

CAN WEBSITE INVESTMENT IMPROVE HOSPITAL PRODUCTIVITY? AN EMPIRICAL STUDY

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ABSTRACT

Due to dramatic change in operational environment and a great need of productivity improvement, hospitals in Taiwan increase heavy investment on information technology (IT). A well-known representative of IT investment for hospitals is the Website. However, the value of Website investment is still not understood. Although plenty of prior studies exist to discuss the relationship between IT investment and firms' performance, there lacks evidence of a payoff from massive IT investments. This phenomenon is also named "IT productivity paradox". Hence, an empirical study to justify the value of Website investment for hospitals is required. This study empirically examines the relationship between Website investment and hospital productivity. A multiple research strategy was employed. The results indicate that: (1) cost of Website maintenance significantly affects the person-time of emergency and outpatient service in 2001-2003, while time of Website implementation only significantly affect the person-time of emergency and outpatient service in 2003; (2) time of Website implementation significantly affects the person-time of hospitalization in 2003. In general, the effect of Website investment on the person-time of emergency and outpatient service is superior to on the person-time of hospitalization. Finally, academic and managerial implications are also provided.

INTRODUCTION

Recently, most studies focus on IT affecting the hospital, the content of hospital Website, and the Website development. However, little effort dedicates to study the relationship between hospital Website and hospital productivity. This study focuses on the influence of hospital productivity after the investment in the hospital Website. Our research questions are following: (1) IT investment must not impact organizational performance immediately. We should consider time lag effect of the IT investment. Our research explores that how the investments in Website on different time affect hospital productivity. (2) IT investment extensively involves in the organization, and the cost is usually huge, if the amount of IT investment in hospital Website can impact on hospital productivity. (3) Each hospital involves differently with new technology, if the adoption time of hospital Website can affect later organizational performance.

This study empirically examines the relationship between Website investment and hospital productivity. Those hospitals on the list from 2001 to 2003 announced by the Department of Health, Taiwan, were selected. A multiple research strategy was employed. This comprised two major approaches: (1) a questionnaire survey of the Webmasters of the hospital Websites, collected by a questionnaire survey to all of 96 hospital Webmasters; (2) annual health statistics for all the hospitals from 2001 to 2003, gathered by the Statistics Division of the Department of Health, Taiwan.

INFLUENCE OF B2C E-COMMERCE ON HOSPITAL PRODUCTIVITY

Information technology can help hospitals to reduce capital cost, simplify artificial operations, and improve hospital productivity (Ko and Osei-Bryson, 2004; More and McGrath, 2002; Lin et al., 2002). Menon et al. (2000) examined the productivity of information technology in hospitals and found that the hospitals investments, including IT Capital and IT Labor, correlate positively with hospital productivity. Consequently, information technology exerts a clear influence on hospital productivity. Narver and Slater (1990) indicated that marketing oriented organizations track customer actions and make appropriate responses. In this manner, organizations can enhance customer satisfaction and organization performance. Raju et al. (1995) also indicated that marketing oriented hospitals must gather useful information effectively, improve customer satisfaction, and respond to customer and competitor requirements. Hospital performance is positively related with a marketing orientation.

RESEARCH DESIGN

Research model

The study used a multiple research strategy. This comprised two major approaches: (1) a questionnaire survey of the webmasters of the hospital Website for IT investment; (2) a secondary data analysis of the effects of the hospital productivity from 2001 to 2003 provided by DOH, Taiwan. Input variables of hospital Website used in the current study include: (1) time of Website implementation; (2) cost of Website maintenance; (3) cost for Website building. Inputs of control variables include: (1) number of sickbeds; (2) number of physicians; (3) number of pharmacists and assistant pharmacies; (4) number of pharmacists and assistant pharmacies; (5) number of administrative personnel. Meanwhile, outputs include: (1) person-time of emergency and outpatient service; and (2) person-time of hospitalization. Hospital operation could be the series of input, process and output. On the other hand, it is the result which is hospital resources transformed into output (Flood, 1994). Hospital activities are the process transforming input into output. However, they are so complex that it is difficult to analyze them.

Measuring the research variables

Chang et al. (1993) pointed out that as measuring hospital services volumes the most output variables are person-time of emergency treatment and outpatient, and person-time of hospitalization. However, they both are influenced by some factors, so we should give consideration to hospital inputs while analyzing hospital productivity. Devaraj & Kohli (2000) collected eight American hospitals three-year data. They used time series regression analysis to analyze the impact of IT adoption and Business Process Reengineering (BPR) on performance. Because performance will appear through time lags, we use time series regression analysis to examine the previous inputs. Equations are estimated to examine the relationship between IT investment and performance while at the same time controlling for various extraneous factors through the use of control variables. In our study, we adopt the translog function which is a generalization of the Cobb-Douglas functional form, relaxing the constraints of the substitution assumptions and allows no restriction on returns to scale (Evans et al., 2000). We take the natural logarithm simultaneously to run the regression analysis.

RESULTS AND DISCUSSION

All regression models are highly explanatory. The most significant variables for the person-time of emergency treatment and outpatient are cost of Website maintenance and pharmacist and assistant pharmacy. For the person-time of hospitalization, the most significant variable is nurse. Another, sickbed and administrative personnel in some years are significantly related to hospital productivity. Comparing with the person-time of emergency treatment and outpatient and the Person-time of hospitalization, hospitals can better improve the person-time of emergency treatment and outpatient from investment in Website. Obviously, time lag effects exist. Some inputs would impact hospital productivity of later years. Taken investment in multi-years into consideration, we can find that some variables are different from ones without multi-years. For the person-time of emergency treatment and outpatient, cost of maintenance is more important for hospital Website than building. Although higher level hospitals invest more cost in building Website, cost for building Website is not significantly related to hospital productivity, including the person-time of emergency treatment and outpatient or the Person-time of hospitalization.

(Due to the page limitation, a complete reference list and the full paper are on request to the authors)