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The role of manufacturing practices in mediating the impact of activity-based costing on plant performance

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Abstract

We study the impact of activity-based costing (ABC) on adoption of world-class manufacturing (WCM) practices and plant performance. In contrast to earlier research that estimates the direct impact of ABC on plant performance, we develop an alternative research model to study the role of world-class manufacturing practices as a mediator of the impact of ABC. Analysis of data from a large cross-sectional sample of US manufacturing plants indicates that ABC has no significant direct impact on plant performance, as measured by improvements in unit manufacturing costs, cycle time, and product quality. We find, however, that WCM practices completely mediate the positive impact of ABC on plant performance, and thus advanced manufacturing capabilities represent a critical missing link in understanding the overall impact of ABC. Our results provide a different conceptual lens to evaluate the relationship between ABC adoption and plant performance, and suggest that ABC adoption by itself does not improve plant performance.
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Introduction

Activity-based costing (ABC) was designed with the objective of providing managers with accurate activity-based cost information by using cost drivers to assign activity costs to products and services. Proponents of ABC argue that it provides accurate cost data needed to make appropriate strategic decisions in terms of product mix, sourcing, pricing, process improvement, and evaluation of business process performance (Cooper & Kaplan, 1992; Swenson, 1995). These claims may have led many firms to adopt ABC systems. A survey of the 1000 largest firms in the United Kingdom showed that 19.5% of these companies have adopted ABC (Innes & Mitchell, 1995). Another survey released by the Cost Management

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Group (1998) of the Institute of Management Accountants indicated that 39% of organizations have approved ABC adoption.[1]

Assessing the impact of ABC on manufacturing plant performance is recognized as an important research question. Prior research has typically focused on the direct impact of ABC while ignoring its indirect impact in supporting other organizational capabilities. While past studies have reported moderate levels of benefits from ABC adoption (Foster & Swenson, 1997; Ittner & Larcker, 2001), few have extended this work to evaluate the linkages between "beliefs" that represent successful outcomes and the operational measures of plant performance. Furthermore, the definition of ABC success has often been vaguely defined in terms of subjective beliefs regarding "financial benefit", "satisfaction with ABC", or "use of ABC system for decision making". In light of these methodological deficiencies, we argue that a more rigorous approach is needed to measure the impact of ABC. It is also important to focus on process-level performance measures, instead of firm-level financial metrics, since the potential impact of ABC implementation may be appropriated before they are reflected in a firm's aggregate performance. Evidence of past ABC implementation failures have led researchers to suggest that ABC success depends on other contextual and process factors, such as organizational structure, task characteristics, management support, information technology, and the external environment (Anderson, Hesford, & Young, 2002).

In this study, we focus on the mechanism through which ABC impacts plant performance, in terms of its role as an enabler of organizational capabilities rather than its direct impact. Specifically, we study the association between implementation of ABC and world-class manufacturing (WCM) capabilities, and their impact on plant-level operational performance. Using a large cross-sectional sample of US manufacturing plants, we find that ABC has a positive association with the development of process-centric capabilities required to successfully implement WCM. We also find that ABC does *not* have a significant direct impact on plant performance measures. Instead, its impact on plant performance is *mediated* through the development of WCM capabilities, which allow plants to leverage the process capabilities offered by ABC into significant improvements in plant performance.

Our study makes contributions in several areas. Our fundamental contribution involves the development of an empirically validated framework which indicates that the impact of ABC on plant performance is *completely mediated* through its enablement of WCM capabilities. Second, since ABC is implemented and used at the business process level, we focus our attention on operational process performance measures by treating the manufacturing plant as a unit of analysis. This allows us to avoid the drawbacks associated with prior studies which have mostly focused on aggregated, firm-level financial measures. Third, our results suggest that the conceptual lens through which prior research has traditionally studied the impact of ABC needs to be revisited and validated using different types of modeling and measurement approaches. Contrary to the findings of Ittner, Lanen, and Larcker (2002) we find that, although the direct impact of ABC is not significant, ABC has a statistically significant *indirect* effect on plant performance that is mediated through its support for advanced manufacturing capabilities.

The rest of our paper is organized as follows. In the next section, we review the related literature on ABC, advanced manufacturing practices, and plant performance. We then present our conceptual research framework and research hypotheses, followed by a description of our research data and design. Next, we describe our statistical estimation results, followed by a discussion of our results, contributions, and limitations. We summarize our findings and the implications of our study in the last section.

Background

The ABC literature defines an activity as a discrete task that a firm undertakes to make or deliver

[1] Implementation of ABC has been observed not only in manufacturing firms but also in service sector firms (Cooper & Kaplan, 1992).

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