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Healthcare Information Technology Issues: Hospital CEO and CIO Perspectives

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ABSTRACT

Healthcare Information Technology (IT) is widely regarded as a tool for improving the quality and perhaps reducing the cost of healthcare in the United States. Yet, its implementation is a continuous challenge for the healthcare industry. In this paper, we report the results of a survey distributed to CEOs and CIOs at 1400 U.S. hospitals regarding their perceptions of the key information technology (IT) issues for healthcare. Among the top ten issues, the implementation of electronic medical records is ranked the highest. Included in the top ten are issues related to: improving healthcare quality by the use of information technology; change management, privacy, security, and accuracy of electronic records; and decision support applications. We found remarkable similarity between the views of the CEOs and the CIOs, but they were also conservative and risk-averse in their entrepreneurial orientation. These results have wide implications for many stakeholders in the healthcare domain.

KEYWORDS

Healthcare IT, Key Issues, hospitals, CEOs, CIOs

INTRODUCTION

Healthcare Information Technology (IT) is widely regarded as the means for improving the quality and even reducing the cost of healthcare in the United States (Chaudhry et al. 2006; Dey, Hariharan & Ho, 2007; Koshy, 2005). The past and current US administrations have emphasized the utilization of computers and information technology in streamlining healthcare and reducing its staggering costs in the United States. For example, President Barack Obama has proposed a massive effort to modernize healthcare by making all health records standardized and electronic. The American Recovery and Reinvestment Act (Stimulus Bill), signed by President Obama on February 17, 2009, includes billions of dollars for health information technology (HIT). Yet, the implementation of IT in healthcare has been a continuous challenge in the United States. As Hersh (2004) points out:

Although the case for adoption of improved health care informatics appears quite compelling, significant barriers to its use remain These include cost, technical issues, system interoperability, concerns about privacy and confidentiality, and lack of a well-trained clinician informatics workforce to lead the process.

In this paper, we report the results of a survey distributed to CEOs and CIOs at 1400 U.S. hospitals regarding their perceptions of the key information technology (IT) issues for healthcare. Our results include how organizational culture (White, Varadarajan & Dacin, 2003) and entrepreneurial orientation (Green, Covin and Slevin, 2008) impact identification of healthcare IT issues. Implications for the transfer of healthcare technologies within and across firm types as well as with respect to systemic implementation are discussed.

LITERATURE AND BACKGROUND

To our knowledge, ours is the first systematic study of the key IT issues in the healthcare setting. On the other hand, the mainstream Information Systems (IS) literature has a long history of “key IS issues” studies dating back to the early 1980’s (Dickson, et al. 1984). This tradition has carried forward on a periodic basis and the key issues are reported every three or four years. The latest key IS critical issues were reported for 2008 (Luftman et al. 2009). Researchers have also identified critical issues within specific areas of IS, e.g., knowledge management (Alavi & Leidner 2009) and ERP implementation (Kumar, et al. 2003). Especially, in a new and emerging discipline such as healthcare IT, a good understanding of the critical issues is useful in directing scarce resources in meaningful ways.

In this study, we are seeking to understand the importance of healthcare IT issues from the perspectives of hospital CEOs and CIOs (figure 1). The hospital context is relevant and important as hospital administrators tend to deal with the entire gamut of healthcare IT issues. We also believe that the views of the CEOs (which may be broader and strategic) and the CIOs (which may be technological and tactical) will provide us with an enhanced understanding of the challenges ahead. In addition, we seek to identify differences based on organizational characteristics, such as leadership style, organizational culture, hospital size, and type of facility.

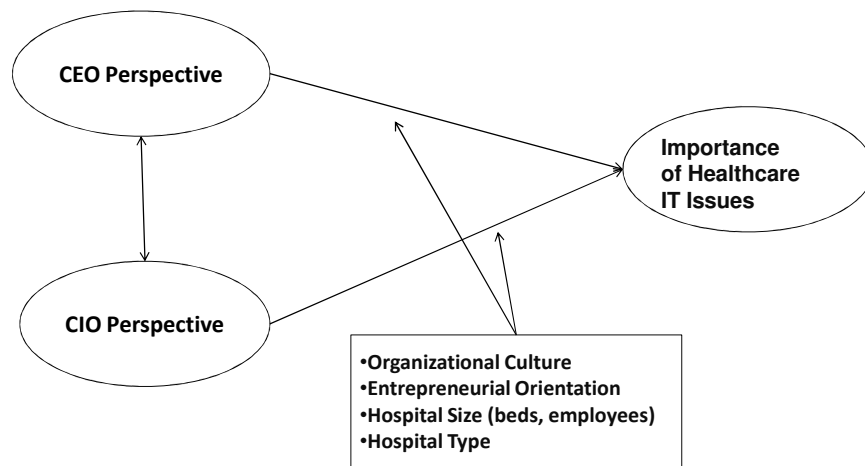


Figure 1. Study Overview

METHODOLOGY

Since we did not find documented compilations of key issues in healthcare IT, we needed to develop our own preliminary list. Three of the authors reviewed the limited literature on IT issues in healthcare. Much of the information was derived from the popular press and web sites; very little was found in academic writings. Once a preliminary list was compiled, it was shared with one hospital CEO, one hospital CIO, and the director of an IT healthcare consortium for their comments. Based on consultation with them, the list was modified. The list of these issues was incorporated in a survey questionnaire. After pilot testing the questionnaire with five hospital IT management executives and researchers, minor changes were made. In spite of the testing, we offer a caveat that this list be considered preliminary given the nascent nature of the topical domain. The list of issues is displayed in Table 1.

This list was part of a larger questionnaire that was targeted to chief executive officers (CEOs) and chief information officers (CIOs) of hospitals in the entire United States. The respondents were asked to rate each issue for its

importance on a 7 point Likert scale, where 1 represents highest importance, 7 represents lowest importance, and 4 represents moderate importance. Given the cognitive load of this exercise and for the purpose of triangulation, they were also asked to rank the top ten issues from 1 to 10.

Table 1. Issues in Healthcare Information Technology

Implementation of electronic medical records
Change management from paper to electronic medical records
Quality assurance of electronic records
System wide approach to patient identity management
Information technology infrastructure issues
Measuring the effectiveness of IT in healthcare
Technology support for home healthcare
Managing the cost of information technology
IT human resources development
Scanning IT trends and timely implementation of selected technologies
IT support for healthcare supply chain (e.g., pharmaceuticals, pharmacies)
IT support for insurance companies
Managing the release-of-information process.
Compliance with regulations (e.g., HIPAA)
Using IT to enable consumer empowerment in healthcare
Controlling healthcare costs with information systems
IT's role in healthcare outsourcing (within the country)
IT's role in healthcare offshoring (outside the country)
Building of regional and national health databases/network
Implementation of personal health record (PHR)
Business model change to embrace IT in healthcare
Decision support systems for physicians and clinics
Decision support systems for hospital units
Decision support systems for consumers
Decision support systems for pharmacies
IT support for telemedicine (i.e., remote care and procedures)
Group collaboration systems in healthcare
Improving quality of care with information technology
Reducing healthcare errors with information technology
Utilizing IT to provide a safe work environment
Health information systems interoperability
Disaster preparedness and recovery
Security of electronic records
Privacy of electronic records

An extensive database of hospital CIOs and CEOs was compiled from various sources. Questionnaires were mailed to CIOs and CEOs in 1400 hospitals in the entire United States. Reminders were sent. In order to increase response rate, those who did not respond were also contacted by email and complete the survey online on a web site.

RESULTS AND DISCUSSION

Sample Description

In all, a total of 177 responses were received. While the response rate is low, the results are credible as we received a good representation from different types of hospitals, e.g., hospitals of different sizes as well as both urban and rural hospitals. The sample characteristics are shown in Table 2. Note that of the total responses, 69 are from CEOs, 100 from CIOs, and 8 people did not indicate their position in the organization.

Table 2. Sample Characteristics

	Total sample size, N = 177	
Respondent Type	CEO	CIO
Sample Size	69	100
Years in healthcare Management, average	29.2	19.2
Years in current position, average	10.5	7.9
Community, government, university, for-profit	46,17,1,1	94,2,2,2
Rural/Urban	47/21	44/54
Number of employees, average	1832	3470
Number of beds	217	759

THE TOP TEN ISSUES

The top ten issues as rated by the CEOs and CIOs are shown in Table 3. The average ratings are also shown. Note that a lower average represents a higher ranking.

Table 3. The Top Ten Healthcare IT Issues

Rank	Issue	Average Rating
1	Implementation of electronic medical records	1.52
2	Reducing healthcare errors with information technology	1.57
3	Change management from paper to electronic medical records	1.69
4	Privacy of electronic records	1.79
5	Improving quality of care with information technology	1.83
6	Quality assurance of electronic records	1.87
7	Security of electronic records	1.90
8	Health information systems interoperability	2.02
9	Decision support systems for hospital units	2.07
10	Decision support systems for physicians and clinics	2.10

Some interesting observations can be made from this list. The implementation of electronic medical records tops the list. Electronic Medical/Health Record (EMR/EHR) systems are central to any computerized health information system. Without an EHR and the databases it facilitates, other modern systems and technologies such as decision support systems and analysis tools cannot be effectively utilized in clinical decision-making and workflow re-design. While the adopting an EHR system is becoming a high priority for many medical practices, they are still slow in fully implementing these systems (Menachemi, Ford, Beitsch, & Brooks, 2007). As an example, while 56% of acute care units (Ford, et al. 2008) are in the process of changing from paper records to electronic records, only 5% of small ambulatory care offices are in the process of conversion. This is in spite of the fact that there are near-term rewards for adopting and penalties for not adopting these systems in the long-term. There are many potential benefits of EHR such as improved administrative efficiencies, cost savings, and enhanced quality of care. Yet there are major complex, user-based, intra-organizational inter-organizational challenges in adopting these systems. The implementation of an EHR application is widely viewed as difficult and expensive, and fraught with risks. Experts

advise careful planning, equipment selection and staff training, and warn that even then you may lose productivity for a time (VersaForm 2008).

The second and fifth issue relates to the use of improving healthcare quality by the use of information technology. Chaudhry et al. (2006) have demonstrated the efficacy of health information technologies in improving quality and efficiency. At the same time, they state that whether and how other institutions can achieve similar benefits, and at what costs, are unclear. Thus achieving quality through the effective use of information technology is a clear challenge and is not automatic. The third important issue is change management. Lorenzi and Riley (2003) point out that many healthcare IS implementations are less than completely successful. Technical shortcomings are only part of the reason; the more important issue is change management. Change management is the process of assisting individuals and organizations in passing from an old way of doing things to a new way of doing things (Lorenzi and Riley 2003). Resistance to change is a common phenomenon and as per the classical Lewin-Schien theory (Lewin 1947) requires attention to three stages of change: unfreezing, the change itself, and refreezing.

Issues ranked fourth, sixth, and seventh refers to the privacy, accuracy, and security of electronic medical records. While accuracy and security are technological issues and have challenges of their own, privacy poses its own sets of tradeoffs. With electronic patient databases, while there are benefits in terms of immediate access to records, quality of care and reduced costs, and thus benefits to society, the traditional rights to personal privacy may be compromised (Gostin1997). While Health Insurance Portability and Accountability Act (HIPAA) Privacy laws have been enacted, the management of privacy issues is still a big issue. Ranked eighth is health information systems interoperability. This is a huge challenge. Most healthcare data, whether on paper or electronic, are trapped in "silos" (Hersh 2004). A patient's personal physician may have all of his records, perhaps even in electronic form. But when the patient requires care elsewhere, there is virtually no access to these records. The problem gets progressively worse when the patient moves out of his city, county, state, and country. Ranked number nine and ten are decision support systems built on electronic data which can be utilized by hospitals, clinics, and caregivers to improve the quality of care. While some products have begun to appear in the market, we are still at the beginning and much work remains to be done.

CEO AND CIO PERSPECTIVES

It is instructive to examine the importance of healthcare IT issues separately from the perspectives of CEOs and CIOs. Table 4 shows the top five and bottom five issues for CEOs, and Table 5 does the same for the CIOs.

Table 4. IT in Healthcare Issues for CEOs

Top Five Issues	Rank	Bottom Five Issues	Rank
Reducing healthcare errors with information technology (1.59)	1	IT's role in healthcare offshoring (outside the country) (5.51)	34
Implementation of electronic medical records (1.70)	2	IT's role in healthcare outsourcing (within the country) (4.43)	33
Improving quality of care with information (1.90)	3	Technology support for home healthcare (4.03)	32
Change management from paper to electronic medical records (1.91)	4	IT support for insurance companies (3.71)	31
Privacy of electronic records (2.00)	5	Scanning IT trends and timely implementation of selected technologies (3.54)	30

Table 5. IT in Healthcare Issues for CIOs

Top Five Issues	Rank	Bottom Five Issues	Rank
Implementation of electronic medical records (1.36)	1	IT's role in healthcare offshoring (outside the country) (5.58)	34
Reducing healthcare errors with information technology (1.51)	2	IT's role in healthcare outsourcing (within the country) (4.75)	33
Change management from paper to electronic medical records (1.52)	3	IT support for insurance companies (4.34)	32
Privacy of electronic records (1.56)	4	Technology support for home healthcare (4.10)	31
Security of electronic records (1.66)	5	Group collaboration systems (3.48)	30

The CEO views and CIO views are largely consistent. They match on four of the five top issues and four out of the five bottom issues. This is an important finding as there seems to be a relatively good alignment between business and IT priorities in the healthcare industry. Business and IT alignment has been a perennial concern in the general IS literature and was ranked the number one issue by IT executives across all industries (Luftman et al.). In fact, Luftman and Kempaiah (2007) have examined the capabilities and components of business-IT alignment and the relationship of alignment with organizational performance. Minor differences can be observed between the views of the CEOs and CIOs, which are not surprising and are consistent with their roles in the organization. The CEOs are more focused on the quality of care, while CIOs worry about technological issues, such as the security of the electronic records. The bottom five issues also tell us something revealing. Overall, overall information technology outsourcing, especially offshoring, is huge in practically all business and industry. For example, according to the Global Insight report, IS offshoring from the US is expected to double to \$250 billion by the year 2015. However, it is still at a nascent stage in healthcare and has not demanding much attention from the CIOs or the CEOs at this time. Other areas which are not on their radar screen are IT for home health and IT support for insurance companies.

ENTREPRENEURIAL ORIENTATION AND CULTURE

The above results can be interpreted in light of the current orientation of healthcare facilities and their executive management. As was pointed out earlier, the US has been slow in adopting information technology in healthcare and healthcare is the last industry to embrace information technology. How fast and how successful this transition will be and what measures can be taken to ensure success depends on the underlying culture of the participants in this process. Using valid measurement instruments, the entrepreneurial orientation of the hospital executives as well as the culture of their institutions were captured. Figure 2 shows their entrepreneurial orientation.

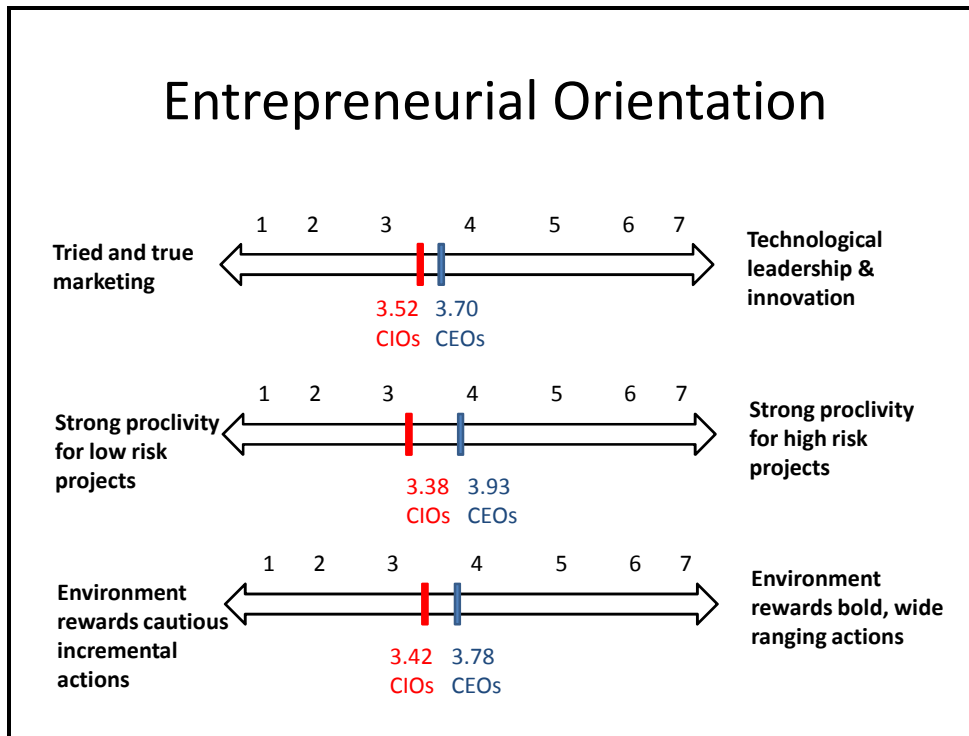


Figure 2. Entrepreneurial Orientation of CEOs and CIOs

Two observations can be made. First, the senior management tends to be conservative and risk averse. These executives are willing to try only tried and low risk projects, and not willing to embark on ambitious and risky projects. Second, while both groups are conservative, the CEOs are slightly more willing to take any risks.

Figure 3 shows the cultural profile of the hospitals that were studied based on the perceptions of the CEOs and the CIOs. To the extent, these results are representative of the entire country, it appears that a majority of healthcare providers function on the basis of personalized family-oriented service to their consumers. One a fourth of them appear to be dynamic and entrepreneurial.

	CEOs	CIOs
Personal – Extended Family	48%	39.9%
Dynamic & Entrepreneurial	24.8%	24.5%
Formalized & Structured	14.2%	20.5%
Production Oriented	13%	15.1%

Figure 3. Hospital Culture.

FUTURE ANALYSIS

This report provides summary findings and key tabulations. The authors are in the process of developing a contingency analysis of the key issue rankings. We expect salient differences in the rankings along several dimensions; for example urban and rural hospitals; government, university and for-profit hospitals; hospital size; and entrepreneurial orientation of the senior management. This finer breakdown will help fine tune the results as well as their application to appropriate healthcare segments.

CONCLUSIONS

This research is most likely the first attempt to capture information technology issues in the healthcare industry. Thirty four issues were compiled based on the literature and consultations with key individuals. After preparing a questionnaire and pilot testing, it was distributed to CEOs and CIOs at 1400 U.S. hospitals regarding their perceptions of these issues. Based on 179 responses from CEOs and CIOs, these issues were ranked. Among the top ten issues, the implementation of electronic medical records is ranked the highest. Included in the top ten are issues related to: improving healthcare quality by the use of information technology; change management, privacy, security, and accuracy of electronic records; and decision support applications. We found remarkable similarity between the views of the CEOs and the CIOs, but they were also conservative and risk-averse in their entrepreneurial orientation.

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