



The relationship between cost system complexity, purposes of use, and cost system effectiveness

Martijn Schoute*

Faculty of Economics and Business Administration, Department of Accounting, De Boelelaan 1105, room 2E-43, VU University Amsterdam, 1081 HV Amsterdam, The Netherlands

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ABSTRACT

This paper uses survey data from 133 Dutch, medium-sized manufacturing firms to examine the associations between cost system complexity (in terms of the applied overhead absorption procedures), purposes of use, and cost system effectiveness. First, factor analysis identifies two underlying dimensions of cost system purposes of use, which refers to the range (scope) of purposes for which the cost system is used, among nine widely used purposes: cost system usage for product planning and cost management purposes. Next, the joint effect of cost system complexity and usage for product planning and cost management purposes on cost system effectiveness, as proxied by the intensity of use of and level of satisfaction with the cost system, is examined. The results robustly indicate that at higher (lower) levels of usage for product planning purposes, cost system complexity negatively (positively) affects cost system intensity of use, while at higher (lower) levels of usage for cost management purposes, cost system complexity positively (negatively) affects cost system intensity of use and satisfaction. This implies that when cost system design (i.e., its level of complexity) and its purposes of use are better aligned, the cost system is more effective.

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1. Introduction

About two decades ago the introduction of activity-based costing (ABC) renewed interest from both academics and practitioners in the design of cost systems. A series of subsequent studies has empirically examined the determinants of cost system design, in particular those influencing the adoption and use of ABC (e.g., Bjørnenak, 1997; Gosselin, 1997). The results of this research have generally been inconclusive and so Abernethy, Lillis, Brownell, and Carter (2001) and Drury and Tayles (2005) have recently started to broaden the scope of cost system design studies. Instead of focusing on the adoption (or use) versus non-adoption (or non-use) of ABC, these studies focus on the determinants of the level of complexity of cost systems. Another series of studies has empirically examined the effectiveness of cost system design, in particular the effects of using ABC on firms' financial performance (e.g., Cagwin & Bouwman, 2002; Ittner, Lanen, & Larcker, 2002). Using a broader conceptualization of cost system design, Pizzini (2006) examined the effects of cost system design on the relevance and usefulness of cost data and on the financial performance of hospitals. As it is very difficult to isolate and show the financial performance effects of using different cost systems, Al-Omiri and Drury (2007) recently suggested that a more productive approach may be to use outcome measures relating to, for example, the level of satisfaction with the cost system as proxies for its effectiveness. Furthermore, they indicated that cost system complexity and contextual factors may have a joint (or

* Tel.: +31 20 598 6068; fax +31 20 598 9870.

E-mail address: m.schoute@feweb.vu.nl

interactive) effect on the effectiveness of cost systems, and suggested that future research should be conducted to examine these interaction effects.

A contextual factor that has not yet been examined is the purposes for which the cost system is used.¹ This is surprising considering the fact that the normative literature strongly argues that the optimal design (i.e., the level of complexity) of cost systems should differ, depending on their intended purposes (e.g., Cokins, 2001; Kaplan & Cooper, 1998). Empirically, this leads to various interesting questions, such as: For which purposes do firms mainly use their cost system?; Are cost systems that are used for a broader range of different purposes, more (or less) effective?; and Do cost system complexity and cost system usage for different purposes have a joint effect on cost system effectiveness? This study aims to provide more insight into these, and related, issues.

The primary objective of this paper is to examine the associations between cost system complexity (in terms of the applied overhead absorption procedures), purposes of use, and cost system effectiveness. Concentrating on firms using absorption costing, two measures are used to operationalize cost system complexity, which reflect the number and nature of cost pools and cost allocation bases used in the cost system. Further, cost system effectiveness is proxied by both the intensity of use of and level of satisfaction with the system. For the empirical analyses survey data from 133 Dutch, medium-sized manufacturing firms are used.

This study contributes in several ways to the contingency-based literature on the design of cost systems. First, this is one of the first empirical studies in which the range (scope) of purposes for which the cost system is used is examined. Factor analysis identifies two dimensions among nine widely used purposes: cost system usage for product planning and cost management purposes.² Second, building on these two dimensions, this study extends the literature on the alignment between the complexity of cost systems and their purposes of use. Specifically, the joint effect of cost system complexity and usage for product planning and cost management purposes on cost system effectiveness is examined, controlling for the influence of environmental, organizational and technological factors. The results of the analyses *robustly* indicate that at higher (lower) levels of usage for product planning purposes, cost system complexity negatively (positively) affects cost system intensity of use, while at higher (lower) levels of usage for cost management purposes, cost system complexity positively (negatively) affects cost system intensity of use and satisfaction. This implies that when cost system design (i.e., its level of complexity) and its purposes of use are better aligned, the cost system is more effective.

The remainder of this paper is structured as follows. Section 2 reviews the literature and develops the hypotheses. Section 3 describes the research methods used. Section 4 presents and discusses the results. Section 5 concludes and discusses limitations.

2. Literature review

The main focus of this study is on the alignment between the complexity of cost systems and their purposes of use, and their joint (or interactive) effect on cost system effectiveness. This section reviews the literature on these issues, and develops the hypotheses.

2.1. Cost system complexity

A major issue in the design of cost systems is whether the system only assigns direct costs or whether it also assigns indirect costs to the cost objects (e.g., products, services and processes) of an organization and, if so, how. Variable cost systems only assign direct costs, whereas absorption cost systems also assign indirect costs. In order to assign indirect costs, various cost allocation methods have been developed, of which activity-based costing (ABC) is the most recent (at least of the methods that are used in practice). In general, these methods consist of two stages. In the first stage the homogeneous costs of resources are gathered in cost pools. Dependent on the type of allocation method, these cost pools are functionally (e.g., based on departments) or process (e.g., based on activities) oriented. In the second stage the costs from the cost pools are assigned to the cost objects using cost allocation bases. Dependent on the type of allocation method, volume-based or hierarchical (e.g., batch-level, product-sustaining and facility-related) cost allocation bases are used.

Abernethy et al. (2001) view cost system design choices as varying along three dimensions: number of cost pools (single versus multiple cost pools), nature of cost pools (responsibility-based versus activity-based cost pools) and nature of cost allocation bases (volume-based versus hierarchical cost allocation bases). Together these dimensions form a continuum of what they refer to as 'cost system sophistication', with one end of the continuum representing a simple traditional cost system (with a single responsibility-based cost pool and a volume-based cost allocation base) and the other end representing a sophisticated cost system (with multiple activity-based cost pools and hierarchical cost allocation bases). Similarly, Drury and Tayles (2005) view cost system design choices as varying along a continuum of 'cost system complexity'. They suggest

¹ Some studies did measure cost system purposes of use, but used them to operationalize variables different from this study, such as 'number of primary applications' (Foster & Swenson, 1997) or (as part of) 'ABC use' (Cagwin & Bouwman, 2002).

² In an earlier study, Chenhall (2004) has identified two dimensions of usefulness of ABCM, which in terms of clustering of the items are almost identical to the two dimensions of cost system purposes of use identified in this study. Chenhall (2004) will therefore be followed in labeling the two dimensions as 'cost system usage for product planning purposes' and 'cost system usage for cost management purposes', respectively.

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