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# Accessing the Impact of IT Budgets on Hospital Performance : A Panel Data Analysis



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## Abstract

• With the enormous budgets and investments in Information Technology (IT), the question of payoffs from IT has become increasingly important. In this study, we investigate the impact of IT budgets on hospital performance. We consider both financial outcomes such as profits and non-financial outcomes such as healthcare quality and patient satisfaction. We use longitudinal data that include the IT budgets and hospital performance measures collected from over 400 hospitals and conduct a panel data analysis. We expect our data analysis to provide evidence for a significant positive relationship between IT budgets and hospital performance measures.

## Background

- Hospitals should continually try to control costs while improving operational performance, healthcare quality, and patient outcomes. A notable budget item for all hospitals is spending on Information Technology investment.
- HIT spending is inclining upward and retains over 6% of total operating budgets for some hospitals (Data360.org, 2015).
- Reasons behind the higher IT spending in the healthcare industry are various including a lower overall IT adoption rate in the early decade as well as impacts of federal policy decisions and advancements in buyer/payer-driven marketplace.
- Economic and Clinical Health Act (HITECH) approved incentive payments through Medicare and Medicaid to hospitals when they implement the EHR to improve quality, performance and safety while maintaining privacy and security.
- In 2004, President Bush established the National Coordinator (ONC) for Health Information Technology which is tasked with the development and implementation of a strategic plan to guide the nationwide implementation of health information technology. In 2009, the US government has allocated approximately \$19 billion a year in funding for programs to help healthcare providers implement electronic health records (EHR).
- The purpose of this study is to examine the impact of IT budgets on hospital performance. While earlier research primarily focused on the impact of HIT applications on hospital costs and outcomes linked to healthcare quality, we analyse the impact of IT budget on both financial outcomes such as profits and non-financial outcomes such as healthcare quality.

## Results and Discussion

- First, we regress the IT budget on two quality measures including mortality and patient satisfaction. Our preliminary results show that IT budget has significant impact on mortality, and we observe that budget are not significantly related with patient satisfaction.
- Our preliminary results show that EMR applications and HR systems are significantly associated with mortality. HIT systems do not have significant impact on patient satisfaction.
- We will test the impact of budgets on hospital profits in the next stage of the study.

## Conclusion

- In this study, we measure the impact of IT budgets on hospital performance. We extended earlier work on performance benefits of HIT systems by focusing on both financial outcomes as profits and non-financial outcomes such as quality. Our research is one of the first studies to examine the impact of IT budgets on hospital quality outcomes and profits of hospitals. Our preliminary results show that IT budgets are of vital importance for hospital quality.

## Literature

- Hospitals started investing in Health Information Technology (HIT) during the 1960's, and first HIT applications used in hospitals was to support billing and financial services. Later, the adoption of HIT grew to the clinical side of hospitals such as pharmacy, laboratory and radiology (Collen,1995). These systems were predominant by the early 2000's (McCullough, 2008).
- The development of Electronic medical record (EMR) systems has dramatically expanded the automation of clinical services. A recent government survey of more than 2,600 doctors in the US on the use of the Electronic health record (EHR) indicates that 82% of the doctors felt the use of the EHR improved quality of clinical decisions, 86% stated that it helps to reduce medical errors, and 85% stated that it helps to improve the quality of the care (Lohr et al.,2008).
- Many studies on the impact of EMR on quality show that there is minimal effect of the EMR on the quality of care (McCullough et al., 2010; Agha, 2011; McCullough et al., 2011; Tucker and Miller, 2011).
- In another study, Chaudhry et al.(2006) believe that the positive effect of the HIT on quality is mainly because of the use of the EMR, computerized provider order entry, and reduction in medical errors. Botta-Genoulaz Millet(2006) found that the use of computer-based decision support systems such as financial systems has shown to provide improvements in many organisational tasks. Brenda et al.(2014) found that Human resource systems are associated with greater client satisfaction and financial outcomes of hospitals.
- Devraj and Kohli (2003), Jenkinson C et al. (2002), Ahmed et al. (2011), Mohan et al. (2011) and Amarasingham et al.(2009) demonstrate that there is a positive association between the HIT and hospital quality. Bardhan et al. (2012) founds positive the impact of clinical applications and EMR applications on hospital quality.
- We extend earlier work on the performance benefits of the HIT by focusing on both financial outcomes such as profits and non-financial outcomes such as healthcare quality and patient satisfaction.

## Methodology

- Figure 1 describes our approach. We collected U.S hospital data of multiple years (2013-2015) from multiple sources including HIMSS, CMS, U.S Department of HHS Hospital Compare Program, and Data.gov and aggregated them to a panel using common identifier (i.e., Medicare number). We used R panel data models to test our hypotheses.

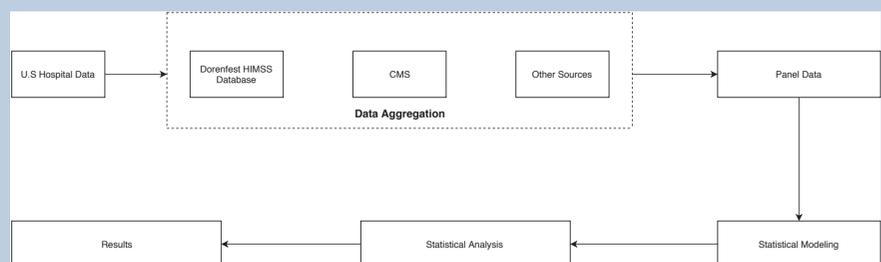


Figure 1: Research Approach

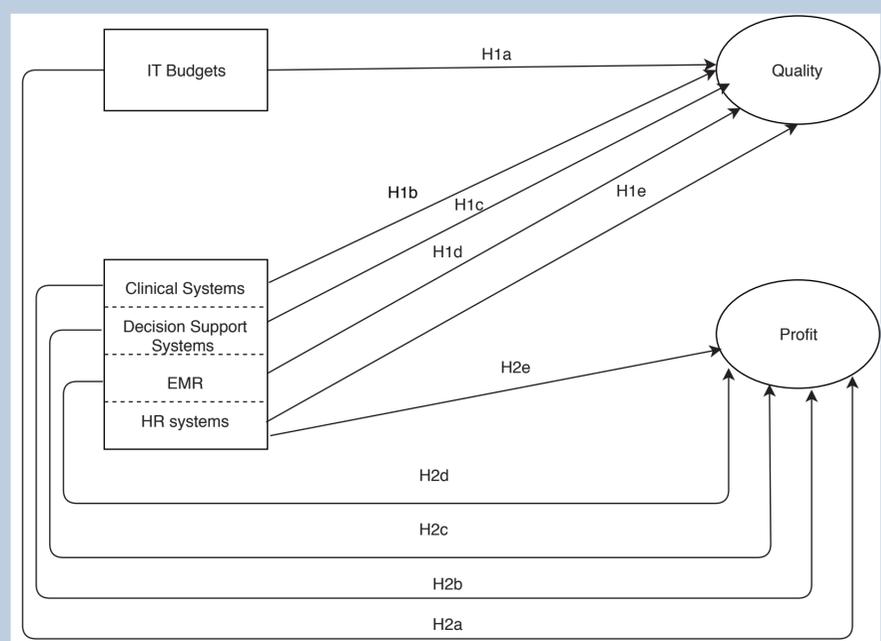


Figure 2: Research Model

Figure 2 describes our research model. We have two hypotheses to test. Hypotheses 1 states that IT budget has significant impact on hospital quality and profit. Hypotheses 2 states HIT systems has significant impact on hospital quality and profit.

- We used mortality and patient satisfaction as quality measures to test our hypotheses. We have classified HIT systems into four types, clinical applications, decision support systems, EMR systems and human resource systems.