



Behavioral changes following the collaborative development of an accounting information system

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A B S T R A C T

This research examines physician response to implementation of an activity-based costing (ABC) system developed and designed with physician input. We analyze changes in resource utilization for treatment of cataract patients and find changes in practice patterns, where physicians redeployed resources toward more severely ill patients and decreased average length of stay. We also find preliminary evidence of improvement in financial performance. We contribute to research investigating the influence of user participation on accounting system success, ABC system success, and hospital accounting information systems.

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Introduction

This paper examines an aspect of activity-based costing (ABC) information systems that has been overlooked in prior accounting research literature: whether non-accountant participation in the development of the information system influences the participants' resource allocation decisions after system implementation. This participatory aspect of system development is crucial in professional settings because accounting information tends to be ignored by decision-makers as they allocate resources (i.e., Bergman, 1994).

Our study is a joint test of the effects of user participation in designing an ABC accounting information system and the consequent behavioral changes by the participants. We provide insights into the dynamics and success of system implementation. Our study provides a particularly useful setting in which to examine the impact of participation on system success because participation is a key element of ABC system design (i.e., Hunton & Gibson, 1999; Ives & Olson, 1984; Shields, 1995). Prior research

suggests that systems are more likely to be accepted and considered successful if users are involved during system development; however, evidence of this is inconclusive (i.e., Lynch & Gregor, 2004).

The professionals we study are physicians from the ophthalmology department of a hospital who perform cataract surgery on both inpatients and outpatients. We investigate implementation of an accounting information system that developed standard costs by incorporating the physicians' knowledge about their activities and use of resources. We test whether implementation of this new accounting information system led to cost containment behavior by examining resource utilization changes.

The new system was the result of a collaborative effort between physicians and hospital accountants at a large government-owned hospital in Taiwan. Development of the standard cost system was a two-stage process. First, physicians were asked to use an activity-based costing approach to develop cost information. They then used this information to analyze current clinical pathways (standard treatment protocols) and to develop new, more cost-effective pathways, with corresponding standard costs for the department. Physician involvement in the process appears to have affected their behavior. They ignored information

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from the previous standard cost system, but appeared to use information from the new system to reduce resource usage and overall patient costs.¹ After the new system was in place, there is also evidence that physicians changed their behavior and decision-making as they redeployed resources and focused on sicker patients.

Our results have implications for healthcare and other professional organizations where professionals make decisions about resource use, and thereby, the financial performance of the organization. Typically, professionals are not involved in accounting information system development. Our results suggest that including professionals in system development may lead to changes in behavior and improve their resource allocation decisions.

We contribute to several streams of accounting research literature. Prior research on the benefits of user participation gauges system performance by measuring self-reported user satisfaction scores (i.e., Foster & Swenson, 1997; Shields, 1995; Swenson, 1995). We provide empirical results indicating that involvement in system design leads to actual changes in resource deployment and improved financial performance. This study is also one of the first to identify non-accountant participation as a crucial factor in the success of ABC information systems.

The remainder of the paper is organized as follows. Section 2 sets our study within a theoretical context and develops our hypotheses. Section 3 presents a description of the study setting and describes our data collection and research methodology. Section 4 describes results of our empirical tests and Section 5 concludes the paper.

Background and hypothesis development

Literature review

We draw from two streams of research: the influence of participation in accounting information system development and factors that influence the success of activity-based costing systems. When new accounting information systems are introduced, there are three stages: design, implementation, and use. Prior accounting research has typically only explored one of these stages at a time. For example, Datar and Gupta (1994) analyze the effects of design choices on measurement error and find that increasing the specificity of allocation bases and the number of cost pools can lead to increased measurement error. Several studies (e.g., Foster & Swenson, 1997; Hunton & Gibson, 1999; Shields, 1995) focus on factors that affect implementation of such systems. Shields (1995) finds that several factors are important in explaining the perceived success of activity-based costing implementations, such as top management support and linkage to performance evaluation and compensation. Relevant to our study is Shields' finding that perception of system ownership by non-accountants is highly correlated with the perceived success and financial benefits of these systems. In a field study of a state agency, Hunton and Gibson (1999) analyze

whether individual or group participation in developing a new accounting information system provides more benefit (lower error rates). They find that when group discussion was included as part of the accounting system design and development, behavioral gains following system implementation persisted for 12 months.

In another related study, Bhimani (2003) investigates the interaction of organizational culture and system development and the effect of personal culture on the perceived success of the system. He finds that organizational culture has a large impact on system design. In addition, system users whose personal culture is more closely related to the organizational culture rate the system implementation as being more successful.

Other research examines the usefulness and financial impact of new accounting systems. For example, Ittner, Larcker, and Larcker (2002) find evidence of improvement in cycle time and first-pass quality for some firms using ABC, leading to reductions in manufacturing costs. However, they find no improvement in return on assets, on average, from these benefits. Their evidence suggests that plant characteristics affect the impact of ABC systems on profitability. Gordon and Silvester (1999) fail to find positive stock market returns associated with ABC adoption, while Kennedy and Affleck-Graves (2001) find that ABC firms have higher market returns relative to non-ABC firms. We extended this literature by examining the effect of user participation during the design stage on subsequent system success by examining changes in resource utilization. The research summarized above is primarily from a US context, we thus provide additional institutional background and discuss the progression of health care costs in the US and Taiwan in the next section.

Institutional background

The cost of health care has been rising worldwide. In an attempt to reduce costs, insurers (both public and private) have moved away from cost-based reimbursement so that hospitals and physicians become more sensitive to cost. In 1983, the US Government, through its Medicare program (which provides care for the elderly), became one of the first government insurers to change reimbursement systems away from a retrospective cost-based payment to a prospective flat-fee per diagnosis to emphasize cost-containment. Similar diagnosis-based payment systems have since been implemented in other countries worldwide, including Australia, Germany, The Netherlands and Taiwan.

When reimbursement is linked to costs, physician and hospital incentives are aligned, because both physicians and hospital managers are focused on the quality of physician treatment decisions rather than cost. However, after the change in payment method, hospitals sustain losses when physicians order treatment resources in excess of the flat fee. In the US, following the change in reimbursement methods, hospitals explored several methods to motivate physicians to contain costs. Accountants began to provide cost information for physicians, but were concerned about whether such information would affect practice patterns. Eldenburg (1994) found that when a subset

¹ Our discussions with the physicians indicated that prior to the ABC system, they did not think that the costs were meaningful.

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