Chapter 20
The Impact of Information Technology Across Small, Medium, and Large Hospitals

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ABSTRACT
Hospitals invest in Information Technology to lower costs and to improve quality of care. However, it is unclear whether these expectations for Information Technology are being met. This study explores Information Technology (IT) in a hospital environment and investigates its relationship to mortality, patient safety, and financial performance across small, medium, and large hospitals. Breaking down IT into functional, technical, and integration components permits the assessment of different types of technologies’ impact on financial and operational outcomes. Findings indicate that both IT sophistication (access to IT applications) and IT sophistication’s relationship to hospital performance varies significantly between small, medium, and large hospitals. In addition, empirical investigation of quality, safety, and financial performance outcomes demonstrates that the observed impact of IT is contingent upon the category of IT employed.

INTRODUCTION
By several measures, healthcare and healthcare information technology spending continues to rise at the fastest rate in our history. In 2005, total national health expenditures rose by 6.9 percent -- two times the rate of inflation. Total spending was $2 trillion in 2005, or $6,700 per person (Catlin, Cowan, & Heffler, 2006). Total health care spending represented 16 percent of the gross domestic product (GDP), and U.S. health care spending is expected to increase at similar
levels for the next decade reaching $4 trillion in 2015, or 20 percent of GDP (Borger et al., 2006).

Concurrently, the expenditure on Information Technology in healthcare continues to grow. According to new research by Datamonitor, Healthcare providers will spend as much as $39.5 billion on information technology by 2008 (Datamonitor, 2006; Monegain, 2006). Fueled by the desire to reduce medical errors and improve clinical work processes, the Health Information Technology (HIT) industry is flourishing. The HIT market growth is led by picture archiving computer systems (PACS) and computerized physician order entry (CPOE) buying and followed by the purchase of other clinical information systems such as computerized patient record, pharmacy, surgery, emergency department, radiology, and document management systems, to name a few (Dorenfest, 2004a). With such rapid growth in HIT and the vast and diverse array of alternative technologies, there has become a pressing need to better understand what role these advancements play within the operational aspects of our healthcare system and how to most effectively utilize these resources.

In addition, healthcare organizations are encountering more competitive environments and their success may hinge on the information technology they adopt. While the importance of IT in healthcare has often been emphasized, there has been very little theory-based, empirical research that examines healthcare information technology (HIT) and its effects. Previous studies have tended to take a management perspective and concentrate mainly on the adoption, implementation, and acceptance of technologies. In fact, the most common examples of empirical analysis have been case studies that examine the costs and benefits of specific IT applications (i.e. telemedicine, computer physician order entry, electronic health records, etc.). While these investigations provide a much needed evaluation and contribute to the growing body of HIT literature, this type of research lacks perspective on how the actual HIT systems tie together and how they perform in a healthcare environment. Further, it has been noted that there are several factors influencing the decision of whether a hospital adopts an IT system, such as; hospital size, teaching status, ownership, and location (Amarasingham et al., 2008; Cutler, Feldman, & Horwitz, 2005; Fonkyh & Taylor, 2005; McCullough, 2007; Wang, Wan, Burke, Bazzoli, & Lin, 2005). Of these factors, hospital size has been a controversial topic. Some authors have found large hospitals to have more clinical IT systems than smaller hospitals (Fonkyh & Taylor, 2005). While others did not find any (consistent) influence of hospital size on the prevalence of clinical IT systems (Jha et al., 2009; McCullough, 2007). However, it is recognized that hospitals that differ in size are also likely to differ with respect to location, kind of patient admitted, services provided and other characteristics (Boyes & Melvin, 2008). Additionally, research shows that larger shares of all hospitalizations occur in large hospitals. For example, in 2005, 23 percent of hospital admissions occurred in hospitals with 500 or more beds, compared to 4 percent in hospitals with fewer than 50 beds (AHA, 2007). These statistics reinforce that hospitals of varying size do not experience the same work flow. Therefore, analysis of performance should not occur collectively (as the majority of current literature reports), but rather hospitals should be grouped by patient density and performance investigated separately by size.

Therefore, we proposed that by looking at HIT and its infrastructure across different hospital environments we could ascertain their impacts on operational performance. Further, we contend that this insight provides guidance to practitioners regarding the types of information technology applications that will best benefit them based on their hospital characteristics.