21st Century will not be basically different from management in the 20th Century, but the technical industry can expect a breakthrough in the development of theories of management and the role technology will play in organizations (Hofstede, 1999).

Problem Background

Corporations are observing a strong trend of convergence of the technologies of computing and telecommunications. Changing technology economics, merging of formerly disparate technologies with different managerial traditions, and the problems of managing each of the phases of IT assimilation in different ways calls for a major reappraisal of the organizational structures designed for yesteryears. In his best seller, Megatrends 2000, Naisbitt (1990) states that we are laying the foundation for an international information highway system.

Information Systems (IS) researchers have expressed time and again that technological change poses the greatest challenge to their research. Many have mentioned that not much attention has been given to the integration of technology or its use as a coordinating mechanism for organizational units.

Turbulent environment drives organizations to use IT to align their structure with environmental preferences, and no other industry outside of healthcare comes close to such a dynamic environment. The structure is determined by the information processing capacity requirements of the organization, which in turn are governed by the information technology being used. Mintzberg (1973) has suggested that the organization's environment and technology are the independent (contingency) variables that determine the structural variables of the organization.

The effect that a Chief Information Officer (CIO) has on information technology in enhancing these values is virtually limitless. It is evident that innovation usually possesses a fairly incidental character, but it is more evident that successful innovations are the result of a previous disposition to accept the challenge given by any kind of opportunity. Thus, as Claver (1998) observes, an innovative attitude is a key factor for the success of these forward-thinking organizations.

Hansen (1999) is also quick to point out, since knowledge management as a conscious practice is so young, executives have lacked successful models that they could use as guides. Culture, control, and competition determine the locus of IT development and applications in the organization. Further, technology can also be socially constructed by the different meanings workers attach to it and the various features they emphasize when used in the information system (Mahenthiran, 1999).

Computers and telecommunications offer some of the best solutions for dealing with the rapid and comprehensive management and fiscal changes projected by the new healthcare legislative initiatives, and the CIO is in a unique position to offer solutions for the clinical community. The medical management network environment is growing

dramatically ranging from Community Health Information Networks (CHINs) and managed care complexes to small groups of practitioners that manage multiple office sites.

The sheer volume, density, variety, complexity, and interdependence of information and information resources, such as hardware, software, and telecommunications, will require a high level of informed and experienced management and support throughout the entire industry. Advances in technology causes the CIO to become well versed in many areas. The areas of notable concern in the next millennium will be in the business side and the clinical side of the organization. Godfrey (1999) observes that a competitive resource may be built on a single, idiosyncratic asset, such as a unique machine or production design.

Medical professionals and many administrators generally have a low tolerance for the restriction of their information access or privileges. The life and death situations that depend on immediate access to information are cited as their rationale for full and unfettered access to information both inside and outside their normal professional areas of authorization.

Literature Review

It is widely speculated in many organizations today that the chief officers are responsible for the management and dissemination of information, and that they are simply individuals with a data processing attitude operating under another title. Miller and Gibson (1995) state that many CIOs have naturally risen from the ranks of the data processing department and remain comfortable in the supporting role within organizations today. But modern-day organizations are beginning to recognize CIOs at

the executive level and therefore, their roles should be less operations support and more long-term strategists for the company.

Romanczuk and Pemberton (1997) further ask is the CIO really little more than a promoted Management Information Systems (MIS) director, a highly paid technocrat with a new title? In other words, hiring executives should be looking for those individuals that have the ability to help the organization compete by optimizing uses of information systems (IS) as strategic weapons.

In most companies, the CIO is the perceived expert on IT, which causes many to differ on the actual role responsibilities and to challenge the executive-level position. Traditionally, the role of CIO has been misapplied to one who manages the operation of the company's data processing activities in support of the essential operations of the organization. Mullin (1996) reports on emerging trends in IT:

> With an effort under way to install client-server systems, intranets, and other high-speed information networks, information technology (IT) professionals claim they are, for the first time, integrating their efforts with business operations. This, they say, marks a fundamental break form the traditional IT department, which operated as a side-line service organization maintaining an ad hoc conglomeration of computers that grew with no thought given to business strategy (p.5).

This research is intended to take a critical look at the current roles perceived by senior management regarding the IT manager and the direction the role of CIO should be headed. Long gone are the days of data processing managers. From the 1950s through the 1970s, organizational departments along with the executive staff were dependent on the data processing department to provide reports concerning mostly financial data. But the 1990s and beyond see the CIO as a role that integrates and modifies information flows

from each business-level strategy, while adding the information resource as a distinctive competency supporting a strategic thrust for the company (Miller and Gibson, 1995).

This integrative strategic role, as noted by Miller (1995), involves three distinctive activities that shape and affect the organizational structure. The roles of the CIO should involve the following:

- Strategic information facilitator
- Strategic information disseminator
- Strategic information change agent

Further, Miller (1995) states four critical success factors to be identified as crucial for the CIO role: structure of the organization, strategy of the organization, environmental factors and temporal factors.

Romanczuk (1997) has noted that because of the data processing mentality of current CIOs or IT managers, many CEOs perceive the role of the CIO as acquiring six successful characteristics of one who:

(1) Is a business person

(2) Can understand technology from a business perspective

(3) Is able to maintain an overall view of business needs

(4) Is able to cross departmental boundaries

(5) Is innovative and flexible

(6) Is able to communicate well

Moreover, McGee (1995) concludes that as CIOs get saddled with more general business responsibilities, they often have less time to sort through the onslaught of new technologies and products available to keep their companies competitive.

CIOs are not living up to corporate expectations mainly because of their technical "gate-keeper of data" mentality. At the bottom of the information hierarchy is the data that is the basic building block, then comes information and finally knowledge. It is at this pinnacle that the CIOs are falling far short in their roles. Pemberton (1997) states that knowledge has become intellectual capital and a manageable resource.

According to DeLisi and Danielson (1998), by 1989, more than a third of the Chief Information Officers in the U.S. were reporting to the CEO. DeLisi (1998) also states that the CEO should be looking for the following characteristics when hiring a CIO:

- Able to position the IT functions and the CIO as agents of change
- Able to focus on achieving effectiveness, not efficiency, from IT
- Able to institutionalize business values for IT
- Able to build an executive team that includes the CIO, and manage IT as integral, not adjunctive, to the business

The skills needed by a successful CIO are virtually identical to those for an effective CEO. Thus, the only additional requirement of a CIO and a CEO is the understanding of information technology and the architectural platforms available for particular organizational needs. Thus, LaPlante (1992) maintains the skill set of the successful executive is being redefined.

Again, DeLisi (1998) observes that other than technical knowledge, unfortunately, the CEOs did not think senior IT executives demonstrated many of these essential characteristics. Many CEOs also felt CIOs were weak in managerial skills such as communications skills, organizational development skills, and strategic skills. Spitze

(1996) maintains that the average CIO keeps his/her job somewhere between 18 and 22 months. This also accounts for the weakness of the CIO, due either to training or experience, in acquiring people skills. Violino (1997) also maintains that one of the most important things looked for in a CIO is that they be both technology and managerial experts.

Morrissey (1997) makes note of what characteristics CEOs are looking for in a CIO. The responses averaged on a scale of 1 to 5:

- Interpersonal skills 4.7
- Good communication skills 4.7
- Strategically oriented 4.7
- Business savvy 4.3
- Understanding and can translate the cost/benefit of technology 4.3

Siwolop (1995) makes the point that to survive the changes still swirling through corporate America, CIOs will increasingly need to be key players in their companies' efforts to exploit new strategic IT. Further, Klug (1996) says the relationship between Chief Information Officers and Chief Executive Officers has never been very good. The reason for this is most CIOs are technical and it appears that most other corporate officers are as well. CFOs are, in many organizations, senior to the CIO and have learned enough to become dangerous to the CIO. Klug (1996) observes that is because the non-CIOs don't think the information systems people know anything about business.

CIOs today come from a variety of backgrounds including marketing, finance, and manufacturing. Most, if not all, have a combination of leadership, management,

problem-solving, business, and technology skills that helped land their jobs. But one problem with CIOs, as seen by McGee (1998) is that many don't realize they need to translate technology into terms and examples that business and other nontechnical people can understand. Thus, a lot of CIOs are good communicators peer-to-peer but aren't able to communicate well outside their area of expertise. McLeod and Jones (1995) state that the first effort to aim the computer at business problems was named MIS (Management Information Systems), and the idea was that if the computer provided the necessary information, the manager could solve the problem. But the scope of the organization, especially healthcare, has been elevated beyond just providing information to end-users by the IT manager.

The CIOs' weakness has been most contributed to a lack of understanding of the business side of an organization. McDougall and McGee (1999) observe that the role of IT is much more important and the CIOs who aren't focused on the business goals will inevitably fail. Thus, CIOs never get fired for meeting the organization's business needs but will get fired for meeting the technology needs instead of the business needs.

To compound the problem in the healthcare industry, the CIOs' weakness is seen in the business as well as in the clinical side. Morrissey (1997) states that healthcare chief executives have figured out that they need a comprehensive information strategy, but a clear majority aren't confident that Chief Information Officers can pull it off. Morrissey (1997) also notes that when CEOs were asked if CIOs are prepared to meet the industry's challenges, 67% said no.

According to Chabrow (1999), the CEO identifies a most important quality of the CIO to be a strong business focus. Also, Berry (1999) states that adding business acumen

to the CIOs portfolio can yield big premiums in salary. Another observation by Berry (1999) is that the performance of the CIO organization has been pretty abysmal and states only 40 percent of big IT projects come in on budget and on time. Berry (1999, p. 2) also states "Do you know any business leader who would say I can only get 40 percent of the job done but leave me in charge anyway?

Another dilemma faced by IT executives today and especially in the healthcare sector, is the assimilation of preponderance of technical changes in shorter time frames. Of the shortcomings CEOs perceived in CIOs, the most serious were a lack of strategic orientation, a bent toward process at the expense of operational goals, and a lack of industry understanding, especially clinical operations and managed care Morrissey (1997).

Further, Cone (1996) states that Information Systems (IS) managers must deal with technology that's constantly changing and having to explain it to people who may not know or care about IT but who expect it to perform miracles.

CIOs today must expand their visual perspectives in order to see beyond their corporate borders and investigate other opportunities. According to McGee (1997)

> The job description for CIOs has been broadening for some time. For example, while it's important to understand lines of code and to help improve the bottom line, people skills are increasingly important. Now add to that list an understanding of the dynamics of global business—an awareness of how local culture, language, and business practices can affect IS strategies that involve integrating systems and standardizing platforms (p. 17).

Thus, globalized IT is creating a new hybrid of complex skill sets for the CIOs.

Finally, Murphy (2000) says tomorrow's IT leaders will have to be part general, part maestro, and part evangelist. The literature, in general, lacks a clear direction for this

relatively new executive position. Thus, a qualitative approach to enlisting comments from current CIOs will be the next step.

Purpose of the Study

No doubt, significant investments are required to protect medical data, especially as systems become more complex. Most organizations have neither the budget nor the staff allocated to perform massive overhauls of their information processes. This is an opportunity to develop both a healthcare business impact analysis and strategy--picking those functional areas that need the most attention and building a strategy around them.

The healthcare industry is one of the most critical components of our society. Further it should be well protected, and possess complete, accurate, and timely information. Lastly, information delivery is the bedrock of healthcare's future.

This study is aimed at exploring and understanding the role of the CIOs, and the challenges faced by CIOs in the healthcare environment. It further seeks to understand the intricate roles to be carried out by these IT professionals within an information-rich and demanding industry.

This study provides some insight into the use of information systems technology within the medical community. More observations would be necessary to utilize the results for policy decisions, but the study indicates directions for future research.

It was not until 1981, when IBM introduced their famous "PC" into the business world that the processing of data began to come of age. This was revolutionary because it had the potential, for the first time, to place access to information at the fingertips of the

user. The early 1990s saw the introduction of networks and by then, third party vendors began to step up the development process of proprietary software for the marketplace.

Thus, the revolutionary advancements of the PC have impacted every possible industry today and there appears to be no end in sight to the impact of this technology. In the early 1980s, the market appeared to drive technology. But, the 1990s have seen a drastic reversal in this trend. In every business sector today and it appears that it will continue well into the next millennium, technology is driving the marketplace. What this means is software technology will continue to be developed and at an increasingly faster pace. The major reason medical care costs are increasing today is attributed to the advancements in technology. Computer technology is addressing every department within hospitals today. From environmental control to the lab, to finance and to the emergency room, the use of technology has only begun. To this end, without the advances of technology, the delivery of healthcare would still be in the dark ages.

Research Questions

The aim of this research is to gather qualitative information from select hospitals in the United States as well as a comparative survey with like hospitals in the United Kingdom. The following questions are the basis for the qualitative study:

1. What are the demographic characteristics of CIOs in the select hospitals in the United States and the United Kingdom? Specifically, their ages, position in the organization, educational background, title, job description and area of responsibility.
2. What challenges do these CIOs or IT managers face in their industry?

3. What are the experiences of Chief Information Officers in the healthcare setting? Specifically,
    a. What is the role of the CIO in healthcare?
    b. How has the role evolved over time, especially from the days of data processing?
    c. What alternate directions, if any, are anticipated by the CIO regarding emerging technologies?
    d. What behavioral roles does the CIO see as instrumental to the healthcare field?
    e. How does the CIO, with emerging technology, plan to interface with Chief Medical Officers on the clinical side of healthcare?
    f. How do CIOs perceive themselves in a leadership capacity?
    g. What new role attributes do the CIOs see evolving with respect to CEO integration?
    h. What role does the CIO perceive in the external environment?
    i. What are the CIO perceptions on how IT can provide continued solutions to the business side as well as the clinical side of healthcare?
    j. How does the CIO line up their role attributes with Mintzberg's classic work?

Limitations/Delimitations

The works of literature referred to have shown to be more prescriptive in nature, and not very descriptive. To date, no studies have been conducted that explores the qualitative nature concerning the issues confronting the CIO role, leadership, and the impact their role can have on shaping healthcare and information technology in the healthcare environment. Almost all of the literatures addressing the role of CIOs deal mostly with business, manufacturing or engineering. The studies do not portray adequately the

constant changing nature of the CIO role, position and the application within the healthcare industry, nor do they investigate career paths available within current organizational structures. Further, there are no recent studies on the demographics of healthcare CIOs causing a lack of benchmarking data.

The literature cited in this study does not portray a holistic picture of the CIOs' position and posture within the healthcare arena nor are there existing scholarly works to compare this most important executive position with current or future CIOs. This study adds not only to the existing body of knowledge concerning CIOs in general, but also substantially to the literature about CIOs in healthcare.

This study will utilize a qualitative approach that will necessitate personal interviews with executive officers at select hospitals in the mid-Atlantic region of the United States. In addition to select hospitals in the United States, the study will also include hospitals or healthcare institutions of comparable size in the United Kingdom in order to involve the international perspective. In keeping with the demographic geography, this study will be limited to the capital areas of each country.

Definitions

- Chief Information Officer (CIO) is the executive officer of a business organization who is responsible for managing the data, systems, and personnel involved with Information Systems (Maurer, Shulman, Ruwe and Becherer, 1995, p 212).
- Data (Processing) Management refers to several levels of managing data. Thus, data processing refers to the capturing, storing, updating and retrieving of data and information. From bottom to top, they are:

(1) The part of the operating system that manages the physical storage and retrieval of data on disk or other devices

(2) Software that allows for the creation, storage, retrieval and manipulation of files interactively at a terminal or personal computer.

(3) A function that manages data as an organizational resource.

(4) The management of all data and information within an organization and includes data administration, standards for defining data and the way in which it is perceived and used in their daily routines.

- Global Net (Global Alliance), also called global strategic alliance, is a global marketing strategy involving, at its core, the formation of major, long-term, cooperative relationships between companies (Presner, 1991, p. 142).
- Information Technology (IT) encompasses a broad spectrum of technologies used to create, store, retrieve, and disseminate information. It covers any form of technology that is any equipment or technique used by a company, institution, or any other organization which handles information (Warner, 1996, p. 2103).
- International (from the Latin meaning among nations), refers to things that involve dealing outside of one's own country (Presner, 1991, p. 164).
- Internet is an international system of interconnected computer networks of government, educational, non-profit organizations and corporate computers (Maurer et. al., 1995, p. 835).
- Organizational Behavior (OB) is an academic discipline concerned with describing, understanding, predicting, and controlling human behavior in an organizational environment (Maurer et al., 1995, p. 1117).

- System is a group of related components that interact to perform a task (Williamson, 1993, p. 257).
- Total Quality Management (TQM) refers to management methods used to enhance quality and productivity in business organizations (Warner, 1996, p. 1455).
- Vision is something beyond optical perception that enables one manager to anticipate and avoid commercial disaster while another (without it) trips and falls. Vision is also built on imagination (Williamson, 1993, p. 271).

Importance of the Study

As technology continues to have a critical impact on the healthcare industry, an increasing demand for qualified IT managers will continue to grow. To insure the quality of information in addition to the dissemination of relevant knowledge, the CIO must strive to acquire skills that are well orchestrated with a mix of departmental demands. Unless CIOs agree to face the changes that will be demanded by the CEO on the business side as well as those from the CMO on the clinical side, it is unlikely this high visibility position will survive.

The healthcare industry is no different than any other industry when considering the utilization of information technology. Because of this, the CIO is in a unique position to create a totally unique managerial paradigm of managing vast reservoirs of information; otherwise, CEOs will simply outsource this vital position.

CHAPTER TWO: REVIEW OF THE LITERATURE

Theoretical Framework

There is a growing sense that despite all the interest and attention directed to high technology by the marketplace that the picture within Information Technology (IT) is not all that glamorous. The problems have become broader and more difficult to solve. The issues include the aging of the IT infrastructures, the pace of technology change and the impact of downsizing and rightsizing on the workforce. Building such an elaborate infrastructure is an exceedingly difficult and demanding task (Emery, 1991).

The stresses on Chief Information Officers (CIOs) and IT managers are not unique. Major social shifts and the fact that the strategy has changed in the corporate environment are the major causes of these stresses. In many corporations, the CIO or IT director is the newest member of the management team. But while this newest team member adjusts to the rigors of corporate disciplines and strategic planning, the CIO's role is growing fast in status and importance, while at the same time, it seems to be evolving into other dimensions. Teo and King (1997) observe that one of the key elements of strategic planning for information systems (IS) is the integration of information systems planning (ISP) with business planning. It is, of course, this integration that enables IS to support business strategies more effectively.

Adding to this, Barlow and Burke (1999) state if organizations are to survive and flourish in the information environment there is a need for more than the implementation

of technological information systems. In order for the whole organization to survive it must change its very nature and the way it operates.

The CIO's role is dramatically shifting from the technical business of data processing to more broadly defined knowledge management. This new breed of manager and guardian of information has become the corporation's most valued commodity in recent years. Pemberton (1997) asserts that if there is, as many suggest, a hierarchy in which information is higher than data, knowledge is higher than information, and wisdom is at the top, then it may well be time for knowledge to emerge as a significant corporate asset. The CIO or IT manager has many roles and responsibilities within the organization and their ability to oversee even end-user computing will have a profound effect on optimal outcomes. Essex and Magal (1998) state that if properly managed, end-user computing (EUC) is believed to improve users' productivity and, in turn, the effectiveness of the organization.

The CIO has become in many ways the most formidable and dynamic leader in the business world and also the most prone for failure. Morrissey (1997) writes in Modern Healthcare an article that asks if CIOs are up to the challenge? He further alludes to a survey that finds CEOs lack confidence in information chiefs. The article goes on to list some of the characteristics CEOs are looking for in CIOs.

Most would agree that healthcare is the most complex and dynamic industry in human history and that this industry is going through severe changes both technically as well as strategically. Shapiro (1998) says that simply knowing the business side of healthcare is not enough; in the new millennium, CIOs will be expected to understand clinical practices as well.

It is therefore the intent of this research paper to explore the characteristics and roles of CIOs in a healthcare environment and to address some of the many characteristics including interpersonal skills, good communication skills, becoming strategically oriented, possessing business savvy and all this in addition to understanding the cost benefits of technology. Caruso (1998) notes that it's a rare IT executive who can easily handle both the technical and people sides of business. IT managers often spend their careers absorbing technical knowledge while paying little attention to obtaining softer communication, diplomacy, and leadership skills.

Morrissey (1997) again draws attention to the major problem in his article that the most serious shortcomings were a lack of strategic orientation, a bent toward process at the expense of operational goals, and a lack of industry understanding, especially clinical operations and managed care.

Defining the CIO Position

CIOs are senior executives tasked with the responsibility for all aspects of their organizations' information technology and technical systems. They are also mandated to use IT to the support of the organization's goals and mission. As Rainer and Watson (1995) noted

> Today's executive operates in a turbulent environment that challenges organizational survival with constant technological, competitive, regulatory, and economic changes. Executives must be able to respond pro-actively to threats and opportunities and to react quickly to new conditions. In many organizations, this executive challenge is being supported by information provided by executive information systems (EIS). These systems provide executives with easy access to internal and external information that is relevant to their critical success factors (p. 83).

It is also important to realize that IT has played a key and significant role in modern society and economy (Filip and Alexandru, 1997). These key technical individuals, with their knowledge of technology and business process, traverse across functional lines within the organization and are most capable of aligning the organization's technology deployment strategy with its business strategy. Knowledge in the new millennium will be the key management issue. According to Dejarnett (1996)

> Tomorrow's successful organizations will be designed around the building blocks of advanced computer and communications technology. The success of these organizations will come from their ability to couple and decouple from networks of knowledge nodes...No longer will information be viewed as an enabler of control or an asset to be controlled. Rather, the goal is to turn information into knowledge by marrying human expertise with information (p. 3).

As demand for knowledge workers grows, this inevitably puts a strain on the role of the CIO to integrate the technical knowledge of the position with the informational needs of the organization. Carrillo (1997) maintains that increasing the knowledge base of workers so everyone can make better decisions is the top objective.

A leading CIO magazine defines the CIO as one who has taken a leadership role in reengineering their organizations' business processes and the underpinning IT infrastructures to achieve more productive, efficient and valuable use of information within the enterprise ("What is a CIO," 1999).

A further insight into the makeup of a CIO is to recognize their mission. Thus, the main duties of a CIO is to provide technology, vision and leadership for developing and implementing IT initiatives that create and maintain leadership for the organization in a perpetually changing and ever fiercely competitive and often hostile environment. Glaser (1999) further states that "the CIO is seen as the executive who would successfully lead

the organization in its efforts to apply information technology to advance its strategies and can be viewed as a critical component of the IT asset." Finally, Olson (1997) states that in today's information systems world, if you're not willing to manage up and down, you may find yourself sidelined with amazing speed.

Skills and Attribute Typology of the CIO

In the early 1980s, according to Grover and Jeong (1993), Chief Information Officers (CIOs) were often portrayed as the corporate saviors who were to align the world of business and technology. Many mixed reviews have emanated from various surveys concluding that the CIO would have high levels of influence but such is not the case today in many organizations. It is reported that many CIOs may not be able to function in a high visibility position. According to Turner (1996), for many IT managers, this means learning a new set of skills.

Grover and Seung (1993) conducted a research study in the early 1980s to investigate managerial roles of CIOs based on the classical work of Mintzberg (1973). They found that CIOs differ from manufacturing and sales executives in the relative importance they place on the managerial roles. They also found that differences do not exist between CIOs and finance executives or between CIOs and IS managers. The researchers discovered that as IS matures, spokesman and liaison roles of CIOs become more important. Further, the more centralized the IS resource, the greater the CIOs' role in acting as a spokesman, environmental monitor and resource allocator.

The researcher's empirical study uses multiple item measures to operationalize six of the ten Mentzberg's roles: leader, liaison, monitor, spokesman, entrepreneur and

resource allocator. The other four roles (figurehead, disseminator, disturbance handler and negotiator), were not operationalized because the activities constituting these roles were correlated with the activities of the other six roles.

The study investigates the roles of CIOs in terms of the extent to which managerial roles of CIOs differ from those of senior managers in other functional area and also the extent to which CIO roles change at varied levels of IS maturity and IS centralization.

The study was conducted among 111 respondents from a wide diversity of organizations and produced some interesting results. The study concluded that the managerial role importance of the CIO is significantly different from those of the manufacturing and sales department but is not significantly different from the finance area. Further, there appears to be no significant difference in the role importance between CIOs and IS middle managers.

As an initiatory step toward understanding the managerial roles of the CIO, this research will benchmark the roles of the CIO based on Mintzberg's classic backdrop of managerial roles. Zwass (1998) describes managerial roles and their information system support as seen in Table 1.

The work of managers of all types, according to Mintzberg (1973) as shown in Table 2, may be described in terms of ten roles: Interpersonal Roles - figurehead, liaison, and leader; Informational Roles – monitor, disseminator, and spokesman; and Decisional Roles – entrepreneur, disturbance handler, resource allocator and negotiator.
Grover and Jeong's research only attempted to look at six of the ten managerial roles identified by Mintzberg. According to the researchers, it was suggested that a similar

Table 1

Managerial Roles and their Information System Support

Interpersonal Roles	Personal Interaction	Assistance in Communication:
• Figurehead		Teleconferencing
• Leader		Teleconferencing
• Liaison		Office Information Systems
Informational Roles	**Information Transfer**	**Extensive:**
• Monitor		Management Reporting Systems Executive Information Systems
• Disseminator		Office Information Systems
• Spokesperson		Office Information Systems
Decisional Roles	**Decision Making**	**Assistance in Decision Making And Communication**
• Entrepreneur		Decision Support and Executive Information Systems
• Disturbance Handler		Crisis Management Systems
• Resource Allocator		Decision Support Systems
• Negotiator		Group DSS and Negotiation Support Systems

Source: Zwass, Vladimir. (1998). Foundations of Information Systems. 61.

Table 2

Summary of Ten Roles

Role	Description	Identifiable Activities from Study of Chief Executives
Interpersonal		
Figurehead	Symbolic head; obliged to perform a number of routine duties of a legal or social nature	Ceremony, status requests, solicitations
Leader	Responsible for the motivation and activation of subordinates; responsible for staffing, training, and associated duties	Virtually all managerial activities involving subordinates
Liaison	Maintains self-developed network of outside contacts and informers who provide favors and information	Acknowledgements of mail; external board work; other activities involving outsiders
Informational		
Monitor	Seeks and receives wide variety of special information (much of it current) to develop thorough understanding of organization and environment; emerges as nerve center of internal and external information of the organization	Handling all mail and contacts categorized as concerned primarily with receiving information (e.g., periodical news, observations tours)
Disseminator	Transmits information received from outsiders or from other subordinates to members of the organization; some information factual, some involving interpretation and integration of diverse value positions of organizational influences	Forwarding mail into organization for informational purposes, verbal contacts involving information flow to subordinates (e.g., review sessions, instant communication flows)
Spokesman	Transmits information to outsiders on organization's plans, policies, actions, results, etc; serves as expert on organization's industry	Board meetings; handling mail and contacts involving transmission of information to outsiders

Table 2 Continued

Decisional		
Entrepreneur	Searches organization and its environment for opportunities and initiates "improvement projects" to bring about change; supervises design of certain projects as well	Strategy and review sessions involving initiation or design of improvement projects
Disturbance Handler	Responsible for corrective action when organization faces important, unexpected disturbances	Strategy and review sessions involving disturbances and crises
Resource Allocator	Responsible for the allocation of organizational resources of all kinds – in effect the making or approval of all significant organizational decisions	Scheduling; requests for authorization; any activity involving budgeting and the programming of subordinates' work
Negotiator	Responsible for representing the organization at major negotiations	Negotiation

Source: Mintzberg, Henry. (1973). The Nature of Managerial Work. 92-93

study be conducted to include all ten roles. Their research was mainly intended to look at the extent to which the managerial roles of CIOs differ from those of senior managers in other functional specialties.

What many students of management learned in their formal studies have for the most part, been undermined by modern day survival tactics. In today's business environment, the push is for quality outcomes at competitive costs and these ideas do not discriminate across professional lines of management.

Today's leaner and flatter organization emphasizes the ability to manage people horizontally and to look for ways to acquire additional soft skills as well. Swinburne (1995) says inevitably, there will also be managers who cannot or do not want to adopt this approach, or whose skill development will be slow. Mateyaschuk (1999) also says that managers need so-called soft skills, including the ability to analyze problems, establish relationships, settle disputes, negotiate, and listen. Watson (1991) states "I would pay more for the ability to handle people than for any other executive talent." Finally, Caruso (1998) says soft skills are becoming even more important as IT gets increasingly involved in business.

Traits that people will need to acquire to become productive managers in the next millennium are going to be very different from those learned in Management Theory 101. In the past, all a person needed to become a good manager was to rule with an iron fist and motivate others to get tasks done in order to meet deadlines. McGee (1996) discusses a study that shows many CIOs lack the ability to motivate others and build relationships. McGee (1995) adds that besides technical ability and good sense, if your goal is to become a senior IS executive or CIO, you need to have excellent interpersonal skills and

the ability to motivate people. In the fast pace, high tech society of the new 21st Century, a productive manager will need to acquire and utilize many more skills then those mentioned above.

Degree of CIOs' Personal Traits

In the past, managers were known and acknowledged for their management style. A single style is no longer sufficient. The manager in the 21st Century will have to move from one way of doing things to another, becoming a strategist, mentor and team leader (St. Amour, 1999). Further, St. Amour (1999) lists ten of the most important skills which will be required to manage and thrive in the next millennium:

- Make the most of technology
- Lead by listening
- Cultivate emotional stability
- Manage relationships, not employees
- Adapt
- Mediate information
- Judge resources
- Be a visionary
- Cultivate ethical practices
- Welcome diversity

Managers, for the most part, must overcome the so-called bottom-line syndrome and instead become a visionary. With this trait, managers press for a view towards new ventures on the horizon. Ray (1991) observed a recent survey by the Center for Creative Leadership that identified the inability to adapt to change as one of the major causes of

failure in managers. Added to this was the notion that all the IT manager needed to accomplish in order to be successful was just keep the computers cranking out volumes of information to senior executives. Further, Earl (1997) maintains that a CIO needs to be a vision builder, someone who can work with executive teams to build a vision of how IT could make a competitive difference to the business. In addition, according to Goleman (1998), cognitive skills such as big-picture thinking and long-term vision are particularly important. DeJarnett (1994) asks thought-provoking questions regarding the IS leader:

> What characterizes a good IS leader? Is it one who is technically proficient or knowledgeable? Does a good IS leader get budgeting for new technologies and projects that allow IS professionals to remain current and on top of the latest capabilities? Is the good IS leader someone that is in control of information technology across the business? (p. 3).

Degree of CIOs' Business Knowledge

At the apex of a technical managerial hierarchical model is the manager's role of developing new products, and identifying new areas of knowledge and business processes. To name a few of the functional skill levels, Rifkin and Fineman (1999) have identified the following:

- Bridging organizational cultures between knowledge workers and business managers
- Building collaborate relationships
- Communicating technical information
- Consulting and advising
- Employing political astuteness
- Integrating technical information for management purposes
- Managing projects

Comparing managers of the industrial age to managers of the information age requires astute managers to become more in-tune to the workers they will employ. Lewis and Snyder (1995) maintain that the central tenet of the information age has been the crucial significance of information and the critical importance of its management to the enterprise. Runge (1994) observes that although industrial work was physical, information work is mental – two very different types of work that require very different management styles. Managers today must acquire the skills and abilities to monitor both internal and external events. Mintzberg (1973) describes one who monitors is continually seeking information that enables him (or her) to understand what is taking place in the organization and its environment.

Another aspect of the CIO's skill level is to be able to recognize various models of corporate structures such as the virtual organization. One future aspect of the CIO is to be able to develop specialized communication and planning skills in the virtual work environment. This may entail managing workers at remote sites rather than face-to-face contacts. Barner (1996) maintains corporations are rapidly moving toward a distributed work force that uses electronic technology to link workers and functions at remote sites. Berry (1998) discusses some of the skills that IT managers need to learn and communications skills are still at the top of the list.

In Mintzberg's classical work, one area of importance talked about is the interpersonal roles. Dash (1999) maintains that business interpersonal skills are critical. Mintzberg's works also addresses the leadership role as clearly the most significant of all roles, and it has received far more attention than any other. Fagiano (1997) writes that not too long ago business people sought training to become good managers but today, they

want to become more effective leaders. One problem CIOs will experience is the ability to carry out the non-technical tasks of leadership. Huber (1997) notes that leaders in administrative positions have responsibility for encouraging the heart, both individually and collectively, to nurture the spirit of the organization.

Another critical area in Mintzberg's work is in the area of Decision Roles. Gennard (1997) asserts that managers are constantly in negotiations with colleagues to gain, for example, support for a proposed course of action or to gain approval for resources to introduce new policies and arrangements.

Included in the Informational Role model of Mintzberg's classical work, is the role of disseminator. What is referred to here is one who has the capability to collect and decipher external information and then channel it internally to those who are able to act on this information. According to Blom (1999), combining different pieces of information creates knowledge. This new information then becomes a tool for making critical decisions.

One area that contributes to a weak knowledge base is the inadequacy of management education and training skills. According to recent surveys, managers are not keeping up with the rapid changes demanded by their own organization and society in general (Matheson, 1996). Skills by any level of management, and CIOs are no exception, are self assumed due mainly because of the elevated position. Wukitsch (1990) states "Just as you have learned technical skills that may have gained you recognition in your organization, and perhaps your industry, you must learn and develop the management skills needed to manage and get work done through others" (p. 57).

Degree of CIOs' Leadership Skills

In order to address the challenges for management leadership, especially at the CIO level over the next decade, it is important to view, according to Mellors (1996) the emerging senior manager profile for organizations equipped to manage pressures for change over the next decade. These include:

- Strong leadership skills
- People management skills
- Being uncomfortable with uncertainty and ambiguity
- Being equipped to use advanced business tools
- Sophistication in the use of information and IT

What characteristics do CEOs look for in selecting CIOs to manage corporate IT? Pemberton (1992) has suggested the following description to describe the attributes of the desired CIO.

> What kind of person, then would be an effective CIO – or whatever the title might happen to be? What skills, what knowledge, what insight should such a person have? Believe it or not, the most reasonable answer is someone who has good business and management skills and is knowledgeable about a broad range of information disciplines, services, techniques, and technologies (p. 43).

Wilder (1997) states that the three skills most in demand are leadership, business understanding, and technology – in that order. After that, the CIO must, at the least, have strategic vision, coordinating skills, and communication skills

Further research has been conducted regarding problems of mismatched goals between senior managers and management information professionals. Moynihan (1990) conducted research of the interactions between senior managers and IT professionals and found ten issues relevant to managerial differences. The issues are:

- Improving strategic planning
- Using IT for competitive advantage
- Facilitation of organizational learning
- Increasing understanding of roles
- Aligning IS with the mission of the organization
- Managing end-user computing
- Promoting effective use of data resources
- Developing an IT infrastructure
- Measuring IS effectiveness
- Integrating IT and telecommunications

All of these points are relevant starting points for further research into the roles of CIOs in healthcare.

Finally, the need for top management involvement in the exploitation of IT is a recurring theme of information management (Feeny and Edwards, 1992). These researchers conducted a study in the early 1990s to identify determinants of a successful two-way relationship between CEO and CIO. CEOs and CIOs were interviewed in 14 large organizations based in the United Kingdom (UK). The initial research seemed to be linked to a shared vision of the role of IT.

Past research showed IT successes generally reflect an effective relationship between business managers and IS managers. Further, the CEO/CIO relationship will continue to succeed in three respects: (1) strategic information systems planning, (2) business/IS partnership and (3) CEO involvement in IT management.

The interview process was semistructured, with interview section, with a typical interview section consisting of a series of open-ended questions. The CIOs were asked to complete the self-perception inventory form.

The results of the study were intended to build insights using depth rather than breadth of the data. A Likert-type scale showed the following results:

- Five organizations were seen to enjoy excellent relationship
- Five more organizations were seen to enjoy fair relationship
- Four organizations were seen to enjoy poor relationships

The data suggests some interesting potential insights with profiles of CIOs who enjoyed successful relationships differing quite sharply from their less successful peers. Each of the five in the top group had a profile in which three strands were prominent:

1. Consultative leadership stressing communication and relationships
2. Entrepreneurial leadership providing good goal orientation
3. Creativity based on lateral thinking ability or strong external networking

Role of the CIO and Nature of the Job

In many corporations, the CIO has become the newest member of the executive staff. Further, the number of corporate CIOs has increased so dramatically that this new position has been called to center stage as one having the wherewithal to offer high quality at tremendous cost savings. As a newcomer to the executive suite, the CIO has become in many ways the most challenging and dramatic leadership role in the business world. Throughout the '70s, '80s and '90s, corporations have faced dramatic challenges brought about by changes in global markets as well as in the domestic sector.

Companies have experienced major shifts, vertically and horizontally and through mergers, acquisitions and downsizing. These dramatic changes have seen corporations worldwide invest billions of dollars back into their IT infrastructure through reengineering efforts. And in the final analysis, it is the CIOs reputation that is squarely on the line in corporate America and around the world.

A survey conducted by Kornferry consultants for the CIO Magazine have noted some key trends in the IT field.

- The role of the CIO is moving from technical planning and implementation to strategic planning. In addition, the CIO seems to be entering a more tactical role.
- The CIO will have a voice in strategic planning. In most corporations, the CIO is not functioning at the executive level and in the strategic planning process.
- Many organizations are rethinking the skill set associated with the CIO function, including the relationship to the senior officers.
- The qualifications for the CIO are constantly changing as the IT function becomes more central to business planning.
- The CEOs are demanding the CIO to become more involved with external as well as internal customer support. The IT role is currently associated more with internal communications and networking than with external customer-based technology support (Anonymous, 1999).

Degree of IT Knowledge

In further study into the roles of the CIO, it would probably be fitting, at this point, to look at some characteristics of another similar role model in the IT environment, that of a chief knowledge officer.

CKOs are known for initiating IT within the social environment as well as the technical environment. Thus, they must be able to handle projects of a multifaceted nature. They must also know which technologies will contribute the desired results given the parameters in which the request was given (Ear and Scott, 1999).

Many organizations have taken the step of appointing a highly visible figure, the CKO, to leverage the collective mind of the enterprise. Knowledge leaders, according to Capshaw and Koulopoulos (1999), cite skills in knowledge collection, organization, categorization and communication, rather than advanced skills in specific information technologies, as critical to their success.

In view of the fact that corporations need and desire their IT infrastructure to become more integrated, CIOs must acquire new skills. Further, the CIOs of the next decade must expand their outlook on the structural definition from which they will determine the necessity for disseminating appropriate information throughout the corporate network.

Sifonis and Goldberg (1997) maintain that the technology leader of tomorrow must be a business leader with all the management skills of any other senior executive. According to Keppler (1997), it's all about making sure that we have infrastructure and systems that get the information to the right people at the right time. Further requirements for the CIO are to understand IT networking on a global basis. The IT leader must develop greater knowledge and skills in the rapidly advancing area of communications to understand how new technologies can be combined with information systems to create global networks for the organization. The objective, according to Ives, Jarvenpaa and

Mason (1993) is a close alignment between the firm's global vision and the firm's IT strategy and architecture as seen in Figure 1.

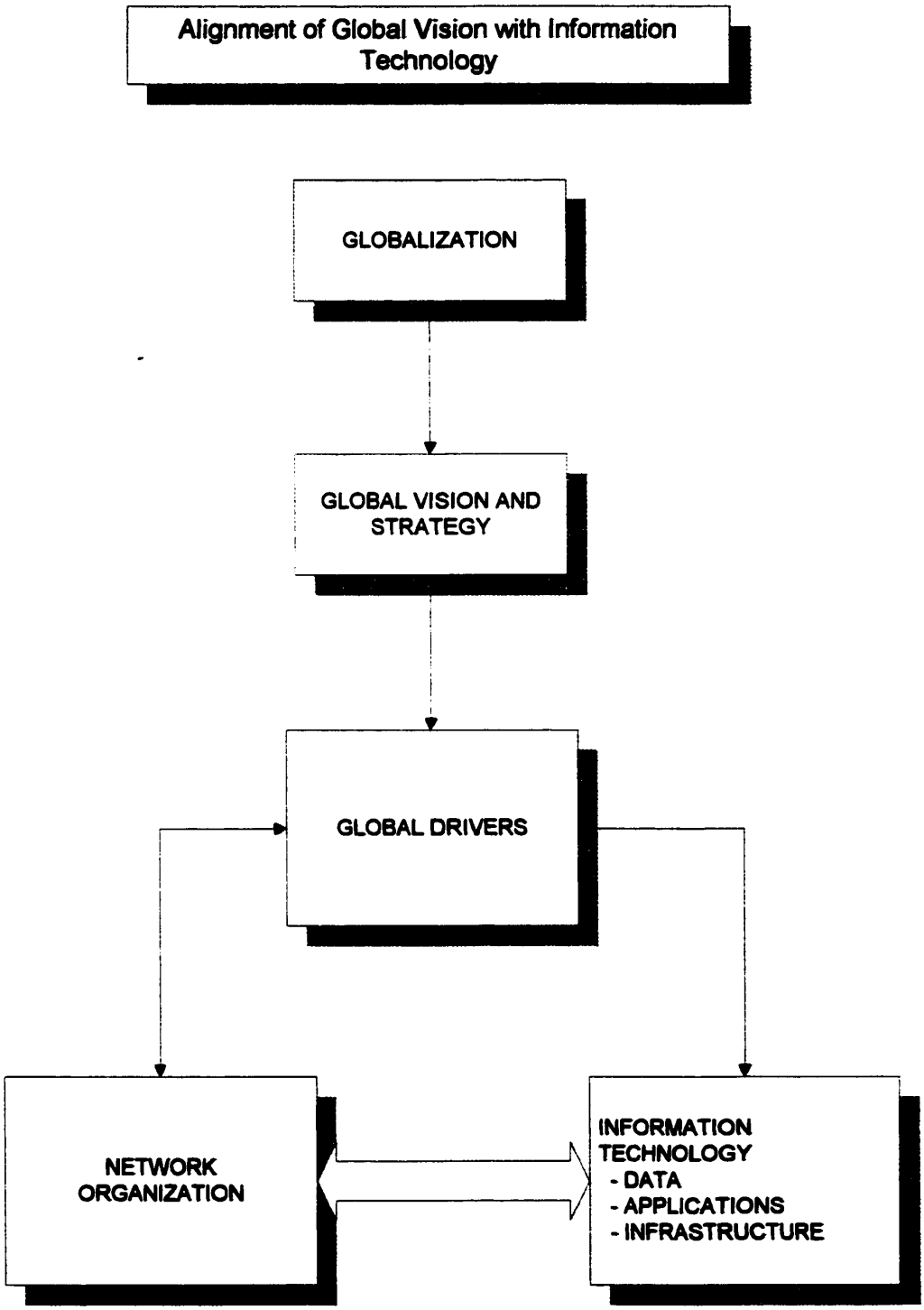
Senior management mandates the CIO with the responsibility of interfacing the organization with its environment in order to gain competitive advantage. Likewise, Disher and Walters (1998) believe the CIO must be able to throw away the traditional technology blinders and develop true service organizations. In addition, the CIO must have the business acumen to leverage the economics of the marketplace to the company's advantage. Mitchell (1993) also believes that what is needed is a new breed of managers who are as adept in managing technology as they are in traditional business skills.

Stephens (1994) suggests the CIOs strategic role of linking IS to the business means linking IS to the business internally and externally. Many executives have challenged the value of a CIO by downplaying the necessity to have such a person sit at the top of the executive planning team. Wolff (1999) quotes Peter Drucker as saying "the organization is a tool – a powerful tool – and wielding it properly requires shaping a learning and teaching organization" (p. 2).

Glou (1995) maintains that without a CIO to keep you at least equal to key competitors, you risk losing market share or reducing profit margins, even if you're at the low end of the revenue scale.

The CIO, as an executive, should be operating primarily at the strategic level in a decisional versus an informational role (Mintzberg, 1973). Thus, the concerns of a CIO should be more toward the long term than the day-to-day functioning of the unit supplying information to the entire network. Stephens and Ledbetter (1992) note that the

Figure 1



Source: IBM systems Journal (1993). Global business drivers, 146.

CIO should be considered as an executive rather than a functional manager.

Stephens and Ledbetter (1992) studied the role of five CIOs in five divergent industries to determine the nature of the CIOs' job as executive or as functional manager. They wanted to determine if the title is just a name for MIS or a significant function. They also wanted to know how does the CIO bridge the gap between the organizations' strategy and IT.

The study researched five CIOs using a structured observation method. The preliminary findings suggested CIOs operate as executives rather than functional managers. The study also provides a view of how these tasks are accomplished in a day-to-day basis through scheduled meetings. Structured observation has been defined as "perhaps the only one that enables us to study systematically and comprehensively those parts of managerial work that are not well understood" (Mintzberg, 1973, p. 228).

The outcome of the study provided qualitative and quantitative analysis of the observed data. The details seemed to pose a common thread as noted below.

- Delegate day-to-day or line management tasks
- Seize expenditure authority for IT
- Avoid adversarial positions
- Initiate contacts outside the IT unit
- Use IT in your personal work
- Establish daily quiet time for reflective activities

The role of the CIO continues to be the subject for much discussion not only in the business world but also in academia. The CIO has not established himself or herself as a definitive role to the extent that this strategically important position is often subject

to firings. Romanczuk and Pemberton (1997) researched the industry and found that in 1989, 13% of CIOs lost their jobs, in contrast with 9% for all top executives. One reasonable interpretation of this finding is that in the information environment, the top executives notice only significant savings.

Additional roles of a CIO are informational roles. Mintzberg (1973) speaks of "Spokesman" in his classical work and states "While the disseminator role looks into the organization, in the spokesman role the manger transmits information out to his or her organization" (p. 76).

The potential use of Information Systems Technology (IST) as a competitive tool has been of enormous interest not only to academic scholars but to practitioners as well. Vessey and Conger (1993) state that the systems development process involves both an application and a problem-solving domain. Opportunities exist for healthcare organizations in particular to gain an edge over their competitors through the use of IST. Kim and Michelman (1990) report in their findings that the need to use Hospital Information Systems (HIS) as a competitive weapon has been further heightened by the competitive pressures that pervade the healthcare industry.

CIOs' Role in Organizational Dynamics and Management Theory

This section deals with the transformation of business organizations in the 21st century. The principles of integration and differentiation are more relevant than ever, given the complexity of modern organizations. Stewart, (1999) maintains that when the organization is viewed as a complex series of interlocking patterns of human

relationships, work-flow patterns, and control patterns, the opportunity for the individual to innovate and shape his or her own environment becomes apparent.

The new challenge is to effectively manage dramatically different aspects of technology that overlap or even compete against one another within a strategically focused enterprise. What's more, there will be a growing need for integration patterns - joint ventures, alliances, etc. - that extend beyond traditional corporate boundaries. Nadler and Tushman (1999) have observed core lessons of organizational design that will retain their relevance in the coming decade:

1. The environment drives the strategic architecture of the enterprise, either through anticipation of, or reaction to, major changes in the marketplace.
2. Strategy drives organizational architecture, in ways in which the enterprise structure manages the work in pursuit of strategic objectives.

There is widespread recognition that sole reliance on traditional management strategies of the past will ultimately threaten the very core of the organization. Owen and Lambert (1998) state that the organization in the turbulent global world requires managers to embrace and participate in creative and directive planning, entrepreneurial creation of new strategies for the firm, design of new organizational capabilities, and guidance of the firm's transformation to its new strategic posture.

Many informational resources are replete with data supporting industries such as manufacturing but little attention has been given to the healthcare industry. The healthcare industry is increasingly finding opportunities to share and research patient information even beyond its borders. Honey (1996) says

> We believe that communities, regardless of location or size, are so interconnected with the rest of the globe that managers must recognize their responsibility to

> bring an international perspective to the profession and to their communities. No longer can governments afford to see themselves as islands apart from the rest of humanity. Decisions that are made are interconnected through a cumulative impact on global sustainability, on worldwide systems of telecommunications, and on the global web of increasing economic interdependency (p. 5).

Along these same lines, in a recent private conversation with James Cox, MD (1999), who is enlisting my expertise to establish a global network in his Nephrology practice, he shared his vision to become a global player in his field of medicine.

Thus, with the increasing levels of corporate globalization occurring now and which will continue well into the next century, it is vital that IT managers grasp the importance of a global perspective. Christmann (1998) sees this approach as one who has a hand in constructing an information vision with a global scope that enjoys widespread buy-in and corporate support from the top executives. Further, Blau and Wolff (1997) maintain that there is greater potential now than ever before to coordinate product development processes electronically across organizational, geographical and cultural boundaries. In other words, the role of the CIO or IT manager cannot be confined to only local boundaries.

CIOs' Role in Strategic Planning

Strategic planning is a process to provide direction and meaning to day-to-day activities. Dennis and Tyran (1997) say strategic planning is frequently cited as a top concern for managers. It examines an organization's values, current status, and environment, and relates those factors to the organization's desired future state, usually expressed in five to ten-year time periods. The organization may be a program, school,

school district, public or private agency or any other institution that wishes to control its future.

If the organization existed in a static environment in which no change was necessary or desired, there would be no need for strategic planning. But, our environment is changing - demographically, economically, and culturally. Thus, strategic planning is both a reaction to, and a tool for adapting to, those changes and creating an organization's future within the context of change. Glaser and Hsu (1999) address three major areas of IT strategies that are very important in the healthcare industry:

1. Those activities that establish a well-conceived linkage between organizational goals and initiatives and IT plans.
2. Approaches and initiatives designed to improve internal organizational characteristics, which significantly enhance the ability to be effective in the application of IT (e.g., creating a robust IT infrastructure or improving the relationships between IS and the rest of the organization).
3. Concepts that will govern the approach to a class of initiatives and applications, e.g., are Internet technologies viewed as an integration opportunity or as a zero cost distribution channel for information, or both (p. 8).

What Does It Involve? As a process, strategic planning involves an orderly sequence of activities, each vital to the success of the whole. Strategic planning activities include:

1. Assessing the external environment.
2. Assessing internal capacity.
3. Developing a vision or mission for the future.
4. Developing goals and objectives to reach that future.
5. Implementing the plan.
6. Measuring progress and revising the plan.

The planning process depends on a formal information system. The external and internal assessments provide a reality base on which to build future plans. The vision or mission identifies the organization's purpose and its desired future state.

Stephens and Mitra (1995) conclude that because of the multidisciplinary nature of strategic planning, and the fact that strategic planning is the CIO's key responsibility, it was hypothesized that the CIO must interact more with those outside the information technology area (i.e., from the environment and functional areas), than with those inside the area.

Boyle and Burdbridge (1991) note that the greater the strategic value of information and information technology to a company, the more it must delegate its management resources to IS. Finally, Miller and Gibson (1995) indicate that the CIO should play the role of integrative strategist, capitalizing on opportunities for bringing individual business-level strategies into the framework of the company's IT and resources.

Visionary Attributes of IT Leaders

Most organizations face a real challenge in getting their workers to unite or become integrated into the corporate culture. Boiney (1998) states that information technologies are exerting a widespread influence on information flow within and between organizations and on management's ability to integrate change. One strategy is to motivate workers to embrace the corporate mission statement. Fowles and Edwards (1999) see a mission statement as one that portrays a beacon of light, or a better place than where we are now.

Vision hasn't always been part of the management vocabulary. Even today some executives ridicule the work by noting it as the "vision thing." Kouzes and Posner (1995) describe the components on vision:

- Vision derives from a word literally meaning, "see."
- Vision suggests a future orientation
- A vision is an image, a picture of what could be.
- Vision connotes a standard of excellence, an ideal.
- Vision also has the quality of uniqueness. It hints at what makes something special.

CIOs, especially in the healthcare industry must face the challenge of breaking out of the data processing box that many have existed in for far too long.

McCartney (1999) brings the necessity of vision into focus by stating that perhaps the biggest benefits have to do with innovative IT officers leveraging the potential of the Internet to create new opportunities for profitability. There is little doubt in today's fast-paced healthcare environment that methods of managing vast amounts of information must be totally revamped. Along with the nature and magnitude of healthcare changes, a new domain of leadership seems to be emerging. Leaders are called on today in corporate America and around the world to inspire a shared vision. Envisioning the future is not as much a solo act as it is the ability to communicate the vision so others come to see the same thing the leader sees.

Thus, incremental ventures will accomplish very little in regards to being competitive in a fierce society. Innovation that breaks industry rules tends to create new areas for learning and opportunities for knowledge workers to contribute their expertise to their organizations. Yates and Skarzynski (1999) maintains that ultimately, a company

must turn employees into entrepreneurs, and turn innovation into Job One, in order to embed the capabilities for innovative thought into the business. CIOs seeking ways to enhance their competitive advantage cannot rely on the traditional measures of mass sales volume, number of employees, years in business, or number of locations. But rather, as Evans (1998) explains, the pre-eminent competitive advantage is innovation, and innovative technology is often the central component driving that innovation.

Leadership Expectations in the 21st Century

Healthcare institutions are under three simultaneous and intense pressures to reduce cost, ensure high quality services and improve levels of service to the covered population. In view of these pressures, it should be noted that healthcare organizations (HCO) are very information intensive in addition to being subject to a myriad of rules and governmental regulations. IT managers must constantly seek ways to consolidate, integrate and disperse business as well as clinical information through the organizational network.

CIOs' Vision of Infrastructure

CIOs are under considerable pressure to consolidate much information in order to make it readily assessable to those department managers that can utilize the information generated by technology for the good and welfare of the patient.

It is determined that changes occurring in healthcare have a direct impact on hospitals and the departments within them. Organizational performance takes on increased importance under the pressures for quality enhancements imposed by the rigorous competitive demands and system integration (Longest, 1997).

It is to this end that CIOs look to expand the existing infrastructure in order to accommodate clinical outcomes and to ensure each department manager (and nursing unit manager) has adequate IT support. Strategic viewpoints in support of the expanded use of IT in HCOs is listed below:

- Rapidly expanding hardware capabilities (in terms of processing power and electronic storage capacity).
- Substantially enhanced software capabilities such as architectures, operating systems, and applications.
- Major advances in communications in local and wide area networks (Shapiro, 1998).

Hospitals are complex webs on highly integrated networks of human and technical resources that demand leadership to be able to maintain each network node in perfect harmony. Further, CIOs today are at a critical juncture in their careers where many who do not acquire the appropriate knowledge to operate at this executive level will soon find themselves looking for another career.

Hospitals are information critical and the savvy CIO would do well to explore new paradigms of HCOs. Hospitals of any size have Chief Medical Officers (CMO) who are responsible for overseeing the hospital medical staff of physicians. Mid-size hospitals with 400-500 beds will likely have a medical staff of approximately 400 practicing physicians, each with his or her own area of specialty. It is becoming commonplace that physicians are not just working in hospitals but are helping run them as well. This means that chief executive officers are working side-by-side with chief medical officers (Prehn, 1993).

Hospitals are just now discovering that CIOs must now begin cultivating closer relationships with the CMO because of the clinical demands on information. This opens up a whole new dimension for the CIO. Not only is this individual to be responsible for keeping abreast of new and emerging technology but now must seek ways to deliver information to a side of the business which is considered by many CIOs as uncharted waters, i.e., the clinical side of technology. According to Murray and Hardin (1991), to survive in the business of the 1990s and beyond, an IT organization must change its values, principles, and fundamental operating philosophies. It must also find core competencies for the future, meaning that it will need to identify the activities and skill sets that best support the business.

Executive Status and Managerial Position

Today's CIO must possess a wide range of skills that were not expected years ago, including strategic planning, a vision for the business and industry, and the ability to become an effective motivator, executive and change agent. The CIO of the next century must become an internal consultant to the healthcare organization, constantly deploying technology to transform business processes. Similarly, Guha and Grover (1997) noted that

> Any significant business process change requires a strategic initiative where top managers act as leaders in defining and communicating a vision of change. Furthermore, the organizational environment, with a ready culture, a willingness to share knowledge, balanced network relationships, and a capacity to learn, should facilitate the implementation of prescribed process management and change management practices (p. 120).

According to Johri, Cooper and Prokopenko (1998), internal consulting is a refinement in the evolution of the staff concept in management. This concept emphasizes making available to the manager a specialized resource within the organization to assist in identifying and studying problems and opportunities, preparing recommendations and assisting in their implementation.

Structure and Organizational Behavior

Because of the visibility of the CIO within the executive ranks, evidences of organizational behavior must become a key skill and one that takes some time to polish. Organizational behavior or (OB) is no stranger to those who have prepared themselves in business courses. But for most of the CIOs today, such courses were not in the technical curriculum but rather heavy technical courses on which many rely for their technical knowledge. Shaw and Fisher (1999) note that many management educators have discovered that traditional classroom teaching is relatively ineffective in equipping young and inexperienced students with the interpersonal and organizational skills needed for success in business.

Tracy and Swanson (1993) address some issues regarding management and organizational behavior. "For instance, the concept of motivation (individual level) is not easily associated with communication networks (group level) or with organizational power and politics (organizational level), even though these higher-level phenomena might be better understood as motivated behavior" (p. 219).

Because of the continuing complexity of the hospital system, the CIO will be continually faced with adapting to new roles within the system. Bilimoria (1998) notes that today's work and organizations are characterized by global influences, new

technologies, and an explosion of information, changing workforce and product/market characteristics, and an increased rate of change. One new role the CIO will be forced to play in the HCOs is a liaison position. In Mentzberg's classical writing, he states that the liaison role deals with the significant web of relationships that the manager maintains with numerous individuals and groups outside the organization (Mintzberg, 1973).

Mintzberg (1996) looks at the structure of an organization as having no top or bottom and he states further that these are just misguided metaphors. Mintzberg also concludes that what organizations really have are the outer people, connected to the world, and the inner ones, disconnected from it, as well as many so-called managers, who are desperately trying to connect the inner and outer people to each other.

What is becoming evident in many hospital organizations is the inability of IT managers to effectively interface with the CMO on a level that shared knowledge is in perfect harmony. In so doing, the CIO or IT manager has gained a thorough understanding of the clinical side of information as well as the technical side. What is happening in hospital settings today is more and more CMOs are requiring information to flow from the towers of computerization down to the patient bedside where information can have healing effects assisted by the physician. According to Israel (1999), the CIO and his staff must fully understand the clinical and business needs of the delivery system and help to determine how we are going to implement the support system needed.

The appropriation of technology in the next century will have profound effects on those who not only use the technology but also those who make the technology available. Clinical information and the practice of medicine increasingly require managing information to meet the needs of practicing physicians. A physician's lab results, request

forms, reports, and pending discharge summaries is sufficient reminder of this. In the past, good organization could usually deal with this paper trail, but there is now increasing evidence that important information is lost or misinterpreted even in the best hospitals (Fraser and Kohane, 1997).

To this end, a new paradigm of managing is emerging for the CIO in the hospitals today. Physicians will demand greater return on the investment of technology in the future as the need for accurate and speedy information becomes the standard.

The CIO and Competitive Advantages

As business continues to expand the role of information technology, a review of the collective risk potential of the information infrastructure becomes critical. Traditionally, software risks have been equated to uncertainties in cost and release dates for systems being developed. Consequently, the CIO's responsibility for evaluating these considerations and the software development process, training, and human resources practices associated with them, are seen as the best way to control those uncertainties.

Those approaches are still important, but managers must recognize the risks inherent in an application's domain. In particular, products and systems designed to foster innovation and the development of new business models carry a high risk. Software is becoming mission critical for most companies. There can be serious business consequences if a hospital information system (HIS) breaks down during critical hours, or if caregivers experience glitches with its application software during critical shifts.

IT Risks

The escalating risks associated with mission-critical health applications warrant a new level of concern about access to various systems; processes for incorporating changes, protection against hackers, viruses, and other outside hazards. The level of security built around databases and application software must be carefully monitored.

As IT departments push for software applications that have low levels of domain specifications, they also push those applications towards possible lower levels of quality as measured by rules of compliance. The natural tendency is to end up with a collection of experimental applications that only hinder adequate information reaching the decision-makers.

Another risk is that most IT organizations were originally set up to manage an information infrastructure designed around a central mainframe. Most IT organizations have experienced a transition to decentralized information infrastructures, such as client-server architectures, that have interfaces with Intranets and the Internet. CIOs considering their positions in HCOs need to thoroughly understand the necessity of maintaining high technological standards to better compete in this complex industry. According to Ramsower (1991), beginning in the late '70s, and energized by the emergence of personal computers, the services of information technology shifted from automating operations to improving management decisions; databases and what-if spreadsheet modeling became commonplace.

CIOs' Competitive Position

In the current economic climate, most HCOs must work to maintain or enhance their competitive position. According to Carlisle (1995), the explosive growth of

technology makes the continuous updating of employee capabilities essential to an organization's competitive ability.

Fried and Johnson (1992) maintain that information technology, which has become an integral part of the corporate infrastructure, is increasingly recognized as a competitive weapon. Kim and Michelman (1990) also maintain that organizations have increasingly been turning their attention to opportunities for achieving competitive advantages through information systems (IST).

Technical skills are not the only skills required for building and using IT applications. In the case of IT, managerial skills include management's ability to conceive of, develop, and exploit IT applications to support and enhance other business functions in addition to the clinical requirements throughout the healthcare network.

Examples of imperative management skills include, but are not limited to:

- the ability of CIOs to understand the business needs of other functional managers, including the clinical side
- the ability to work with these functional managers, to develop appropriate IT applications
- the capability to coordinate IT activities that support other functional managers, and
- skills to anticipate the future IT needs of the HCO

Pinsonneault (1998) examines the association between IT usage and the nature of managerial work. His research discovered that empirical evidence concerning the relationship between IT and managerial work parallels that concerning the productivity paradox and concluded that it is mixed and inconclusive. What this means is IT spending has failed to yield significant productivity gains. Several of the managers interviewed in

the study felt that IT took away numerous decision-making opportunities and limited their exercise of initiative and judgement, as well as their span of control. His research also found that IT was associated with greater decentralization of decision-making authority.

Modern organizations invest heavily in IT with the objective of increasing profit and productive knowledge workers. According to Pinsonneault and Rivard (1998), the benefits are disappointing. Their empirical research shows a failure to understand the interplay between IT and managerial work. The research addresses issues by analyzing patterns of association between IT usage and the nature or managerial work in different organizational contexts.

The method called for 59 semi-structured interviews conducted on middle managers in three large corporations. Daily activity and IT usage was logged.

Data from the research indicated a relationship between levels of IT usage and the nature of managerial work was stronger in two organizations that were reorienting their strategy. The three organizations in the study were from the Banking, Telecommunications and Utility industry.

The findings suggested that heavy IT users paid greater attention to and spent more time on the roles they performed best with the technology. The relationship between IT usage and the nature of managerial work was explored through semistructured interviews with 59 middle managers in three large firms consisting of approximately 25,000 employees.

The outcomes of the data did not support proposition 1, which stated that as the level of IT usage increases, time spent by middle managers on informational roles

decreases. Thus, level of IT usage was significantly related to the time allocated to four roles in the Telecommunications company (informational, negotiator, leader and liaison), and to six roles in the Bank (informational, negotiator, leader, liaison, entrepreneur and disturbance handler).

There is widespread and continual interest to seek ways in improving information systems and its utility and effects on healthcare strategy. Clemons and Row (1991) observe that information systems are strategic business tools and essential for competitive strategy, and information technology can lead to sustainable competitive advantage when it is used to leverage differences in strategic resources.

The fact that these managerial skills are valuable is almost self-evident. Without them, the full potential of IT for a HCO will almost certainly not be realized. How frequently different HCOs will possess similar IT management skills is an empirical question. Unlike technical IT skills, managerial IT skills are often developed over longer periods of time through the accumulation of experience by trial and error learning. Mata and Fuerst (1995) conclude by stating that managerial IT skills is the only attribute that can provide sustainability.

Interpersonal communication can take years to develop to the point where IT managers and managers in other functional departments are qualified to effectively work together to develop and utilize mission-critical IT applications.

CIOs' Role in TQM and Reengineering

The most widely publicized approach to reinventing organizations is the practice of "reengineering the corporation," as Michael Hammer and James Champy titled their

book. Reengineering involves a significant reassessment of what a particular organization is all about. Hammer and Champy (1993) urge managers to ask themselves if they were re-creating this company today, given what they know and given current technology, what would it look like? According to Hammer, reengineering means radically rethinking and redesigning those processes by which we create value and do work.

Reengineering thus involves redefining processes as patterns of relationships connecting organizational members with people inside as well as outside the organization.

Within this context of design and redesign, Mintzberg (1973) explains the entrepreneurial role of a manager who acts as initiator and designer of much of the controlled change in the organization. He further states that entrepreneurial work begins with scanning activity, and as part of the monitor role, the manager spends much time scanning the organization, looking for opportunities and for situations that may be considered problems.

Thus, the IT manager of the next decade must look for opportunities to create or enhance current IT processes to the extent that every department in the HCO reaps the benefits of new ways of doing things. Champy (1995) adds that the reengineering of management asks managers at all levels to get out of their command-posts, out of the boxes on the organization chart, out to where the real world of business lies – the marketplace. But with that outward movement, everything in the enterprise must change.

The concept of reengineering has only recently crossed the line into the service sector. Shaffer and Shaffer (1996) suggest

> Business organizations are under increasing pressures to become more cost-effective in today's fast-changing, high technology environment. Hospitals in

> particular are facing reduced demand for many of their services due to the growth of minimally invasive and outpatient surgeries, decentralized diagnostic and therapeutic service centers, and managed care. For hospitals, one answer is synonymously referred to as reorganizing, redesigning, restructuring, reinventing, or reengineering (p. 10).

Organizations and hospitals that were once created to thrive on the ideas of mass production, stability, and growth are finding it difficult to operate in the new business environment of customers, power, competition, and change. As a result, many are reengineering to provide an environment in which hierarchy is diminished, workers are more skilled, and structures are more flexible.

King and Sethi (1998) state as the demand for IS professionals increases, so does the pressure on IS managers to design innovative strategies for attracting and retaining talent. Mintzberg also notes in his classical work that one of the managerial roles of the leader is responsibility for staffing and training employees. CIOs that become knowledgeable of trends in IS environments should also be aware that increases in employee autonomy and the formation of teams often result from reengineering and process innovation efforts, as do moves to downsize or flatten organizations (Janz and Wetherbe, 1997).

CIOs tasked with the responsibility of disseminating information through the appropriate channels must meet the new challenges of working with a variety of departmental activities. Orman (1998) suggest that a prescriptive and analytical approach is taken to business process reengineering (BPR), and the objectives are to provide precise guidelines for process redesign to take full advantage of the efficiencies created by information technologies, and to develop techniques to evaluate alternative structures.

IT Professionals and Global Networking

A growing concern for CIO and IT managers is to constantly scan the environment for innovative ways of managing information. To say that we live in a global environment is a foregone conclusion. A single entity or even a cluster of hospital entities cannot maintain, manage, or assimilate the abundance of knowledge that is becoming available through today's technological advancements. It is with this global concept in mind that IT managers, especially HCOs avail themselves of every available tool technology has to offer. Grosse (1996) notes that international technology transfer is the diffusion of technology from the place of its introduction to other markets around the world.

Without a shared business vision, developing a common global information technology base for research and analysis could be very costly. Thus, the CIO, IT managers, CEOs and CMOs must look towards the development of a common global system of information sharing. Ives, Jarvenpaa and Mason (1993) examine the global business driver (GBD) approach for envisioning the business entities that will benefit most from an integrated global IT management. Table 3 illustrates some questions that are used in the analysis, and also identifies examples of these drivers.

According to Ball and McCulloch (1999), global management involves the following:

1. Searches the world for
   (a) market opportunities
   (b) threats from competitors
   (c) sources of products

Table 3

Analysis of Some Global Business Drivers

Global Business Drivers	Analysis Questions	Example Entities
Joint Resources	Can you electronically move work to countries with a highly skilled workforce and favorable wage levels?	Employee location, employee skill, employee position, work assignments, employee compensation, standard work tools, relationship history between customers and employees
Rationalized and flexible operations	Can you move production around the world? Can you rapidly move knowledge work around the world? Can you share production resources across country boundaries? Are you optimizing plant locations and production planning on a global scale?	Production plan, production schedule, product demand, plant capacity, vehicles, storage facilities
Risk reduction	Do you manage your monetary flows and the associated risks on a daily and hourly basis at the global level? Are you vulnerable to political and economic conditions in particular countries?	Investments, pending investments, foreign exchange, assets, safety of assets
Global products	Are there opportunities for global products and brands? Do you need to launch synchronized product introductions on a global basis?	Product standards, process standards, legal requirements, repair records, marketing plans

Table 3 Continued

Quality	Can you identify the source of a defective component on a global basis? Are you conducting competitive benchmarking on a worldwide basis?	Competitive benchmarks, internal performance standards
Suppliers	Can volume discounts be negotiated on a global scale? Do you know your global position with a major supplier?	Supplier information, parts and material, procurement standards, innovations
Corporate customers	Are your leading-edge customers becoming global? Can you ensure consistent product and service regardless of the location? Can you provide seamless worldwide ordering, order tracking, and billing? Do the needs of global customers provide new business opportunities?	Customer information, customer quality standards, customer product specification, local preferences, preorder history, order status.
Disturbance Handler	Responsible for corrective action when organization faces important, unexpected disturbances	Strategy and review sessions involving disturbances and crises
Resource Allocator	Responsible for the allocation of organizational resources of all kinds – in effect the making or approval of all significant organizational decisions	Scheduling; requests for authorization; any activity involving budgeting and the programming of subordinates' work
Negotiator	Responsible for representing the organization at major negotiations	Negotiation

Source: Ives, B., Jarvenpaa, S. L. and Mason, R.O. (1993). Global Business Drivers: Aligning Information Technology to Global Business Strategy. *IBM Systems Journal*, 32, 147.

2. Seeks to maintain a presence in key markets

3. Looks for similarities, not differences, among markets

The practice of medicine is becoming increasingly complex and healthcare providers are seeking new and innovative tools to assist in care for their patients. Enter the role of the CIO. Because of the worldwide reach of information through technical advances, the CIO's role now has exceeded the box-like corporate boundaries or the HCO. According to Wolff and Gibson (1997), there is a need to share facilities, people, technologies, ideas, and yes even cultures between our public and private-sector institutions nationally and globally, and there is a need for benchmarking and importing technology-based best practices.

As technology advances and the relative ease of acquiring information becomes more commonplace, CMO's are likely to insist that the Management Information Systems (MIS) department engages in assisting these medical officers with a royal entrée into this electronically linked world. In Mintzberg's classical work he points out that the role of monitor seeks and receives a wide variety of special information to develop a thorough understanding of organization and environment.

In the area of knowledge management, Dutton (1999) points out that Omron, an international company headquartered in Japan, has established a global knowledge database and holds global planning meetings in its offices throughout the world. In the information-rich society of today's world of medicine, this is where the CIO or IT manager will be expected to generate new approaches to a more effective delivery system of information technology. Ives and Jarvenpaa (1991) have identified four key issues in global IT:

- the linkage of global IT to global business strategy
- information technology platforms
- international data sharing
- cultural environments

All in all, the practice of medicine is constantly finding common grounds and the sharing of information becomes paramount in the treatment of illnesses worldwide. Wolff and Heitor (1999) describe the outcome of the International Conference on Technology Policy and Innovation in August 1998, held in Lisbon, Portugal. They reported the findings on one of the speakers

> Leif Edvinsson reported on the activities of Skandia, a company leading the usage of the opportunities of the knowledge economy for business advantages through the development of knowledge management techniques aimed at measuring a company's intellectual capital. His framework of accounting emphasizes the increasing importance of intangible assets in terms of valuing company equity. While traditional valuation criteria tend to focus on material assets and codified knowledge, Edvinsson argued that intangible assets, such as human capital or know-how, are perhaps more important, especially in terms of longer-term competitive prospects in the emerging and global knowledge-based economy (p. 8).

CIO Role Perception in Clinical Leadership

The role of the CIO in clinical outcomes is becoming more predominant in HCOs and will increase in the coming millennium. The monitor role that Mintzberz talks about in his classical work involves the scanning of environments in order to stay abreast of innovative clinical and technical advances. One such method for the transference of clinical data is mentioned by Shapiro (1998) regarding a Clinical Event Manager (CEM).

A CEM provides asynchronous communication to clinicians (often with an alphanumeric paging service) that will automatically send clinicians vital clinical data about their patients the instant the laboratory, pharmacy, or radiology has processed patient data.

CEM runs on a Microsoft NT server and provides clinical event monitoring by interfacing with any HL7-compliant legacy information system. CEM uses commercially available messaging systems for paging, e-mail, printing, and fax services. Data and messages are filtered to meet a provider's specifications using the CEM subscribe module. Patient coverage assignments are made using the CEM coverage module or through an interface to a coverage program already in place as part of a hospital information system (HIS).

One aspect the CIO must be keenly aware of is the fact that the pace of technology evolution is rapid, and new technologies are arriving that enable new ways of supporting processes, gathering new data and differentiating services. Glaser and Hsu (1999) make a critical analysis regarding new technology that is effectively leveraged:

- organizations should have a function that scans the industry for new technologies and engages in their evaluation and experimentation
- critical to the assessment of new technology is the development of an understanding of the key characteristics of the technology that provides value

Wyatt (1995) discusses why information management matters to clinicians and the benefits to be gained from a Hospital Information System. He states in many hospitals, information systems are of little value to clinicians. Further, the solution is to focus on useful information and clinical functions, not computer artifacts. Computers must not drive the process of information management, but are only to serve IT.

The central business of doctors is to meet the needs of patients by drawing on the knowledge accumulated by medicine. Clinical information can be defined as the commodity used to help make patient care decisions. Smith (1996) concludes by stating those interested in medical informatics have tried to develop systems that will help doctors in their daily clinical practice by providing them with information. Very few of these systems have been adopted, and most doctors continue to practice without them.

Smith (1996) conducted research in order to gather clinical information on the information needs of physicians. The driving force of his research was to realize that now is the time to understand the needs that technology must meet. His research concluded that the current volume of scientific information was unmanageable and was a major problem. In the final analysis, the researcher found that computer systems that have been developed to help doctors are not widely used and that perhaps they have not been developed to meet doctors' information needs.

Conclusions and Implications of the Literature Review

Following an extensive review, it is determined that problems surrounding technical managers in senior positions of HCOs are immense. The literature provides a panorama of the problems involved in assessing the managerial roles and skills required to deliver technical information to doctors and other functional units in hospitals.

The search for a workable model will continue. As the ever-changing world of technology continues to evolve, the call for managerial roles to step up to new and exciting responsibilities will increase. The only resolution at the moment is to encourage

technical managers to constantly seek creative and innovative ways to deliver adequate information systems for the good of those who will benefit it the most.

Grover & Jeong (1993) have stated that their research only examined six of Mintzberg's managerial roles. The author's further stated that it would be beneficial for further research if all ten roles were covered. This study attempts to examine all ten roles because no study has been conducted to this significance.

CHAPTER THREE: RESEARCH METHODOLOGY

A review of literature in the area of Information Technology (IT) within the healthcare industry has revealed little, if any, studies to reflect the managerial and leadership roles of the Chief Information Officer (CIO). This study is designed to provide an opportunity for CIOs in select hospital settings in the United States and the United Kingdom and to reflect upon and narrate their present experiences. This study will also narrate the CIO or technical officer in their naturalistic environment with the intent of capturing real-world thoughts and their projections for the future of IT.

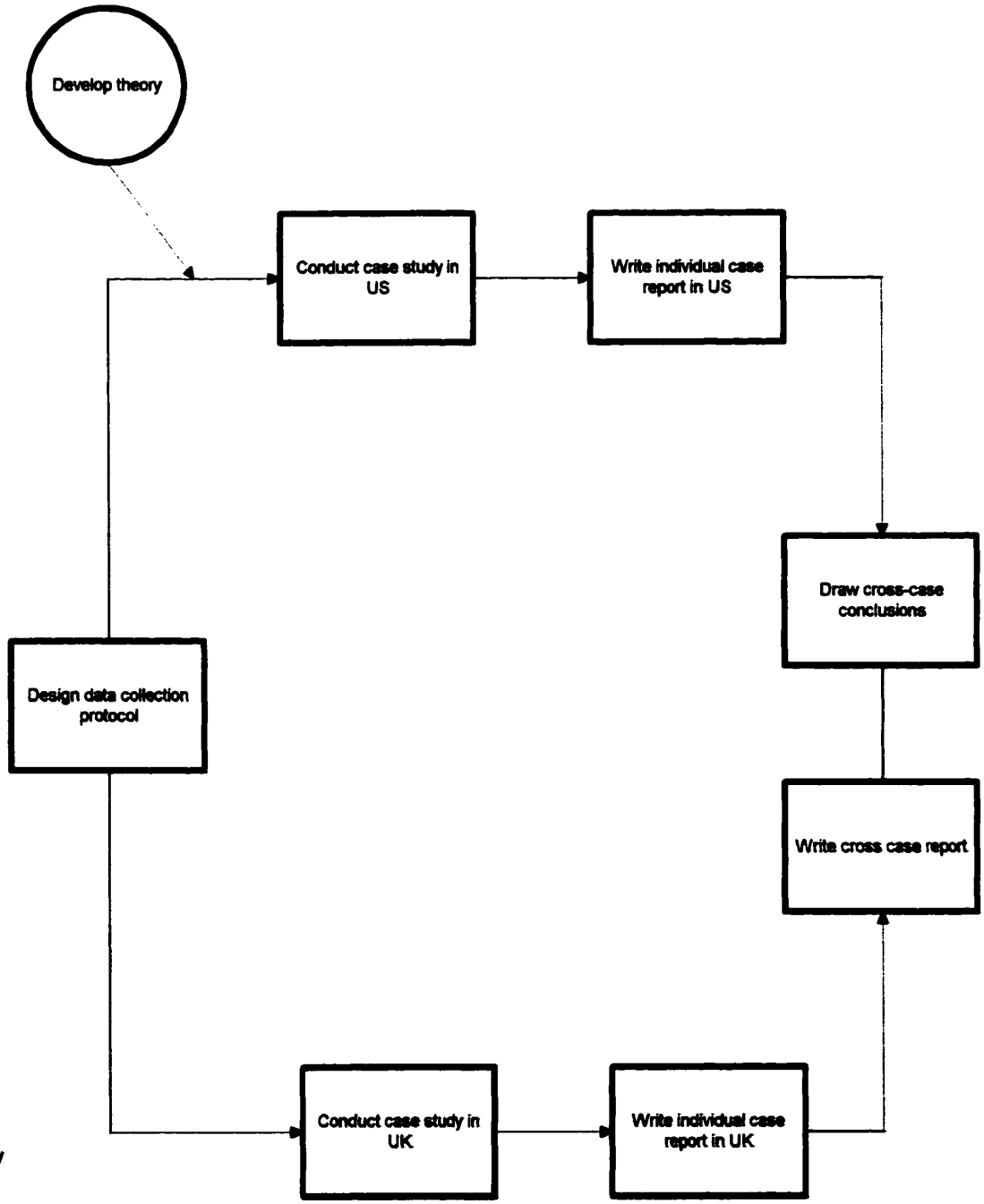
The aim of this research was to gather qualitative information from select hospitals in the Greater Washington Metropolitan area of the United States as well as a comparative survey with hospitals in London, United Kingdom.

Figure 2 demonstrates a logistical model of the method of data collection and analysis for this study. The following questions are the basis for the qualitative study:

1. What are the experiences of Chief Information Officers in the healthcare setting? Specifically,
    a. What is the role of the CIO in healthcare?
    b. How has the role evolved over time, especially from the days of data processing?
    c. What alternate directions, if any does the CIO anticipate regarding emerging technologies?
    d. What behavioral roles does the CIO see as instrumental to the healthcare field?
    e. How does the CIO, with emerging technology, plan to interface with Chief Medical Officers on the clinical side of healthcare?

Figure 2

CASE DATA COLLECTION AND ANALYSIS MODEL
CASE STUDY METHOD



Developed by Author

f. How do CIOs perceive themselves in a leadership capacity?

g. What new role attributes do the CIOs see evolving with respect to CEO integration?

h. What role does the CIO perceive in the external environment?

i. What are the CIO perceptions on how IT can provide continued solutions to the business side as well as the clinical side of healthcare?

j. How does the CIO line up their role attributes with Mintzberg's classic work?

2. What challenges do these CIOs or IT managers face in their industry?

3. What are the demographic characteristics of CIOs in the select hospitals in the Greater Washington Metropolitan area of the United States and London, United Kingdom? Specifically, their ages, position in the organization, educational background, title, job description, reporting channel and area of responsibility.

Case Study Interviews

The qualitative interview approach was chosen as an acceptable research method, and the most appropriate means to present information regarding the CIO role in the framework of the healthcare industry. Strauss & Corbin (1990) state that qualitative methods are used to uncover and understand what lies behind the phenomenon about those things that are not yet known as well as to gain a fresh slant on things that are already known.

The intent of this method was to gain empirical evidence in real-time mode. In addition, the interviews are intended to reveal personal descriptions of current CIOs or senior IT managers in terms of their job descriptions, strategic thinking, motivation, and

sense of future emerging technology. Finally, it is also intended to provide insight into the CIO role and the interactions with Chief Medical Officers (CMO).

Basically, there are three major components to qualitative research. First, there is the data which, in this study, came from direct interviews of CIOs. The second element of qualitative research consists of the interpretive procedures that were used to arrive at the findings or proposed theories. Last, a detailed written report from direct interviews of participants of the case study were compiled and analyzed. The interviews were conducted in the capital area of Washington, D.C., United States and in London, United Kingdom.

The qualitative naturalistic model was chosen as an appropriate means to capture narrative data from CIO experiences and a wide-range of complex duties in a healthcare setting. The interview approach is further intended to capture the voice of each respondent who described his/her role and experiences in addition to explaining or correcting a preconceived impression regarding how this position might be viewed by other management levels.

The purpose of in-depth interviewing is not necessarily to answer a set of prescribed questions, nor to test hypotheses. But rather, it is intended to gain an understanding of the experiences of other people and the meaning they make of their experiences. Seidman (1998) concludes that interviewing, then, is a basic mode of inquiry. Interviewing also requires that researchers establish access to, and make contact with, potential participants whom they have never met. Thus, the final aim of an inquiry method of data collection is to develop a theoretical knowledge base from participants rather than from statistical generalizations that are derived from a historical context.

Selection of Respondents

The analysis of each of the respondent's interviews in this study is intended to draw upon their own experiences currently and futuristically. The primary focus of personal interviews is to explore personal reflections on the management roles of the (IT) director, the CIO and how those roles interact in the technological decisions of the respondent's institution. Specifically, the interviews addressed questions concerning the evolution of the role of the CIO, the function and future of the CIO in healthcare, the vision perceived in such a complex industry, the perceived successes of such a role in the 21st Century, the role of the CIO as leader and gatekeeper of mega-amounts of information, the role of liaison between other medical executives, and other ways in which the CIO can maintain the role of senior executive in the adaptation of new technology.

The structure of the interview process consisted of four healthcare institutions in or within close proximity of Washington, D.C., United States (n=4), and four healthcare institutions in similar locations in London, United Kingdom (n=4). Each CIO was contacted by phone in order to establish appropriate dates and times to discuss the details of this study.

The four healthcare institutions in the United Kingdom are University College London Hospital (London), Nuffield Hospitals (Surrey), St. Martin's Healthcare (London) and Kings College Hospital (London). The four healthcare institutions in the United States are Suburban Hospital Healthcare System (Bethesda, Maryland), National Institutes of Health (Bethesda, Maryland), The University of Virginia Medical Center (Charlottesville, Virginia) and Carilion Health Systems (Roanoke, Virginia).

This naturalistic approach, according to Guba and Lincoln (1981), is the more useful for all social-behavioral inquiry and for responsive naturalistic evaluation.

Collection of Information

The structure of the interviews was based in part on pre-written questions and part open-ended dialogue of the participant. The researcher captured comments made by the respondent in an open forum but also directed the respondent to confirm affiliation, if any, with Mintzberg's managerial roles. The format of the written questionnaire is shown in Table 4. The 7 point Likert scale was used in the questionnaire with the number one as very low perceived involvement, two as low perceived involvement, three as slightly perceived involvement, four as neutral perceived involvement, five as slightly high perceived involvement, six as high perceived involvement, and seven as very high perceived involvement.

According to Grover and Jeong (1993), their study of CIO roles was only based on six of Mintzberg's original ten roles. It was also recommended that future study might include all ten of Mintzberg's roles.

It was the intent of the researcher to conduct a one-on-one interview with each CIO lasting 90 minutes to two hours. The researcher also received consent to tape the conversations in addition to taking hand-written notes during the interview process.

A prompt sheet covering all ten of Mintzberg's managerial roles was given to the respondent as a logistical guide during the interview process. The second part of the

Table 4

Summary of Ten Roles Valuation Scale

Role	Description	Valuation Scale
Interpersonal		
Figurehead	Symbolic head; obliged to perform a number of routine duties of a legal or social nature	1 2 3 4 5 6 7
Leader	Responsible for the motivation and activation of subordinates; responsible for staffing, training, and associated duties	1 2 3 4 5 6 7
Liaison	Maintains self-developed network of outside contacts and informers who provide favors and information	1 2 3 4 5 6 7
Informational		
Monitor	Seeks and receives wide variety of special information (much of it current) to develop thorough understanding of organization and environment; emerges as nerve center of internal and external information of the organization	1 2 3 4 5 6 7
Disseminator	Transmits information received from outsiders or from other subordinates to members of the organization; some information factual, some involving interpretation and integration of diverse value positions of organizational influences	1 2 3 4 5 6 7
Spokesman	Transmits information to outsiders on organization's plans, policies, actions, results, etc; serves as expert on organization's industry	1 2 3 4 5 6 7

Table 4 Continued

Decisional		
Entrepreneur	Searches organization and its environment for opportunities and initiates "improvement projects" to bring about change; supervises design of certain projects as well	1 2 3 4 5 6 7
Disturbance Handler	Responsible for corrective action when organization faces important, unexpected disturbances	1 2 3 4 5 6 7
Resource Allocator	Responsible for the allocation of organizational resources of all kinds – in effect the making or approval of all significant organizational decisions	1 2 3 4 5 6 7
Negotiator	Responsible for representing the organization at major negotiations	1 2 3 4 5 6 7

Source: Mintzberg, Henry. (1973). The Nature of Managerial Work. 92-93

process allowed the respondent an opportunity to cover the salient points discussed in questions 1 through 3 and sub-points (a) through (j).

The methodological approach of this study was conducted in a direct personal contact field study. It is important to know that fieldwork is the central activity of qualitative inquiry. Thus, going into the field means having direct and personal contact with people under study in their own environment. Patton (1990, p. 46) says "qualitative approaches emphasize the importance of getting close to the people and situations being studied in order to personally understand the realities of the work environment."

Reliability and Authentication

It is imperative that studies of this magnitude maintain accurate records in order to conform to audit protocols. The collection of data for this study is well suited to the background and experience of the researcher. Because the researcher has some twenty years of technical knowledge and work experience in addition to fifteen years in the healthcare industry, the collection of such data to be journalized can be authenticated and dependable, based solely on his professional position in the industry.

Thus, the researcher used a three-step approach to the collection of data. First, the participant in the case study was asked to respond to the first set of prepared questions as they pertain to demographics, challenges and other experiences. Second, the participant was asked to respond to a questionnaire reflecting Mintzberg's ten managerial roles. Third, the participant was asked to elaborate on any other issues pertaining to their position, profession, industry or future of the technological impact in the industry.

Analysis of Collected Information

The preparation for data collection begins with adequate skills on the part of the researcher. This includes a preplanned set of interview protocols and will be carried out by the researcher. The following points are outlined by Yin (1989).

- Able to ask good questions
- Able to be a good listener
- Become adaptive and flexible
- Must have firm grasp of the issued being studies
- Should be unbiased by preconceived notions

In addition to the above protocols carried out in the data collection phase, the researcher utilized a matrix table for organizing data. Table 5 will show an example of how the data collection was organized for further examination. The contents of the table will also reveal key phrases and words given in the interview process and compared in a frequency format for comparative evaluation.

Each country matrix was compared and contrasted in order to get the full sense of how the impact of technology affects managerial roles at the senior level of technology. With this information, it was the intent of this study to draw a more formidable conclusion regarding managerial roles in the healthcare industry.

A prompt sheet based on Mintzberg's managerial roles revealed a 7-point Likert format for each respondent to answer. The instrument is designed to elicit responses to each of the three major roles: Interpersonal, Informational and Decisional. Thus, the data gathered from this instrument will satisfy the objectives of evaluating each CIO on the basis of the ten classical roles of management.

Table 5

Unordered Matrix: User Reflections/Concerns and Other Variables

Site/Users	Reflections/Concerns
United Kingdom 1. IT Director	
United Kingdom 2. IT Director	
United Kingdom 3. IT Director	
United Kingdom 4. IT Director	
United States 1. CIO	
United States 2. CIO	
United States 3. CIO	
United States 4. CIO	

Developed by the Author

My own personal interest in this study is backed up by some twenty years of professional experience in IT. Through the years I have been able to observe management practices in the technical field including ten years as an adjunct professor of management. It was the intent of this study to develop a working model for further technical managers in the healthcare sector that are well equipped for the business and the clinical challenges of information demands.

CHAPTER FOUR: FINDINGS

This study is built on individual interviews of Information Technology (IT) directors from four healthcare institutions in the London area of the United Kingdom and four healthcare institutions in the greater metropolitan area of the District of Columbia in the United States.

The study is also based on Henry Mintzberg's classic managerial role model. Grover and Jeong did a similar study of CIOs among sales and manufacturing executives. Their research only covered six managerial roles and suggested future research to cover all ten roles, which this research attempts to accomplish.

Restatement of the Purpose

This research is also intended to capture information knowledge from the information officers in their professional environments. The purpose is to explore the depth of knowledge in these positions rather than the breadth of their discipline and thereby allowing each participant the opportunity to focus entirely on their individual practice in their technical discipline.

The interview areas for discussion are the following: Background and areas of responsibilities; CIO challenges; role of the CIO; changing role of IT; views on emerging technology; behavioral roles; clinical integration role; perceptions on leadership role; CIO and CEO involvement; CIO role in external environment; and clinical solutions involvement.

The final area of research will be based on a seven point Likert scale of Mintzberg's ten managerial role model. The study will examine the responses from all eight participants and how they responded to the instrument. The measurement scale was

designed to capture responses to the ten leadership roles using (1) as very low perceived involvement; (2) as low perceived involvement; (3) as slightly perceived involvement; (4) as neutral perceived involvement; (5) as slightly high perceived involvement; (6) as high perceived involvement and (7) as very high perceived involvement.

The Chief Information Officers, or in the United Kingdom, IT Directors, shared with the interviewer, many experiences and perceptions about their involvement in the management of IT. This chapter will introduce each institution along with their interview comments, starting with the United Kingdom and ending with the United States.

The term CIO is used exclusively to identify the information officers in the United States. The United Kingdom, on the other hand, does not use the CIO title but rather uses the title of IT Director to denote the same position responsibility. The researcher used a recording device to capture the participants' actual conversation during the interview process. At the conclusion of the interview, the participant completed the Mintzberg instrument and both of these became the basis for the completion of this dissertation.

Background of the National Health Service (NHS) United Kingdom

The National Health Service is Europe's biggest organization. It has a workforce of around one million people who provide care and treatment for many millions every year. The NHS has a budget in excess of £42 billion [$63 billion USD] - the largest item of central government expenditure after social security. This section looks at how this massive organization works.

The purpose of the NHS is to secure, through the resources available, the greatest possible improvement in the physical and mental health of the nation by: promoting

health, preventing ill-health, diagnosing and treating injury and disease and caring for those with long term illness and disability who require the services of the NHS.

NHS Trusts provide a wide range of hospital and community based services - from accident and emergency (A&E), delivering babies and providing care for people with long term illness or disability. People usually access non-emergency services from NHS trusts following a referral from their own general practitioner. The care and treatment provided by NHS trusts are free to patients.

Hospital Trusts are found in most large towns and cities, offering a general range of services to meet most people's needs. Some Trusts also act as regional or national centers of expertise for more specialized care, while others are attached to universities and meet teaching commitments. Trusts also provide services in the community through health centers, clinics or in people's homes. It is also quite common, in the UK to refer to physicians or doctors as consultants or consultant/physician.

As a public service funded by the taxpayer, the NHS is accountable to Government Ministers, who in turn are accountable to Parliament. Different arrangements exist in different parts of the United Kingdom - both in government responsibilities for the NHS and how that responsibility is released.

The NHS in the United Kingdom is the responsibility of the Secretary of State for Health who is a member of the cabinet. The Secretary of State and his team of Ministers set overall health policy in the United Kingdom, including policy for the NHS. The NHS Executive board, which is a part of the Department of Health, acts as the headquarters of the NHS in the United Kingdom and is responsible for translating policy into practice, setting strategic targets for the NHS and monitoring performance. The Executive has

eight regional offices, which in turn monitor the performance of the health authorities in their areas.

United States Healthcare Background

The healthcare system is administered within the private and the voluntary sectors on a decentralized basis, with supporting public/private financing that includes national, state and regional components. The responsibility for delivery of health services resides primarily within the private and voluntary sectors, with federal healthcare institutions having responsibility for certain sections of the population such as veterans and the military. Various Federal and State regulations govern aspects of healthcare delivery. The vast majority of the American population (about 74%) is covered by private health insurance for healthcare.

United Kingdom – Public Institution

Case #1

Background and Area of Responsibility

The Information Technology (IT) director is in his early 40's and has worked in the NHS system about seven years. He previously managed a large NHS project in Scotland where, in his words, "all the circumstances were beautifully aligned." The hospital was very politically disciplined so there was no interference. Everybody in the hospital wanted the project to work and was totally focused on the project. He stated that there was nothing else to distract the team from accomplishing the project goals. He also noted that he had an extremely high quality staff. His current hospital is exactly the opposite and is immensely complex. Before his current position with the hospital he

taught at the University of Edinburgh in the department of Management Information Systems. Educationally, he did mathematics and computer science as a first degree at Edinburg and an MBA at London Business School.

CIO Challenges

The IT director talked about the challenges for individual managers first. One problem managers have is that there is an absolute obsession with accountability because everything is ultimately funded by the taxpayer. In this environment, what really matters is to avoid doing something that would embarrass a politician. That is the one thing you must not do according to the director. Consequently almost everything that is done needs to be concerned with laying an ordered trail, diffusing responsibility and then taking the safest possible risk-avoiding route. It also means that any money that the hospital chooses to spend on IT has to be justified time and time again, since that is money not directly spent on patient care.

This position reports to the Board Director and the IT director is one of the five Board Directors and has responsibility for explaining how IT fits into the overall scheme of the hospital. He is often seeking approval for information projects. He stated that IT projects in the NHS are usually completed late. He has heard it stated at the national presentations, that "never in the history of the NHS has one IT project been completed on time." He reports that this is not true, but "you don't often have somebody in the audience who can come up with a concrete example to disprove it."

Role of the CIO

The IT department outsourced 35 members, which amounted to 70% of its staff two years ago. They kept 15 people (30%) as part of his immediate staff. The director

stated that he was trying to minimize the amount of system design. He noted that IT involvement is part risk avoidance. As a hospital, one takes risks with patients' lives, so it is not beneficial to take risks with building speculative systems.

Changing Role of IT

The biggest single change is the advancement in user education. The users are more educated, more aware and more demanding. There is far more splinter movements trying to set up their own systems and therefore the majority of the job, in many ways, has become a political matter of balancing control and utility. IT attempts to standardize on systems. However, it was mentioned that there are times one must look at the realities of system requirements. For example, if one really wants gastroentrologists to be able to use this information, then the physician/consultant must be willing to accept the application that may have been developed in a language which could be unfamiliar to the consultant.

Change becomes more difficult because there are so many emotional commitments to small non-standard systems for the year 2000 and beyond. The IT department looked at many systems and found 257 multi-user systems in the Trust and discovered that only approximately 30 systems had a direct impact on the individual user.

Views on Emerging Technology

The director observed that the hospital has moved with the times because the suppliers are commercial companies and are trying to encourage the hospital to take what they see as state-of-the-art systems. The current systems that they would prefer to maintain are likely to only function properly for six to seven years so there is an incentive there for the suppliers to keep IT up-to-date on the latest technology.

He also states that the utilization of the Internet was not a priority at the present. The organization has about 600 people who are regular users of the Internet. The consultant/physicians are already using MedLine, which is a medical support information system. The hospital is also using this system to return results to family doctors. The results are simply put on the net or on the web site for the NHS information authority.

He notes that the hospital maintains a paper record for legal reasons and he reports that records are kept for 25 years, which is quite a substantial length of time. Other departments such as mental health and other specialties require seven years of record keeping. The new hospital being built will have no space for paper. There are no cupboards or filing areas and there is no record storage space. This was an intentional decision in designing the new office area so that electronic record keeping would be encouraged.

Behavioral Roles

The director testified that his personal management style is to always be completely democratic and not spend time doing but rather thinking. He has a very small IT team. His IT staff is extremely intelligent and he will quite often test ideas by throwing them out to the staff for discussion. It was reported that every one of his staff has either an MBA or Ph.D.

In his opinion, the NHS is incredibly centralist and dictatorial but it acknowledges the need for a move toward a more democratic position. There was an attempt to introduce competition under the last government but this is being reversed significantly and a plan is under way to return to a centralized model. He stated that he was speaking recently to a NHS executive regarding the costs. This individual stated that the funding

was at £45 billion [$68 billion USD] a year and rising to £60 billion [$90 billion USD] over the next three years. He further stated he thought the centralist model was completely unworkable, but he felt it was his job not to question but to do what he was told.

The director indicated that he has no experience working directly with the private side of healthcare other than having colleagues on the private side. Their view is that the NHS as a whole is slow moving and centralist.

According to the director, there are two rules for the Chief Executive. "You must not break the budget and you must not let the waiting list grow. Breaking the budget is a fundamental constraint and the waiting list is a political constraint. Perform either of those things and you will bring down the wrath of the politicians on you. There is nothing as bad as that."

He explained that if the hospital seems to be doing a good job and people want to come to you and have hip replacement, you either have to do the work – which will increase costs – or not do it – which will increase waiting lists. They must not attract more patients under any circumstances. Therefore, he is constrained to give the impression that they run at best a mediocre service. If their service is perceived to be excellent, the only defense is to shut it down; otherwise, the politics come against the individual hospital and that could mean big trouble. The NHS side is very politically backed.

Clinical Integration Role

The hospital has a CMO that is a paid staff member. Every Trust will have a chief executive, a medical director, a nursing director and a finance director.

Clinical specialists come under the role of nursing, x-ray, pharmacy and lab. The United Kingdom model is different than the United States model in that they have imported HBOC and SMS software application systems. These are activity and cost-led programs. Currently, the mood is more generated toward a clinically rich information system, rather than business systems. The essence of health care evolves around the electronic medical record.

The private sector is more dedicated to the business side whereas the NHS Trust leans more toward a clinically rich information side. Therefore the NHS model has a much more detailed description of the patient. Each Trust is afforded the opportunity of working in the clinically rich information side and not having to bother with financial details as all of that is handled by the government side. There are clinicians on the information systems steering group. There are also two deputy medical directors who are both closely involved in what's going on in technology benefits to the hospital.

Perceptions on Leadership Role

The type of leadership involvement by the IT executive is less of a "doer" and more of a "thinker" role. A thought perspective is of paramount importance. His aim is that he or his immediate staff of five should not "get their fingers dirty" in the details of running the business. Rather, his objective as the IT officer is to start looking at where the details fit in the overall strategic plan. His thinking leans toward working on ways technology can impact medical practice. A further aim is how technology can assist in critical pathways.

CIO and CEO Involvement

There are bi-monthly meetings between the IT staff and the Executive Board. The IT director allows any of his staff who is expert in a particular system to attend these bi-monthly board meetings representing the IT director. If any of his immediate staff is expert in any of the clinical systems i.e. radiology that staff member would avail himself to the board at the bi-monthly meeting in order to answer his questions.

CIO Role in External Environments

The IT director personally takes the lead role in working with external vendors and suppliers. This particular hospital is about to undertake a bid service of about a £50 [$75 USD] million bid for management services and 4,000 end user devices. This is an undertaking that will involve totally reengineering the IT infrastructure.

Clinical Solutions Involvement

The Chief Executive understands what is going on from the clinical side as well as the business side and keeps the IT officer well informed on the necessary needs for any technology projects.

United Kingdom – Private Institution

Case #2

Background and Area of Responsibility

The IT director manages all facilities and systems information. His responsibilities include the delivery of capital projects, acquisition, development and ongoing management projects, telecommunication, data communications installations, information systems and associated technology. He is degreed, in his mid 40's and

oversees all application and technical programs for the hospital group including approximately 25 technical personnel.

This health institution is composed of 40 private hospitals. IT is supporting the 40 hospitals centrally and IT policies are made corporately. A wide-area network that links all the hospitals, WAN and LAN, is used internally at various hospitals. They have a distributed network system that is server based. Project Managers are responsible for the technical systems and report to the IT director. Another technical person takes care of application support. There doesn't appear to be any formal structure in this particular private hospital and the medical records are not electronic. One major issue is the confidentiality of the patient record access. The IT agenda is influenced by what is happening in the health services administrative side.

The progression of an employee into a senior technical role in this institution varies. Some attain to that position through education and experience, others work themselves up through the ranks yet having no degree in a particular field. This particular hospital has a much flatter structure and less hierarchy. One of the challenges seen by the IT director has been the rapid rate of change of technology and emerging technology. It was pointed out that one challenge the organization is facing evolves around the clinical issue. They are endeavoring to make the shift away from a business side to the clinical side of healthcare. Progress is centered around the critical path methods. Clinical strategy is very much focused on care pathways. This particular hospital does not have a CMO. They have a director of technical services that covers the diagnostic departments.

They also have a staff member that is responsible for patient quality and another individual responsible for clinical governance. Another issue in healthcare on the private hospital side is cost issues for emerging technology. The whole cost benefit equation tends to be very important and very critical in benefit outcomes on the private hospital side.

CIO Challenges

The central challenge is to translate the business needs into technical solutions for the administrative as well as the clinical requirements. One of the greatest challenges is maintaining adequate computer performance for all hospital sites in the network. Another challenge is to make a smooth transition to the clinical requirements from the financial and business side. Although the business needs of technology are very important, addressing the clinical needs are beginning to move front and center in the decision-making process.

The director also noted that dealing with the critical pathways is becoming much more of a routine challenge and the focus is shifting towards the patient care process. He stated that the electronic medical record was less mature in the UK than in the US.

Role of the CIO

The IT director's role at this hospital is viewed as assisting the administration. As a result of this, the hospital has been deferring investments that they might have made in order to accommodate necessary systems development in order to get a more integrated technical portfolio and in order to attain those economies of scale.

Changing Role of IT

The director reports that one of the biggest changes seen in IT is the rate of changes in technical applications. He notes the diminishing role of the mainframe to a more distributed processing role.

Views on Emerging Technology

The director's views on emerging technology covers areas such as the need for voice and data convergence, the use of mobile computing and the use of the Internet. He believes these areas are becoming critical in assisting with the medical delivery system. He also notes that the consultants (commonly known as physicians) are putting pressure on IT to assist them in accessing hospital systems through the Internet.

Behavioral Roles

The structure of the IT executives push up decisions from the IT staff to the chief executives. In turn, a filtering of information also comes from the chief executive down to the IT staff on directional needs from a visionary standpoint and all that is filtered through the IT director.

He sees his role as information officer as that of an advisory role. His responsibilities include integrating the business need and the clinical needs of the organization.

Clinical Integration Roles

This hospital does not maintain a CMO - rather they work with a medical audit committee. The physician consultants develop the clinical pathways. The technology that they bring in is designed to support the clinical pathways. The IT director at this

hospital very much desires that there would be one person to speak for the remaining physician consultants as opposed to an audit committee.

The IT department at this hospital runs in a team environment. The director tries to maintain focus on the business needs as well as the clinical needs. The IT vision is concerned with the care of the patient and a lot of emphasis is put on the cost of the clinical pathways. Their mission statement would allude to the fact that all systems would be financially viable. Quality becomes a public driver but at the same time, they must be able to make an income because they are a private hospital. Therefore, profits are of paramount importance. This private hospital invests a portion of their revenues in their other 40 facilities.

Perception on Leadership Role

The director has structured his department into team responsibilities. Each team has a team leader with specific responsibilities coupled with reporting duties to the director. He reports that the team structure is well suited to their environment rather than the traditional hierarchical structure.

CIO and CEO Involvement

The director reports directly to the Chief Executive for the organization. He mentioned that the CEO is very knowledgeable on the uses of the Internet and its potential role for knowledge acquisition by the administrative staff as well as the clinical staff.

CIO Role in External Environment

One of the director's major duties is to monitor the external environment for technical opportunities that would enhance the current technology in place as well as

selecting future technology that would fit into the overall strategy of the care delivery system. He also states that one important task is to listen to the needs of the insurance payers. This task is critical within a private institution. The generation of revenue tends to dictate how far they are able to advance their technology needs.

Clinical Solutions Involvement

The director states that the delivery of excellent patient cares by means of technology is paramount to the organization. His views are that if revenue were available to try emerging technology that would benefit the patient through the deliverance of clinical practice, then the investment would be warranted. However, as a private hospital, the finances must be the first consideration before new technology is brought into the organization. Finally, the benefits of technology must be centered on the quality care of the patient.

United Kingdom – Private Institution

Case #3

Background and Area of Responsibility

The office of the IT director manages three private hospitals in London. According to the director, the responsibility is more of a procedural role rather than a technical role. The director worked in IT for 30 years and is in her early 50's. She started out as a programmer in the technical area working on business programs and moved through the rank to systems analyst and project manager. Therefore she has a good understanding of how systems are put together. She finds that a large portion of her

time is used in trying to stay on top of changing technology. She has no formal education but rather has spent her time in becoming experienced with systems association.

The director is also responsible for developing and maintaining a cost effective IT support group through the recruitment of in-house staff and the utilization of third party contracted vendor services. She manages around 12-15 technical personnel. Additional responsibilities include the task of maintaining IT and telecommunications strategy as a core component of overall business strategy. She states that the job summary includes the following IT professional elements:

- Establish a cohesive IT strategy on behalf of the group to facilitate efficient and cost effective management of IT solutions
- Provide an internal consultancy service for the three hospitals in the management of IT applications
- Coordinate the management of hardware, software, maintenance and contractor supply to achieve consistent application, economies of scale and a reduction in duplication of effort.

CIO Challenges

One of the challenges seen by the director is how to utilize current tools for business and clinical needs. More and more the clinical side of healthcare is becoming important. She also receives inquiry from consultant/physicians on how to access the healthcare systems for additional benefits.

Role of the CIO

The IT director's position is involved in a very broad-based business perspective. A lot more concentration is placed on the business side because of the involvement of

regulatory policies demanded by the government. She tends to benchmark a lot of her projects against other hospitals. She has an extensive background as a data processing manager.

Changing Role of IT

As a data processing manager in her earlier days, she was responsible for the operation of the computers, making sure they were up and running and proper reports were expedited to the end user or requester of that information. Today, the end user has total control of information.

Views on Emerging Technology

The IT director sees no trend for her hospital to move toward pursuing new technology such as bedside computing, etc. any time in the near future. This hospital does not utilize the Internet or an Intranet. At the present time, consultant/physicians have to call the hospital in order to do any bookings for admitting of their patients. There is some talk that they may move toward a shared resource of the Internet so that the consultants can have a more direct approach to the hospital's administration. She is looking to establish web-enabled applications. She reports that there is presently no Intranet application installed within the hospitals. One technology to be looked at in the near future is the ability to access the patient record electronically.

Behavioral Roles

This hospital is able to web-enable some of the applications that they currently have. The hospital is currently not utilizing the electronic patient record but they look for opportunities to move in that direction if and when the NHS moves in that direction. A

lot of her time is spent outside of the IT office communicating with the executive staff particularly the CEO.

Clinical Integration Role

There is no chief medical officer employed by the hospital but rather the consultant physicians interact quite often with the department directors, i.e., director of nursing services. They have an internal medical committee advisory that convenes and shares clinical advice with the executive staff and then any requests for information needs are passed on to the IT director. Right now the IT department leans more toward the business side of the hospital administration but sometime in the near future it hopes to posture IT more in the center of clinical needs.

Perceptions on Leadership Role

One important position that is noted on the IT director's staff is a business system consultant. The role of the business systems consultant is to interface with the clinical and the administrative departments, constantly monitoring their needs and then passing those requests in the form of systems projects back to the IT director. She also employs two technical analysts. Their major applications are run on a Unix based system over IDSN lines. She has bi-monthly meetings with her support staff in order to stay abreast of systems needs from the administrative and clinical side. An additional responsibility for the IT director is to make sure the business analysts maintain continuity in their consultant role, which involves all three hospitals, in order to avoid any one department of the hospital branching off and doing things on their own.

The director is also tasked with employing more standardization in technology. She is moving the organization's PCs to an NT windows based system. They are now

using Compaq and DELL. A lot of the IT director's time is involved in dealing with outside vendors. They try to enforce procedures and policies that prevent individual departments from acquiring their own system, applications and hardware. She attends computer conferences even though NHS representatives heavily attend the conferences and it appears that the vendors lean more toward the NHS market.

CIO and CEO Involvement

The IT director reports directly to the Chief Executive of the organization. She sits on the same board as the CEO, director of human resources and the finance officer. She attends bi-monthly meetings to discuss the advances in technology as well as to submit requests for new project funding.

CIO Role in External Environment

The director attempts to network with vendors at the conferences she attends in order to keep abreast of new emerging technologies and applications as well as hardware that is coming on the scene. She states that the organization works with only a select few vendors but with those, they usually form long-term relationships.

Clinical Solution Involvement

The IT director states that the gap between the business and clinical side of healthcare is becoming smaller. The challenge here is to leverage technology in the most cost effective manner and still deliver clinical support to the consultant/physician.

United Kingdom – Public Institution

Case #4

Background and Area of Responsibility

The role of the IT director is to manage the implementation of systems at the Trust. The director is in his late 40's, has a Bachelors degree, reports to the director of finance and manages approximately 15 technical personnel. The role of IT director is to develop, maintain and continue to update the Trust's Information Management and Technology (IMT). He is responsible for insuring that the Trust's IMT is constantly running and is adequately supported. He sees that the business and the clinical needs are properly procured and implemented. He is also responsible for the availability of the information to both the managers and clinicians. He is responsible for maintaining or emphasizing cost rather than spending dollars for visionary projects. In this hospital the IT director is a qualified accountant and therefore must hold proper degree credentials.

CIO Challenges

One of the challenges in a NHS Trust is the demand for information technology. The availability of funding for IT is very limited. The director reports that 2-3% of the total revenue generated by the Trust is spent on IT. Although there are 850 beds in this Trust and approximately 1400 PCs throughout the organization, there is not yet a PC on every desk.

The hospital maintains a census of about 98% occupancy. Another challenge is the difficulty in getting people to think corporately. The majority of the physician consultants are primarily looking for IT to develop systems that would allow each

physician consultant to record and capture data or information that is specific to their particular discipline rather than systems that would involve 80-90% of the entire hospital.

A further challenge is to be able to have a system that would keep the individual physician consultant happy as well as benefit the hospital as a whole. For example, the doctors want a diabetic system, a renal system or radiology system and it is very hard to get them to buy into a more generalized plan of capturing data for the patient electronic record.

Role of the CIO

The IT director is not a technician and therefore relies heavily on his technical support staff. He reports directly to the chief executive. His role is to ensure the readiness of the technical system for this 950-bed hospital. His responsibilities require accurate management of some 1400 desktop personal computers.

Changing Role of IT

The IT director feels that people in general under his employ possess much more knowledge of IT as opposed to the batch run systems of data processing. He has seen a much greater demand in recent years for IT and the benefits of clinical systems. The director also sees the benefits of the Internet to assist the consultant/physician.

He states that the NHS Trusts are encouraging more sharing of information between the hospitals and the government. Because this institution is a teaching hospital, the demands for sharing information between the hospitals and the medical schools are seen as an increasing demand on the IT department. Thus, there is more need to develop information delivery systems.

Views on Emerging Technology

According to the director, the health department of the government side is requiring information from the individual Trusts in order to compare or benchmark what they are doing with other hospitals. They are then able to look at the processes that each hospital uses and if they decide another hospital has better results, they can make a recommendation for a particular hospital to change to that process. The health department of the government side is able to compare and contrast processes from a variety of hospitals. The IT director is not currently an advocate of utilizing the Internet as a delivery system for medical information but rather sees the use of the Internet as a tool for looking up data or information. He does not feel that a physician consultant can adequately utilize the Internet for ordering tests or entering into other procedures from the hospital that would be a benefit to his/her practice.

Behavioral Roles

One concern of this director is recognizing the fact that the senior people tend to fear being shown up and run the risk that their ignorance may be displayed among their peers. Those who possess less technical skills tend to be the more senior officers in the organization. The IT director recognizes that the senior people who are PC illiterate find it very difficult to adjust to new technology. He recognizes that many of the senior people are reluctant to being trained on computers. Therefore the pressure and demands on the director is to ensure that the systems being developed for the organization are easy to use and user-friendly.

Clinical Integration

The organization has a clinical medical director who is employed by the hospital. The Medical Director is a neurologist and works very closely with the IT Director, and supports the training in technology. The IT director strives to get the Medical Director and his team of physician consultants involved in designing new systems for the clinical practice. The IT director's strategy is to create a prototype first and get their feedback and input on the system. This gives the physician consultants an opportunity to critique, edit or change the prototype before it is put into production. The Medical Director often looks at what is going on in other hospitals as well and then reports any new medical technology applications back to the IT Director.

Perceptions on Leadership Role

The IT director tends to look at least six months ahead at what possible systems would benefit the hospital. The director invites comments from his technical staff on an ongoing basis. He states that there should be no difference in the pursuit of new technology whether the organization is a NHS Trust system or a private system. He further states also that the demands for technology, utilization of information and the acquiring of emerging technology are still very high. The director notes that physician consultants have slightly above average expectations on the government side, i.e. the NHS Trust, to maintain equipment far more than the expectations of the physician consultants in the private sector.

CIO and CEO Involvement

According to the director, the CEO's vision for the NHS Trust is to pursue a leading edge technology. This visionary role of the CEO requires the IT director to maintain a good relationship with the chief executive.

CIO Role in External Environment

The appropriation of equipment from outside vendors must fall within certain guidelines that the Trust sets out but the IT Director does maintain a certain amount of latitude and flexibility in the selection of these vendors in order to satisfy the requirements for a particular capital investment.

Clinical Solution Involvement

The hospital also maintains an Intranet service for the whole organization. The IT Director states that the systems are equally dedicated between the administration and the clinical demands for information. The director states that there is a slight leaning toward the administrative side because historically IT has favored the finance side but it tends to be moving more to satisfy the clinical side as well.

United States – Private Institution

Case #5

Background and Area of Responsibility

The CIO is in his early 50's and has an MBA. He has a background in data processing as an analyst and a data base administrator and has worked in the data processing environment for 18 years. One vital area of responsibility for the CIO is to be concerned with supporting the business plan and strategic objectives of the hospital.

CIO Challenges

The CIO believes that the Information Services Plan needs to support the hospital plan. This environment is basically a Meditech environment. This hospital is a not-for-profit organization. He stated the biggest challenge he sees is to provide value to the services that they offer through information technology. He also states that he has never been able to use tools to any great success in IT that has brought about significant cost savings. Consequently he feels they have very little to show for the work that they have done while utilizing these advanced system tools. Therefore, he believes one of the challenges is to change that culture. Another challenge is dealing with regulations and HIPAA (Hospital Information Portability Accountability Act). He is concerned not to let HIPAA cripple the organization but rather to become an advantage. HIPAA goes after three things:

- Standardization of all the electronic communications.
- Security - all electronic information has to be encrypted.
- Privacy

The CIO states that the health care industry is under much pressure to maintain rules and regulations of HIPAA.

Role of the CIO

The CIO sees his role involved in the business side rather than the technical side. His role involves talking with the departments and trying to match the business with technology and making sure that he communicates the matrix of their success. He feels that over his 30 years experience in IT, the healthcare industry has done a poor job in dealing with the matrix side of the organization. The matrix can only be fulfilled if there

is a good working relationship with the other senior partners within the organization. His staff is made up of 22 people composed of network technicians, analysts, help desk people, PC technicians, and operation staff. The Meditech Hospital Information System (HIS) runs on a mid-range mainframe but the hospital is leaning more toward bringing in client servers. The Hospital Information System (HIS) has a very robust clinical module in the software package that is managed by the CIO's support staff.

Changing Role of IT

The CIO notes that he has observed the progression of information from the days of data processing where it was heavily controlled by the CFO (Chief Financial Officer). He has witnessed that the finance side turned the corner a few years ago and is now leaning more toward a CEO based environment.

Views on Emerging Technology

The CIO also has seen emerging a new role of a knowledge-based business. He sees processes coming soon which involve taking knowledge and wrapping that around technology in order to produce a viable means of processing information and as a means of reducing costs. He believes it is imperative to stress the business side of managing IT rather than the technical side. He reports to the Senior Vice President of Finance. What is unique in his position is that he maintains a permanent seat on the Executive Board. He also reports directly to the Board.

In terms of emerging technologies, he feels that wireless communications is going to have a severe impact on the way hospitals deal with IT. He feels that the wireless technology is moving toward the "point-of-care." One example he cited was bedside computing with wireless communication devices. He feels that the work cannot be done

at the nurses' station but rather needs to be done at the bedside. The CIO feels that if the caregiver is able to capture the data at the point of contact, the information is a lot more reliable than information that is entered at the nurses' station. He states that another emerging technology that his hospital would like to move toward is the Internet. He notes that one negative of the Internet is security issues. He states that another challenge at his hospital is that his organization becomes web-enabled.

Behavioral Roles

The CIO believes that his role is one of a marketer or one that possesses a marketer leadership style. He is constantly interacting with all departments within the organization attempting to "sell" his services to the organization. His leadership style for the IT staff stresses "why we're doing it and where we're going." He then looks to his technical director as to how to do it. He employs a director of MIS who is involved in how the technology is going to be dispersed throughout the organization.

Clinical Integration

The CIO states that there is a chief of the medical staff who chairs the Clinical Informatics Committee and brings together teams of clinical staff and physicians. The Committee actually tests out some of IT's recommendations. He is a member of that committee as well. Another component of this is that they have a senior vice president of medical affairs. There is a vice president of quality who is a physician and he interacts frequently with that office. His further responsibility is to interact with these senior medical officers in terminology that they understand and assist them with their information needs.

He states that it is critical to keep the technology in balance while delivering patient service. At the same time, it is very difficult to manage the culture of IT and the understanding that the physicians have about how IT can assist them in their medical practice. He feels that he can install the technology quicker than he can deliver the solution. It is a perpetual problem in dealing with the transition from the technology to outcome performance. He observes that the physicians coming to practice in the hospitals today are a lot more computer savvy. He notes that there are three types of physicians:

- one group that want no part of technology and will retire long before they aspire to use it – probably about 10%
- one group who are more radical and will delve into the technology. They are looking for opportunities to use it for additional personal revenue – about 10%
- one group that know they are going to have to use the technology, and therefore force themselves to participate – 80%.

Perceptions on Leadership Role

The CIO feels that there are three major areas of concern in managing IT. One is access management – how are we going to access the care i.e. how we get things scheduled, how we get patients registered and how we communicate with the patient. Then there is care management – which is the whole aspect of how IT provides care in order to reduce cost and increase quality. Third, is business management – getting the bill out and providing all the decision support associated with strategic planning. He feels that if IT can learn to do those three things well by utilizing technology, then IT will share in the way the patient feels and will improve the way the doctor feels about the

practice of medicine. While doing all that, IT can reduce costs and see quality go up. He feels that he is going to organize IT around those three management areas.

CIO and CEO Involvement

The CIO reports an excellent relationship with the CEO. He noted a statement in the hospital's recent magazine written by the CEO, Brian Grissler:

> Along with financial support, these initiatives require technological readiness. With that in mind, the hospital's voluntary Board of Trustees has just approved a bold information systems strategic plan that promised to move Surburban to the forefront in the delivery of technologically advanced care. The plan focuses on increasing utilization of the Internet and other e-strategies that can improve patient and physician access to healthcare services and information. Specifically, it addresses the development of a fully automated, secure clinical record that ensures convenience, continuity of care, and privacy for patients. It also provides the foundation and tools necessary for the virtual integration of our multiple ambulatory sites throughout the system.

Thus, the CEO support for IT in this hospital is unquestionable.

CIO Role in External Environment

The CIO notes that much of his time is spent with vendors who often supply him with complete market analysis and the impact of technology in the healthcare industry. He admits that without a good working relationship with vendors, his goals to move the IT initiatives for the hospital would be severely hampered.

Clinical Solutions Involvement

The CIO believes that the clinical systems integration initiatives are very important for this organization. He noted three important areas in the management of healthcare systems management:

- Access management – which involves care of the patient and the scheduling of the patient for health services.

- Care management – which involves the business details, the reduction of cost and the increase of quality.
- Business management – which involves getting the bill out, supplier involvement and strategic planning.

United States – Public Institution

Case #6

Background and Areas of Responsibility

The CIO is retired after 22 years from the US Army in the Medical Service Corp. During his time in the military, he was trained as a hospital IT professional. He also served two years as CIO at Walter Reed Hospital in Washington, D.C.. He is in his mid 40's and has an MBA. One of the major areas of responsibility is to balance the clinical and business mission objectives of the research institute.

CIO Challenges

The CIO feels his biggest challenge is the IT staff and how they cope with the rapid changes in technology. His responsibilities are to organize the departments, teach the managers how to be proactive and take responsibility for keeping their own projects on a consistent time-line. Another challenge is dealing with the culture of the organization. He reports that the government is very slow to take on any changes that might have a dollar amount to consider.

Role of the CIO

At the present, the CIO does play the role of a technology officer but at the same time he is looking to hire a chief deputy officer to assist in carrying out some of the

responsibilities of the CIO role. This individual would carry out the day-to-day role while he would be free in his CIO role to spend time on processes and visionary roles. He believes that one of the major roles of the CIO is to bring together knowledge owners in order to glean from their experiences. He reports to the CEO who is the director of the hospital.

He states that each research institute has their own CIO and CEO. He has about 100 employees composed of analysts and programmers that implement his vision for full IT integration of the organization. They use ORACLE in a client-server environment and this functions as their main data base system. He has hospital information systems developers that are composed of nurses, pharmacists and hematologists. These are functional specialists who assist IT in developing product lines. He also has interface people who are responsible for making any product line "talk" with another product line. They run a 24 x 7 data center, which consists of a UNIX administrator, an NT administrator, a NOVELL administrator and a help desk team.

Changing Role of IT

The CIO notes that he has seen dramatic change in technology from the days of data processing (DP) which was involved in pulling cables through ceilings to the present where someone actually goes out to a department and sits down and discusses information needs with the department staff. He feels his role tends to take on more of a champion role. He is able to share with departments what he has seen successfully implemented by other departments.

Views on Emerging Technology

The CIO maintains a budget line for emerging technology in his organization. His strategy is to look at the technology that is emerging in the field of healthcare. If he thinks there is an application for that department he will then approach the director and ask if they would be willing to take on responsibility to work with a prototype of this technology in order to field-test it. He determines who the test population consist of and then writes up a test plan and an analysis and attempts to project some reasonable outcomes for this new technology. One of the projects that was a success for this organization was the utilization of wireless communications. One procedure he used was to bring in an outside vendor in order to provide application integration as well as hardware integration with their system. This project met the approval of many on the executive staff.

Behavioral Roles

The leadership style that the CIO employs is one that utilizes a mentorship program. One of the senior officers within the organization will quite often communicate with the CIO and listen to things that he is struggling with in order to see if it is the system causing the problem or something that he is doing wrong.

During this interview, it was evident that he possesses a very compassionate heart for listening to the needs and problems of others within the organization and he seems to go to great strides to rally his staff around the needs and problems of other members of the administration. He has noticed during his tenure at here that his staff is very passionate about their own jobs to the extent that they will even forsake their family on occasion. Oftentimes, he finds himself entrenched in their lives because he feels that he

has to basically minister to the whole person. He realizes that there is a life after their work responsibilities.

Clinical Integration Role

There is a chief medical officer at this institution, but the CIO confesses that he does not communicate as much as he should to the CMO and the nursing director but rather he receives information from the department directors regarding the need for technology assistance. He has one-on-one meetings with the CEO every week and discusses business and operational needs that meet the mission objective of the organization.

Perceptions on Leadership Role

The CIO's leadership style is most unusual in that he personally takes the time to get involved with his staff. He reported that many times he has insisted any staff who has invested an unusual amount of time at work to leave in order to spend quality time with his family. This is very unusual for an executive at that level.

CIO and CEO Involvement

The CIO stated that his involvement with the chief executive occurs at least two to three times a month. He felt that this involvement was necessary due to the size of the multi million-dollar projects he is responsible for initiating.

CIO Role in External Environment

The CIO keeps extremely busy with outside vendors and keeps open communications with at least 100 vendors. He states that when he talks with vendors, he is most interested in "the one thing that they are able to deliver" and relies less on company history and product line history. His bottom line is "what can that product do

for the organization." He desires to hear what specific value the vendor can bring to their product line. He states that the hospital uses about 1,000 Macs and about 800-900 PCs.

Clinical Solution Involvement

The CIO notes that the representatives from the clinical side approach the IT department with their requests quite frequently and as a result the IT staff has a better understanding of their information needs. Because the hospital is a research institution, they fly patients in from all over the world with no charge to the patient. Therefore the information needs are critical to the caregiver and that puts a greater challenge to the IT staff. He looks at utilizing technology's value in assisting physicians in the practice of medicine. The CIO also looks for opportunities to reduce paper and put more information at the fingertips of the caregiver by utilizing technology.

Because he is one of 25 CIOs here at this institution, he maintains close relationships with other CIO colleagues within the organization in order to keep abreast of emerging technology and management innovations as it applies to research.

United States – Public Institution

Case #7

Background and Areas of Responsibility

The CIO has a BS in Computer Science and a MA in Management and Supervision. He is in his early 50's and has been in his present position for two years.

His role as CIO involves the responsibility for day-to-day computing services operations as it relates to the financial systems as well as the clinical systems. He also has responsibility for information services supporting the health services foundation,

which is the faculty practice plan at this institution. This organization supports 750 physicians. The health services foundation provides administrative services to those physicians primarily related to billing operations.

He is responsible for putting together the strategic direction for information services for the health systems. He leads and coordinates the efforts that pull together the requirements for these systems and then defines and articulates the strategy for implementing the systems to meet those needs.

He reports to the Chief Operating Officer for this institution. The COO's cabinet consists of the CIO, Financial Officer, the Chief Administrative Officer, the Chief Nursing Officer and the Marketing Chief.

CIO Challenges

The CIO feels that the business rules change so frequently and this presents a unique challenge to the health services industry. He has observed a lot of changes on the financial side, as well as security and confidentiality changes. He feels that the health care environment encompasses a lot of the other industries. In addition to normal scheduling and reservations, his office is tasked with keeping up with current technology as it applies to billing and record keeping. From a technical standpoint, he feels he faces the same challenges as anyone else trying to implement reliable computer services.

Another challenge is trying to come up with a reliable infrastructure that can be depended on day in and day out. It is a challenge that his staff is meeting today. With the onset of an increased amount of virus attacks, a whole new set of challenges is created that run the risk of upsetting the technical balance already in place.

Further challenges are the pace at which technology changes in the industry. For example, a few years ago the IT department was supporting a total of 2,000 email users. Today, three years later, IT is supporting almost 6,000 email users, thereby dramatically increasing the amount of support given to the organization.

Additional challenges are getting adequate resources of finances to support the dramatic growth in technology. He notes that in his opinion the healthcare industry falls way behind in the amount of monetary support that other industries are afforded which could be spent for the growth of technology. He notes that other industries may be spending upward of 10-12% of their revenue on technology this facility is in the 2% range.

He feels they are under-funded but yet still trying to keep pace with the growth of technology. To be effective in today's world, he feels that he needs to possess the right tools to assure reliability. He notes that you can operate without those tools but you are significantly more vulnerable than if you have the right tools in place.

Role of the CIO

The CIO notes that as CIO, you are expected to know everything. It is not uncommon, he states, to get stopped in the hall and asked about an ink jet printer cartridge. The expectation is that the CIO knows all there is to know. His opinion is that no one person can possibly keep up with the onslaught of demands of technical, business and clinical information needs.

At the present time, he is attempting to restructure the department to bring on a technical officer to exist in the role of a delivery systems manager. He stated that the delivery systems manager would have control of everything in the data center, including

all of the networking, the mid-range servers, the local area networks, and all of the desktop computers. These areas would then be under the control of one person. That person then becomes the chief technical officer (CTO). His role is to focus on the business perspective of IT. He has to know the technology but doesn't have sufficient time to keep up with it. There are 160 employees on the IT staff. About half of that staff is directed toward the delivery system. The bulk of the remaining IT staff is directed toward the desktop computing needs of the organization.

Changing Role of IT

The CIO notes that there has been a move toward integrating clinical information and the business needs of the hospital. Therefore the role of CIO has broadened significantly. In the past he was only responsible for billing systems, now he has to understand clinical systems so that he can implement those systems to improve the health delivery process. This role has expanded over time in order to integrate all these systems together.

Views on Emerging Technology

Part of his responsibility is to look to the future and see how he can deploy technology to make the business or operational processes more effective. His role as he is deploying these information systems is to determine where he can integrate technologies in order to enhance those information systems. One example might be to employ speech recognition. Currently, IT is looking at the clinical process in regard to how they can integrate speech recognition to help physicians with dictation. Bar coding technology is another area he is investigating.

An additional emerging technology would be the utilization of scanning documents. He states that in terms of emerging technology you really need to have a plan. You have to know how you are going to deploy these tools and you have to know what technologies can be used to enhance what you are deploying. Another example might be using radio frequencies rather than tethered devices. Also under consideration is bedside computing. The CIO's role is not concerned with developing new technologies but rather constantly looking at what services the market can provide to the organization and then seeing where that new technology might fit within the overall scheme of things.

Behavioral Roles

He feels that the breadth of knowledge of his staff is lacking and therefore in his role as CIO he finds himself in a more one-on-one leadership role. He has determined that he needs to be an instrument of change and strives to drive and motivate his staff toward a new knowledge base. Part of his role is strong leadership and taking control. He recognizes that there is a large pool of talent within his staff that he needs to take advantage of. He feels that he needs to be a mentor to his staff and guide them in new directions, and give them confidence to accomplish new things. People who have been on his staff for a long time feel they don't need to change so he has to be the change agent, the leader and the mentor. Therefore, he presents a plan to his staff and then coaches them in acquiring the final objective for the task he assigns them.

Clinical Integration Role

There is a chief medical officer (Chief of Staff) who acts as the head of the IT Governance Committee. There is an IT Governance Committee at the cabinet level that provides direction to the CIO. He interacts with the chief of staff almost on a daily basis.

Perceptions on Leadership Role

The CIO sees that the role of CIO is expanding beyond the technical role. He needs to understand the business of healthcare and understand it well so he can deliver these information systems and business processes and thereby help the administrative staff achieve their individual missions. Being involved at the cabinet level makes his responsibilities much easier as he is able to express his opinions. As CIOs become more experienced and as they mature in their profession, He believes that a logical career path could easily see a CIO being promoted to a CEO. He feels that a CIO is no longer a terminal position.

CIO and CEO Involvement

The CIO reports that he has a daily interaction with the CEO because of his cabinet position. He has broad latitude to run the departmental operations. He believes he could do more but senses reluctance on the CEO's part to more deeply involve him.

CIO Role in External Environment

His internal strategy is to acquire "off the shelf" products as much as possible. He needs to develop relationships with external vendors. He notes that vendor management in any industry is very difficult. Managing highly technical people is very difficult. He states that you have to know not just the questions that need to be asked but also how to ask them. It is more important the way you ask the question in order to gain the correct

information. A trust relationship with the vendors is necessary. Long term relationships with vendors are important so that there is mutual trust on both sides. He states that vendor relationship management is almost a full time job. He further states that he spends at least 20% of his time talking to vendors either trying to avoid a problem or fix a problem. His responsibilities are so vast that he is currently looking at initiating a move to bring on either a deputy CIO or someone who would function in a business manager role. This new role would also manage vendor relationships in particular and licensure and keep up the support agreements that are currently in place.

Clinical Solutions Involvement

The CIO feels that the clinical side of healthcare is extremely important. He feels that HIPAA (Health Insurance Portability and Accountability Act), established in 1996 is forcing the healthcare industry to move toward an electronic medical record, which he feels is very good. HIPAA is a federally mandated program and will ultimately affect all healthcare organizations in the near future. He feels that the electronic medical record will in essence help reduce medical errors that are caused because information was not available. He feels that on the clinical side, IT should assist in moving towards the technology that would enable the process to be more effective. He stated that he feels that they should be moving away from physicians having to manually write their diagnosis and notes down on paper and move toward voice activated medical records thereby eliminating errors. The challenge is that putting those kinds of systems in effect is very expensive. He feels that the Internet can be a useful tool but is concerned that we not become too reliant on it because of its instability. Therefore, he feels the Internet

would serve no purpose on the clinical side because the clinical systems must be always available.

He also feels that more research needs to be implemented to involve the Internet in a healthcare environment simply because of the fact of security issues. At the same time, he doesn't feel security over the internet in the healthcare environment is as important of an issue compared to other security breaches such as employees leaving a patient medical record or information in clear view of someone who is not authorized to view that information. He feels also that in these security issues it is a series of small things that lead up to larger issues.

United States – Private Institution

Case #8

Background and Area of Responsibility

This individual is VP and CIO. He is in his early 50's and has a BS degree and an MBA. He is also currently enrolled in a distance Masters program in Information Technology. He is responsible for the total computing and information needs of the hospital business as well as the information clinical needs.

CIO Challenges

The CIO feels that the healthcare industry faces a number of challenges. The major changes that he sees is an aging population, the constant threat of higher cost and a new emerging force would be consumerism. Those changes are at play at an accelerated level. At the technology level, he feels that they are plagued by a lack of standard practices, which make the complexity of the healthcare environment difficult. According

to the CIO, there are no two industries that have changed faster than the merger of IT and medicine.

Role of the CIO

The CIO feels that his role as a technical officer is really nondescript. He feels his role is more of a consultant and facilitator and that he has at his disposal a variety of experts that he can rely on for information needs. He strives to be the person who matches the technical vision with the business vision. He attempts to become the change agent and at the same time support the status quo. He has to spend a lot of time figuring how to put the vendor pieces together. As a result, he feels his role is a multifaceted job.

His IT staff consist of 170 people. He has five directors – one dealing with administrative systems, one dealing with clinical systems, one dealing with programs, one dealing with networks and one dealing with operations.

Changing Role of IT

The CIO feels that the emergence of information technology as it has emanated from the days of data processing is a key success factor in the information technology success of the healthcare industry.

Views on Emerging Technology

The CIO feels that keeping pace with new technology is his biggest challenge because this area has practical implication on patient care. He also stated that it is imperative to listen to physicians and their needs for new and innovative technology.

Behavioral Roles

The CIO reports to the Executive VP. He noted that there is a lot of discussion in the industry as to whom the CIO reports but feels that it makes no difference whom you

report to but rather the support and access you receive. He feels that organizational charts that show CIOs reporting to CFOs are strictly hype.

He notes that you are not a leader unless people follow you and the way the people follow you is the way they respect you. He concludes that his role is one of leadership rather than a technical role. He stated the line drawn between CEOs and CIOs are very narrow today. As a result, he views the roles of leadership in both categories as one and the same.

Clinical Integration Role

The CIO states that there is an executive VP who is a physician. The chief operating officer is a physician but does not carry the title of CMO. His feeling is that it is more important to have a composition of good chemistry among the executive staff rather than an emphasis on titles. He feels the culture of the company at that executive level is so critical that the titles and everything else that go along with it are meaningless to a point.

Perceptions on Leadership Role

The CIOs leadership style involves anything from interacting in local staff squabbles all the way up to negotiating new contracts with vendors and trying to set precedent for new systems requirements throughout the administration.

CIO and CEO Involvement

The CIO believes that the amount of time he spends with the CEO is not as important as is the immediate access he has to the CEO. Both he and the CEO interact quite frequently. He stated that the culture of his organization was very contemporary with the healthcare industry. He is attempting to get all the managers in the organization

more fluent with the technology. He also plays a consultant role where he relies on his actual experience as a consultant in the field.

CIO Role in External Environment

He feels that there is a dominance of vendors in the industry today and that healthcare is severely impacted by these external vendors. He feels that it is easier for physicians to play the role of advisor on the clinical side and provide assistance to IT than physicians to be technically competent because of the time involved to bring that physician up to speed in technology. He has noticed that the vendors are much more receptive over the last few years. He feels that the vendors will ultimately have to establish a working relationship with the CIO. He stated that in the past, many vendors have done an "end run" around the CIO and gone directly to the CEO. The feeling now is that the CEOs have placed more confidence in the role of CIO that these vendors now are asked to speak directly to and carry out their negotiations with the CIO. This is a major change that has occurred in the last 15 years. He has a rule of thumb when giving vendor recommendations to the CEO. He will write not more than one page per $1 million that the hospital is engaged in spending for a vendor product. For example if a vendor product is to cost $10 million, his formula is not to exceed ten pages to explain the suggested purchase. He noted that in this regard the hospital has a process in place and the CEO and Executive Board trust that process.

Clinical Solutions Involvement

The CIO notes that the business side and the clinical side of healthcare are treated equally as peers and partners in their endeavor to develop technological solutions for their information needs. He notes that he is very respectful of clinical needs and at the

same time the clinicians are very respectful of his having to maintain technology within his portfolio. He points out that as a leader he has never required that his internal clients follow his lead in developing new technology to deliver their information needs. Rather his process requires that each internal client sponsor the projects that IT has initiated.

He has helped them understand their problem, helped them articulate what they expect from the vendor and helped them to understand what they could and could not do and pointed out the risk to them. He points out to the internal clients that a good business plan would benefit not only IT, but also their individual departments.

Therefore, as the CIO, he functions behind the scenes and makes sure the plan moves forward successfully. He also stated that the internal clients not only "took the charge and the bullets but also the accolades as well." He has initiated a peer process whereby each of the internal clients learns from one another and that seems to have permeated throughout the organizational culture.

Analysis of Data

This study initially set out to look at the ten managerial roles of Henry Mintzberg's classic work. Thus, the researcher incorporated into this study a seven point Likert scale to test the mean score of each role and thereby examine the emphasis of each role as compared to the cultural setting of the United Kingdom and the United States. During the interview process, the researcher set out to accomplish two objectives. One, to administer the Likert instrument for comparison and two, to conduct personal interviews of CIOs in their business setting. The administration of the Likert instrument took less than five minutes on average. The in-depth interviews by the four IT Directors in the

United Kingdom and the CIOs in the United States took, on average, one and one-half hours.

United Kingdom Model

Some interesting observations occur when examining the United Kingdom model seen in Table 6. The first observation noted is the total mean score of the four health institutions spread over all ten roles. A total mean score of 5.0 for all roles indicate only slightly high perceived involvement. One would have to conclude that the IT Directors in the United Kingdom model perceived their involvement in the ten roles corporately just one point higher than neutral.

However, when looking at selective roles based on the four-group involvement, a different perspective is seen. First, the leader role scored the highest in the instrument. Shapiro (1998) solidifies this point by stating that the CIO has been recognized as a key leadership team member in most healthcare organizations.

In contrast to the high score posed by all four members of the United Kingdom model, figurehead and resource allocator both scored a mean value of 3.5 on the scale. This score of 3.5 is somewhere between slightly perceived involvement and neutral perceived involvement. From this perspective, it may very well be that the IT director position is noted as a leader in his or her own domain rather than performing that role from a corporate-wide perspective. This also may account for the fact that directors have not yet attained to executive status in many organizations. According to Mintzberg, a figurehead may at times be recognized only at the highest organizational level. This would possibly account for the fact that many of the IT directors are still hanging on to

Table 6

United Kingdom Model
Likert Summary of all participants

Mintzberg's Ten Roles	Valuation Scale 1	2	3	4	5	6	7	Total Participants	Mean
Figurehead	1	1	0	0	1	1	0	4	3.5
Leader	0	0	0	0	0	0	4	4	7.0
Liaison	0	0	0	1	1	2	0	4	5.3
Monitor	0	0	0	1	0	2	1	4	5.8
Disseminator	0	0	0	1	1	1	1	4	5.5
Spokesman	0	0	1	0	3	0	0	4	4.5
Entrepreneur	0	0	0	1	0	3	0	4	5.5
Disturbance Handler	0	1	0	1	2	0	0	4	4.0
Resource Allocator	1	0	2	0	0	0	1	4	3.5
Negotiator	0	0	0	1	1	1	1	4	5.5
								Total Mean	5.0

Participants
Nuffield Hospital Group
St. Martin's Hospitals
Kings College Hospital
University College London

1 = Very low perceived involvement
2 = Low perceived involvement
3 = Slightly perceived involvement
4 = Neutral perceived involvement
5 = Slightly high perceived involvement
6 = High perceived involvement
7 = Very high perceived involvement

Developed by Author

data processing (DP) mentality. DP personnel were never historically thought of as a figurehead within the organization.

Resource allocation, according to Mintzberg, is the heart of the organization's strategy-making system. Mintzberg also points out that this role encompasses such tasks as resources of money, time, material and manpower. Again, the literature points to many organizations that observe CIOs still maintain the data processing mentality and therefore are not expected to expedite attention to corporate resources.

United States Model

Similar observations were noted in the United States model as seen in Table 7. The instrument revealed that the three highest scores of 6.3 were Leader, Entrepreneur and Negotiator. Contrasting these three roles with the United Kingdom model gave very little surprise to the author of this study. According to the interviews from the United Kingdom participants, all four confessed that they felt they were somewhat behind the States in management practice as well as technological advancements.

The United States model, observing leader, entrepreneur and negotiator do promote cause to examine the literature on these roles. According to Maccoby (2000), managers are principally administrators who write business plans, set budgets and monitor progress. Leaders on the other hand get organizations and people to change. Thus, management is a function that must be exercised in any business, whereas leadership is a relationship between leader and staff that can energize an organization.

Although the difference in scoring in the leader role between the United States and the United Kingdom (6.3 and 7.0 respectively) only differed by .7, both were very

high in this role. As the business world becomes more complex and interdependent, executives cannot afford to lead in isolation (Wah, 2000).

The use of technology appears to be the paramount concern in businesses today whether "brick and mortar" or on e-business ventures. Ritchie-Matsumoto (1999) says that staying abreast of technology, understanding it and using it effectively is a great challenge. Thus, we not only must understand the technology, but also its impact on individuals who will be affected by it.

Table 7 also shows highs score for the entrepreneur role at 6.3, which interprets, as high perceived involvement. Although this role is usually associated with one who seeks venture capital for a start up, many organizations incorporate this role in the business sector by labeling it as "intrapreneur." Thus, the intrapreneur performs the same behavioral traits as an entrepreneur but only without the start-up capital. Ryan (2000) observes that the dictionary definition of entrepreneur is one who organizes, manages and assumes risks but applied to the business organization, this person is one who builds, pioneers, solves problem and then repeats the process over and over.

The out-working of this role in business is not experienced, as one would expect it to be. Goodman (1994) says entrepreneurs must have imagination and the ability to envision scenarios as well as the ability to exhibit passion.

The last highest role of those listed in Table 7 is negotiation, noted by 6.3 on the scale. This high score could account for the fact that the United States CIOs are much more solicited for technical systems than their counterparts in the United Kingdom. This could also account for the belief that the States are much further advanced than the United Kingdom IT directors in the utilization of technology.

Table 7

United States Model
Likert Summary of all participants

Mintzberg's Ten Roles	Valuation Scale 1	2	3	4	5	6	7	Total Participants	Mean
Figurehead	1	1	0	0	1	1	0	4	3.5
Leader	0	0	0	0	1	1	2	4	6.3
Liaison	0	0	0	0	1	2	1	4	6.0
Monitor	0	0	0	1	2	0	1	4	5.3
Disseminator	0	0	0	0	3	0	1	4	5.5
Spokesman	0	0	0	1	1	1	1	4	5.5
Entrepreneur	0	0	0	0	1	1	2	4	6.3
Disturbance Handler	0	0	0	0	1	2	1	4	6.0
Resource Allocator	0	0	0	1	2	0	1	4	5.3
Negotiator	0	0	0	0	0	3	1	4	6.3

Total Mean 5.6

Participants

University of Virginia
Carilion Health Systems
Suburban Hospital
National Institutes of Health

1 = Very low perceived involvement
2 = Low perceived involvement
3 = Slightly perceived involvement
4 = Neutral perceived involvement
5 = Slightly high perceived involvement
6 = High perceived involvement
7 = Very high perceived involvement

Developed by Author

Mintzberg states that one of the roles most concerned with daily operating problems is the negotiator. Mariotti (1998) states that in business you don't get what you deserve, rather you get what you negotiate. Thus, because of the high interest of the US technical market, the CIOs must constantly be honing their skills in this area. Jordan and Roloff (1997) point out that goals and plans determine negotiation tactics that contribute to negotiation outcomes.

This accounts for the fact that the United States model noted in Table 7 illustrates this negotiator role with a 6.3 scale and the United Kingdom counterpart in the same role at only 5.5. The high scale attributed to the United States model may account for the "high-tech, high-pace" culture as opposed to a much slower marketing pace of technology in the United Kingdom mode.

United States/United Kingdom Model

An overall examination of both the United States and the United Kingdom IT directors, seen in Table 8, reveal that the three highest scores were leader, entrepreneur and negotiator (scores of 6.6, 5.9 and 5.9 respectively). Together, the researcher concludes that the healthcare CIOs/IT directors interviewed commented on these roles as having the highest significance. The researcher also observed that the lowest score found in Table 8 was resource allocator at 4.4. Thus, from this study, is can be concluded that the roles of leader, entrepreneur and negotiator had the highest priority among the United States/United Kingdom IT directors but the lowest concern was the importance of allocating resources. During the interviews, many of the IT executives affirmed another level of authority responsibility such as a director who handled the day to day operations. It is quite likely that allocating resources were delegated to a lower level managerial rank.

Table 8

United States/United Kingdom Model
Likert Summary of all participants

Mintzberg's Ten Roles	Valuation Scale 1	2	3	4	5	6	7	Total Participants	Mean
Figurehead	2	2	0	0	2	2	0	8	3.5
Leader	0	0	0	0	1	1	6	8	6.6
Liaison	0	0	0	1	2	4	1	8	5.6
Monitor	0	0	0	2	2	2	2	8	5.5
Disseminator	0	0	0	1	4	1	2	8	5.5
Spokesman	0	0	1	1	4	1	1	8	5.0
Entrepreneur	0	0	0	1	1	4	2	8	5.9
Disturbance Handler	0	1	0	1	3	2	1	8	5.0
Resource Allocator	1	0	2	1	2	0	2	8	4.4
Negotiator	0	0	0	1	1	4	2	8	5.9

Total Mean 5.3

Participants

University of Virginia
Carilion Health Systems

Suburban Hospital
National Institutes of Health
Nuffield Hospital Group
St. Martin's Hospitals

Kings College Hospital
University College London

1 = Very low perceived involvement
2 = Low perceived involvement
3 = Slightly perceived involvement
4 = Neutral perceived involvement
5 = Slightly high perceived involvement
6 = High perceived involvement
7 = Very high perceived involvement

Developed by Author

Frequency Analysis

Table 9 presents a list of key words and phrases and the frequency of occurrences. The tally of words and phrases are noted in this table and some words bear mentioning here as possible significance. The researcher observed that during the interview process, the word "mentor/mentorship" was mentioned a total of three times from the United States CIOs but not once from the United Kingdom participants. The significance may be attributed to management styles of the CIOs.

Another interesting significance was found in the use of the phrase "security issues." This may account for the fact that the United States CIOs value the security of medical records, and sense pressure being received from the medical staff to make the electronic medical record available over the Internet. On the other hand, the United Kingdom IT directors valued the phrase security issues of less importance, possibly due to the fact that they put a higher value on the utilization of the Internet but not the release of electronic medical records through means of this channel.

The United States CIOs used the word "wireless" a total of four times but none by the United Kingdom hospitals group. This would suggest that emerging technology did not have an impact on the United Kingdom as much as the United States group due possibly to marketing strategy in the States.

Another interesting word uses quite frequently was "team." This word occurred seven times during the United Kingdom interviews but only twice during the United States interviews. This was surprising because of the books published in the United States regarding teams in the workplace.

Table 9

Frequency of Keywords Occurrence

Key Words/Phrases	United Kingdom	United States	Total
Mentor/Mentorship	0	3	3
Bedside Computing	1	3	4
Prototype	2	1	3
Security Issues	2	7	9
HIPAA	0	6	6
Internet	11	7	18
Intranet	3	0	3
Standard/Standardize	3	2	5
Web-enabled	2	1	3
Wireless	0	4	4
Knowledge-based	3	4	7
Critical Pathways	3	0	3
Team	7	2	9
Electronic Medical Record	7	4	11
Vendors	7	26	33
Network	4	4	8
Culture	0	6	6
Integration	1	5	6
Client	0	5	5

Developed by Author

This study shows that two of the health institutions were government based in the United Kingdom but even the private institutions were very much influenced by the NHS philosophy of treating patients. On the United States side, compliance with the Health Insurance Portability and Accountability Act (HIPAA) of 1996 has become the biggest concern for the healthcare industry. Shinkman (2000) states that the regulations mandate that hospitals, health plans and other providers reconfigure patient records into a uniform electronic format and guarantee their security. For this reason, the term HIPAA was used a total of six times in the United States group and none in the United Kingdom group. This suggests that the role of the CIO in the States will increasing lean toward satisfying strategic mandates in order to comply with Federal rules and regulations.

Most significant was the word "vendor" used a total of 26 times by the United States CIOs but only seven times by the United Kingdom group. This could account for the marketing thrust and competitive environment within the healthcare industry within the United States.

The use of the word "network" was evenly divided among the United States CIOs and the United Kingdom IT directors. This suggests that for the four IT directors interviewed in the United Kingdom, the use of emerging technology, at least in the networking arena, matched importance with the CIOs in the United States group. All participants interviewed in the United Kingdom were quite pleased to discuss their networking infrastructure comparing this to the days of mainframe technology.

Also of interest to the researcher was the word "culture." This word occurred six times by the United States group but none from the United Kingdom group. This would suggest that the United Kingdom IT directors might be less inclined to consider

workplace environment but rather concentrate on the "business at hand." Schermerhorn, Hunt and Osborn (1991) make note that the important parts of an organization's culture emerge from the collective experiences of its members. On this note, the cultures of organizations have attracted much writing and research which accounts for the use of the word in business conversation.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

The aim of this study was to provide descriptive information about the role and leadership of Chief Information Officers (CIOs) from healthcare institutions in the United Kingdom and the United States.

The complexity of the healthcare industry is a challenge within itself but this study attempted to examine the role of the IT officer by conducting on-site interviews. The study was designed around a structured infrastructure noting each participant's background and areas of responsibility; the challenges faced by the CIO; the role of the CIO; the changing role of IT in terms of today's technology; views on emerging technology; behavioral roles; clinical integration roles; perception on leadership roles; involvement between the CIO and CEO; roles in the external environment and clinical solutions involvement.

Summary

Overall, the IT directors from the United Kingdom's (UK) private hospitals were generally concerned with the economics of business. In many instances available finances drove their concerns and aspirations for emerging technology. The UK's private institution's IT directors maintained the same level of technological tenacity as their counterparts who are involved in the government regulated NHS side.

The study also attempted to observe some of the cultural differences between the United States and the United Kingdom's professional characteristics among its managerial staff. The research did detect a more strategic thinking attitude in the United

Kingdom than that observed in the United States. The literature also supported this observation.

Davies and Nutley (2000) published a journal that presented the idea of developing learning organizations within the NHS. The authors state that:

> The organizational culture within which individuals work shape their encounter with the learning process. More than this, there are serious questions about whether and how the organization can harness the learning achieved by its individual members. Thus, although continuing professional development has long been a part of the NHS, evidence from other sectors suggests that learning needs to take a more central role. Organizations that position learning as a core characteristic have been termed learning organizations, and this concept is an important one in the context of organizational development (p. 998).

The researcher for this study observed this attitude among the professionals in the United Kingdom during the interview process. The emphasis on the learning organization in the United States has not become as widespread as some management theorists would like. Senge (1990) states that what fundamentally will distinguish learning organizations from traditional authoritarian controlling organizations will be the mastery of certain basic disciplines and these disciplines of the learning organization are vital.

During the interview process, it was pointed out that the NHS encourages teaching strategies and information skills, which enhance the learning process. It was also noted that government policy would like to see the NHS undergo cultural transformation that would incorporate continuous learning. Davies and Nutley (2000) further point out that the national quality strategy for the NHS highlights lifelong learning as a way for improving health care in the United Kingdom.

Phillips (1995) describes a program in the United Kingdom, and under the auspices of the NHS, that is dedicated to the development of professionals in healthcare and a move towards a performance-management regime and assisted by training and organizational initiatives. This role of strategic thinking among the IT managers in the NHS was also apparent on the private side of healthcare.

The interviews in the United States revealed a slightly different approach towards the professional staff. The CIOs placed more emphasis on the successful delivery of services within the healthcare institution and less on the learning aspect of the job task. They were also much more aware of emerging technology and how the technology would integrate the clinical systems in order to improve patient care.

Findings

This study found that three of the four IT directors in the United Kingdom held at least a Bachelors degree but all four CIOs in the United States held Bachelors as well as Masters degrees

The participants interviewed presented a variety of challenges in this study. In the United Kingdom, one IT director found his greatest challenge was dealing with lower level managers who were obsessed with accountability issues because their responsibilities were funded by the taxpayer. Another was concerned with how to utilize current technical tools both in the business as well as the clinical environment.

One hospital in the United States expressed concern regarding HIPAA and the possible hold this may impose on the technical services as a result of extensive rules and

regulations. Another CIO expressed concern regarding his staff having to deal with the rapid changes in technology.

The role of IT directors in the United Kingdom, in general, revolves around delivering workable patient-based systems and concentrating on the business side of technology because of policy demands of the government.

In the United States, some CIOs stressed a heavy involvement in the business side in order to match the business needs of technology. Other CIOs felt that the role included CEO interactions as well as visionary thinking.

United Kingdom IT directors reported that their biggest changing role was seen in technical applications, and noted a diminishing role of the mainframe computer to distributed processing using client server technology.

The CIOs in the United States reported that the days of data processing years ago has now shifted to a more information oriented environment reporting to the CEO. It was also expressed that the biggest change seen was the integration of clinical information and the business needs.

In the United Kingdom, one IT director mentioned he was seeking ways to innovate especially in the areas of ergonomics. Another is seeking ways to encompass the use of voice and data convergence as well as mobile computing and the Internet.

Some CIOs in the United States would like to see more technology move in the direction of knowledge-based application. Others feel wireless communications will make serious in-roads into the healthcare industry.

In the area of behavioral roles, one IT director in the United Kingdom felt his management style was one of an advisory role. Another stated he must constantly be

aware of his involvement with senior personnel and their ability to adapt to new technology.

In the United States, one CIO felt his major role was to be a marketer by promoting the services of IT to the administrative and the clinical sectors of the hospital. Another stated that mentoring was an important behavior role. The need to demonstrate one-on-one leadership characteristics was further mentioned as a vital behavioral role.

Many of the IT directors in the United Kingdom emphasized the importance of integrating the knowledge of technology through the development of a clinical prototype.

Many CIOs in the United States reported working closely with clinical staffs to develop technical projects to accomplish their requests.

One IT director in the United Kingdom reported his leadership role as a thinker rather than a doer. Other director's leadership style invites comments and discussion on technological advancements that would enhance the clinical and business integration.

One CIO in the United States instills into his staff the importance of quality measures in building successful systems.

Regarding the CIO and CEO involvement, the IT directors in the United Kingdom stated that the government requirements for a successful program demands much interaction between either the director or one of his or her staff members who has acquired expertise in a given discipline.

The CIOs in the United States, in general, believe it is important to keep the CEO well informed of any and all technology that has healthcare advantages.

External vendors tend to be the main conduit through which emerging technology flows. Many IT directors in the United Kingdom as well as CIOs in the United States

utilize a good part of their time interacting with external vendors in order to maintain current knowledge of emerging technology. Further, IT directors as well as CIOs seek ways to influence the clinical side of healthcare by staying abreast of the technical needs.

Method

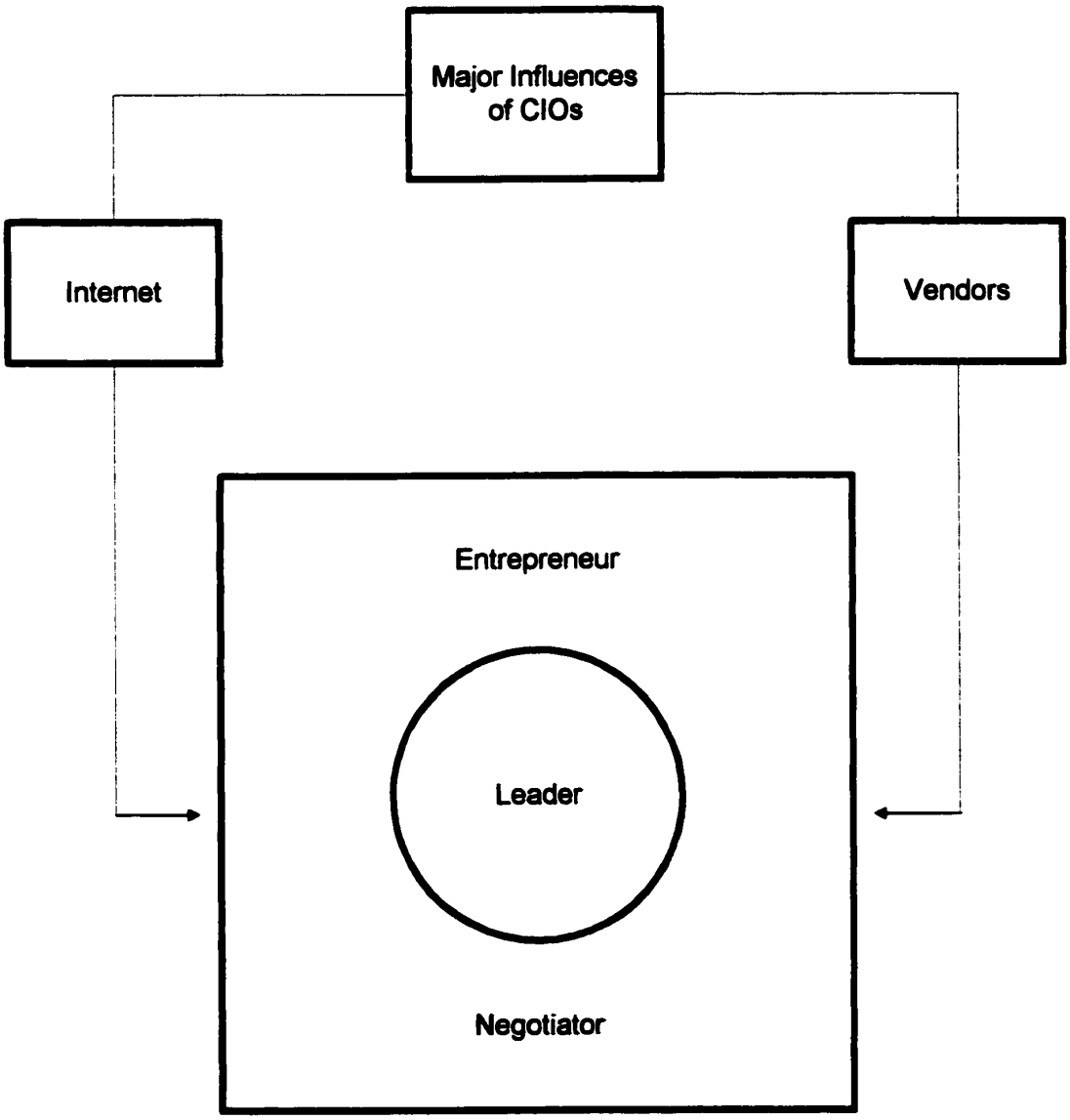
This study set out to accomplish two goals. First, appointments were made at eight hospital institutions in the United Kingdom and the United States for an in-depth interview lasting on average one and one-half hours. The United Kingdom was chosen primarily because of the lack of the language barrier. Second, the participants were given an instrument based on the ten managerial roles of Henry Mintzberg's classic book written in 1973. The objective was to see how the technical officers in the United Kingdom and the United States saw their managerial role applied in the technical environment of healthcare.

The responses from the seven-point Likert instrument were examined in order to get a sense of where the emphasis on the roles was placed. The last method to be utilized was a model showing the frequency of words or phrases and the corresponding number of times these words or phrases occurred in the interview. The words or phrases were recorded and later analyzed as to the number of occurrences within the interview process.

Finally, Figure 3 was developed by the author of this study as an outcome demonstrating what may become a working CIO model for future implementation. The model demonstrates the major influences that emanated from the research and which influenced two of the most often used words listed in Table 9. These were the use of the words Internet and Vendors. The remaining part of the model reveals the three top areas

Figure 3

CIO Model



Developed by the Author

listed in the Mintsberg role instrument. The results of the study revealed that CIOs scored the highest in leadership and equally among entrepreneur and negotiator.

Contribution to International Business Theory

The study contributes to international business research in several ways. It proves that managerial perceptions can be used for international business research. The study also shows that the managerial requirements and technical issues as they pertain to the healthcare industry indicate very little difference, although separated by a large body of water. It remains to be seen if these differences and similarities could render a different reading if the same research were to be conducted between the United States and say Asia, China or South America.

Limitations

This study only examined eight healthcare institutions between the United Kingdom and the United States. Future research might consider a much broader study to include a quantitative study reaching a few hundred healthcare organizations between the United Kingdom and the United States. The quantitative study could concentrate on questions dealing with issues of time and sequences.

Conclusions

There are a number of implications and applications from this study that may be useful not only to the current CIOs but also to CEOs preparing to hire a CIO. After reviewing the results found in this study, it can be concluded that the CIOs interviewed in

the United States study were advanced in certain areas that the United Kingdom participants were not and vice versa.

Furthermore, it can be noted that the most critical issues that require immediate attention on the part of the hiring CEO is that a greater amount of attention be given to the leadership, entrepreneurial and negotiating skills of the CIO. The literature reveals a startling fact that the average length of time on the job for a CIO is 18-22 months. This statistic should be at the forefront of every CEO when considering hiring a CIO for their organization.

This study looked at two cultures operating within the same industry for comparative advantages and ability to gain an even greater appreciation for the role of CIO.

Recommendations

It is possible that there are considerable differences across the healthcare industry in the areas of management styles and the application of technology. It is therefore recommended that the present study be replicated in other countries for contrasting and comparative research outcomes. Future studies of technological implementations should incorporate some of these multi-cultural variables.

It would also be interesting to use the research approach utilized in this study to identify the significant motivational similarities and differences that exist between multinational healthcare organizations in third world countries with the intent of introducing this study into economies of these countries through government involvement.

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APPENDIX A

Letter of Introduction

The University of Sarasota

5250 17th Street, Sarasota, Florida 34235, USA
Tel: 1(800) 331-5995 Fax: (941) 379-9464

May 2000

To whom it may concern

My name is Wallace Saunders. I am a doctoral candidate in International Business at the University of Sarasota in Sarasota, Florida. I am writing a dissertation on the study of the role of Chief Information Officers in healthcare and the determinants for successful managerial roles in the United States and the United Kingdom.

My dissertation committee and I would greatly appreciate it if you could assist us in our research by taking an hour or so to discuss how information technology executives envision their role in the healthcare environment. The plan is to interview technical officers or information directors from four hospitals in the United States and the United Kingdom. Your participation will provide invaluable information towards the knowledge base of technical officers in healthcare and better prepare others as they seek similar positions.

Upon the completion of the interview, the data will be compiled and analyzed in a manner in keeping with scholarship procedures.

If you would like to receive a copy of the research, please let me know at the time of our interview and I will be happy to make one available.

Thank you for your willingness to contribute to our research study.

Sincerely,

Wallace Saunders
Doctoral Candidate

Approved:

Gordana, Pesakovic, Ph.D.
Associate Professor of International Business
Dissertation Chairman

Prosper Bernard, Ph.D.
Assistant Professor of Management

Frank Tallman, Ed.D.
Associate Professor of Behavioral Sciences

APPENDIX B

Summary of Ten Roles Valuation Scale

The following is the scale for the 10-leadership roles questionnaire

1 = very low perceived involvement

2 = low perceived involvement

3 = slightly perceived involvement

4 = neutral perceived involvement

5 = slightly high perceived involvement

6 = high perceived involvement

7 = very high perceived involvement

Table 4

Summary of Ten Roles Valuation Scale

Role	Description	Valuation Scale
Interpersonal		
Figurehead	Symbolic head; obliged to perform a number of routine duties of a legal or social nature	1 2 3 4 5 6 7
Leader	Responsible for the motivation and activation of subordinates; responsible for staffing, training, and associated duties	1 2 3 4 5 6 7
Liaison	Maintains self-developed network of outside contacts and informers who provide favors and information	1 2 3 4 5 6 7
Informational		
Monitor	Seeks and receives wide variety of special information (much of it current) to develop thorough understanding of organization and environment; emerges as nerve center of internal and external information of the organization	1 2 3 4 5 6 7
Disseminator	Transmits information received from outsiders or from other subordinates to members of the organization; some information factual, some involving interpretation and integration of diverse value positions of organizational influences	1 2 3 4 5 6 7
Spokesman	Transmits information to outsiders on organization's plans, policies, actions, results, etc; serves as expert on organization's industry	1 2 3 4 5 6 7

Table 4 Continued

Decisional		
Entrepreneur	Searches organization and its environment for opportunities and initiates "improvement projects" to bring about change; supervises design of certain projects as well	1 2 3 4 5 6 7
Disturbance Handler	Responsible for corrective action when organization faces important, unexpected disturbances	1 2 3 4 5 6 7
Resource Allocator	Responsible for the allocation of organizational resources of all kinds – in effect the making or approval of all significant organizational decisions	1 2 3 4 5 6 7
Negotiator	Responsible for representing the organization at major negotiations	1 2 3 4 5 6 7

APPENDIX C

Interview Questions

1. What are the demographic characteristics of technical managers in the select hospitals in the United States and the United Kingdom? Specifically, their ages, position in the organization, educational background, title, job description and area of responsibility.
2. What challenges do these IT managers face in their industry?
3. What are the experiences of Information Officers in the healthcare setting? Specifically,
    a. What is the role of the CIO in healthcare?
    b. How has the role evolved over time, especially from the days of data processing?
    c. What alternate directions, if any, are anticipated by the CIO regarding emerging technologies?
    d. What behavioral roles does the CIO see as instrumental to the healthcare field?
    e. How does the CIO, with emerging technology, plan to interface with Chief Medical Officers on the clinical side of healthcare?
    f. How do CIOs perceive themselves in a leadership capacity?
    g. What new role attributes do the CIOs see evolving with respect to CEO integration?
    h. What role does the CIO perceive in the external environment?
    i. What are the CIO perceptions on how IT can provide continued solutions to the business side as well as the clinical side of healthcare?
    j. How does the CIO line up their role attributes with Mintzberg's classic work?