



Assessing the interaction effect of cost control systems and information technology integration on manufacturing plant financial performance



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The interface between management control and information technology is an under-developed research area with a knowledge gap concerning its implications for financial performance. This study contributes to bridging this gap by investigating the interaction effect of cost control systems and information technology integration on manufacturing plant financial performance. We surveyed a sample of 518 managers of U.S. manufacturing plants, approximately evenly distributed between those using activity-based costing and volume-based costing. Using hierarchical regression analyses, results indicate that while information technology integration and cost control systems do not provide significant independent effects on plant financial performance, they do interact to positively impact manufacturing plant financial performance. Thus, our findings suggest that manufacturing plants will reap the greatest financial performance benefits from investments in activity-based cost control systems when combined with information technology integration.

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1. Introduction

Successful IT integration can deliver IT resources in support of the new roles and functions of workers as a result of redesigned and tightened business processes (Rockart, Ear, & Ross, 1996). From a broad social and organizational point of view, a company with a high level of IT integration across different channels of operation may be able to transmit, combine, and process external data from customers and suppliers/vendors. It may also be effortless in such a company to share data among various internal systems (e.g., forecasting, production, shipment, and accounting) and to retrieve information from various databases for decision support (e.g., cost information, reporting tools). Further, external and internal systems can automatically reflect order changes in downstream processes or systems (e.g., inventory and manufacturing systems) (Barua, Konana, Whinston, & Yin, 2004; Sikora & Shaw, 1998) and help monitor order status at various stages in the process of a manufacturing plant (e.g., manufacturing, shipment).

The research on the organizational financial performance impact of information technology (IT) has been referred to as IT business value research (Kohli & Grover, 2008; Melville, Kraemer, & Gurbaxani, 2004; Mukhopadhyay, Kekre, & Kalathur, 1995). Prior studies in this area suggest that organizations should realize greater financial performance benefits when such resources are increasingly integrated (Simoens & Scott, 2005; Weiner, Savitz, Bernard, & Pucci, 2004). However, the IT literature reveals mixed empirical results with respect to organizational financial performance achieved from IT integration (Bharadwaj, 2000; Chapman & Kihn, 2009; Hunton, Lippincott, & Reck, 2003; Poston & Grabski, 2001). For example,

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Bharadwaj (2000) compared the financial performance of firms that had been recognized by *InformationWeek* magazine as IT leaders in their industry to the financial performance of a control group not having such recognition. She found that firms with high IT capabilities (firms in the study sample) outperformed firms from the control group. Hayes, Hunton, and Reck (2001) found that capital markets place value on enterprise resource planning (ERP) implementations, but Poston and Grabski (2001) found that ERP implementations have no effect on firm financial performance. Following these results, the research questions turn from whether investments in IT have a positive impact on financial performance to a question of when and why there is a financial performance effect (Dehning & Richardson, 2002).

A parallel development in the literature has been to increasingly attend to contemporary management accounting developments, including “new” management accounting information such as activity-based costing (ABC) (e.g., Abdel-Maksoud, Dugdale, & Luther, 2005; Banker, Bardhan, & Chen, 2008). Accounting systems require formalized categories for collecting and reporting information, and create a common language with which members of the organization can communicate (Wouters & Verdaasdonk, 2002). This facilitates the coordination between different functions that need to provide input to the decision-making processes (Galbraith, 1973).

Despite many assertions of financial benefits resulting from ABC systems, the empirical results have been mixed (Bromwich & Bhimani, 1989; Gordon & Silvester, 1999; Innes & Mitchell, 1995; Ittner, Lanen, & Larcker, 2002; Rafiq & Garg, 2002). For example, while empirical findings by Rafiq and Garg (2002) suggest that there is a strong relationship between ABC implementation and profitability, many other studies find no relationship between ABC and profitability (Bromwich & Bhimani, 1989; Gordon & Silvester, 1999; Innes & Mitchell 1995; Ittner et al., 2002; Maiga & Jacobs, 2008). Additionally, several reservations have been expressed regarding the efficacy of ABC (Innes, Mitchell, & Sinclair, 2000; Malmi, 1997; Morrow & Connolly, 1994).

There has been conjecture regarding why the effect of IT integration or cost control systems, such as ABC, has not been consistently shown to have a positive impact on organizational financial performance. Indeed, some studies claim that financial performance-enhancing programs have been implemented in ways that lack balance with competing priorities, thus resulting in a reduction of, or no increase in, financial performance (Shields, 1995). For example, Milgrom (1992) suggests that the value that a resource can bring to an organization might remain limited unless other complementary factors are adopted and implemented as well. This is in line with Milgrom and Roberts' (1995) framework which suggests that factors in a system of mutually enhancing elements will operate in such a way that doing more of any of these factors increases the attractiveness of doing more of the other factors in the system. These arguments suggest that successful outcomes of management accounting systems may be contingent upon the implementation of new manufacturing techniques.

While the literature does recognize the importance of contingency variables, there is little cross-fertilization between the stream of literature which highlights contemporary developments in cost control systems and the literature on organization-level IT integration (Drake & Haka, 2008). Although the intense development of information technology over recent years opens new venues for modeling and integrating organizational activities (Berry, Coad, Harris, Otley, & Stringer, 2009), and despite suggestions of potentially important synergies between IT and accounting, their complementarity effects on manufacturing plant financial performance have not been empirically assessed. As such, the interface of management control and information technology is still an under-developed area both empirically and theoretically (Granlund & Mouritsen, 2003). This gap in accounting literature constitutes the motivation for this paper. Therefore, the first contribution of this study is to attempt to develop a workable framework that integrates existing theory and research in management accounting and information technology. The second contribution is to develop a theory-driven hypothesis and to attempt to bridge this gap between management accounting and IT by evaluating the possible interaction effect of cost control systems and IT integration on manufacturing plant financial performance. In so doing, we are responsive to Topkis (1995) who suggests that investments in information and production technologies cannot stimulate productivity and growth without a number of complementarity developments. To our knowledge no operationalizations of this complementarity have been presented so far, making this study interesting for continued research in this area. Based on these contributions, this study provides knowledge that adds to the research which seeks to integrate the information technology and management accounting literatures.

Using hierarchical regression analyses, our results indicate that while information technology integration and cost control systems do not provide significant independent effects on plant financial performance, they do interact to positively impact manufacturing plant financial performance. This finding implies that maximizing the performance benefits of cost control systems and information technology integration require attending to the integration between them, rather than treating the levels of cost control systems and information technology integration as independent decisions. The study thereby subscribes to, and provides statistically significant evidence in support of, the conclusion of Dechow, Richardson, and Sloan (2005: 691) who suggest that “...control cannot be studied apart from technology”.

This paper is organized as follows. In the next section, the theoretical background and hypothesis development are presented. These topics are followed by the discussion of the research methods. Subsequent sections address the results, conclusions, and limitations of the study.

2. Theoretical background and hypothesis development

2.1. Cost control systems

ABC measures the cost and performance of activities, resources, and cost objects (Player & Cobble 1999: 247), and evaluates whether those activities add value, thus providing a means of understanding how to most effectively reduce costs. ABC

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