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Time-driven activity-based costing in an outpatient clinic environment: Development, relevance and managerial impact

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ABSTRACT

Healthcare managers are continuously urged to provide better patient services at a lower cost. To cope with these cost pressures, healthcare management needs to improve its understanding of the relevant cost drivers. Through a case study, we show how to perform a time-driven activity-based costing of five outpatient clinic's departments and provide evidence of the benefits of such an analysis.

1. Introduction

One of the key challenges to the continued viability of healthcare organizations is the development of relevant and accurate cost information on which to base strategic, pricing and management decisions [1–5]. Recently, healthcare organizations have started to invest in more sophisticated cost-accounting systems, such as activity-based costing (ABC) [see, for example, 6–10]. ABC is an advanced cost calculation technique that allocates resource cost to products based on resource consumption. Researchers have claimed that, since ABC may provide greater visibility into organizational processes and their cost drivers, it may allow managers to eliminate costs related to non-value added activities and improve the efficiencies of existing processes [7,8,11,12]. This process is also referred to as activity-based management.

While several articles have advocated the use of ABC by service organizations in general and healthcare organizations in particular [6,8–10], there is, nevertheless, need for some degree of caution. Lievens et al. [7] and King et al. [13], for example, argue that a potential drawback of ABC systems lies in the time and resource consumption associated with the development and management of these systems. Kaplan and Anderson [14] note that the high time and cost to estimate an ABC model and to maintain it – through re-interviews and re-surveys – has been a major barrier to widespread ABC adoption. In a similar vein, Everaert et al. [15] claim that many managers who have tried to implement ABC in their organizations, including healthcare managers, have abandoned the attempt in the face of rising costs and employee irritation.

In order to overcome the difficulties of ABC, Kaplan and Anderson [14,16], developed a new approach to ABC, called time-driven ABC (TDABC). A TDABC model can be estimated and installed quickly as estimates of only two parameters are required: (1) the unit cost of supplying capacity and (2) the time required to perform a transaction or an activity. The breakthrough of TDABC lies in the usage of time equations to estimate the time spent on each activity [17]. Through the inclusion of multiple time drivers, the time-driven approach to ABC can capture the complexities of organizations far more simply than the traditional ABC system could, which might well have had to account for varying transaction times by treating each variant of the process as a distinct activity [14]. Hence, TDABC seemingly provides many opportunities to design cost models in environments with complex activities, as in healthcare organizations, and service organizations, in general.

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This paper describes the development and application of a TDABC system for an *outpatient clinic* in Belgium. The outpatient clinic is a consultation department where physicians with different specializations have their office hours and where patients, after having an appointment, receive medical advice. Depending on this advice further medical treatment or hospitalisation takes place. By definition, all outpatient facilities are alike in having no overnight patients.

While previous accounting studies have explored the development and the role of cost-accounting studies in more traditional hospital contexts [2], there has been relatively little analysis of the development and managerial impact of cost systems in an outpatient clinic. This lack of attention might be partly due to the absence of a legal framework to report and register all costs in an outpatient clinic environment [4]. Outpatient clinic services, however, are an important part of the healthcare services sector [18]. An increasing number of community-level outpatient clinics are satellites of larger medical centres or systems, and are thus part of a complex that can emphasize continuity of care. This trend toward increased outpatient health care corresponds with a growing workload at many outpatient clinics [18]. From an empirical standpoint, the outpatient clinic therefore offers an attractive context for this study.

The remainder of this paper is organized as follows. In Section 2, we briefly address the technique of TDABC. In Section 3, we present the TDABC outpatient clinic case. In Section 4, we describe how the TDABC information induced improved decision making in this case. We end with concluding remarks.

2. Theoretical background

2.1. From ABC to TDABC

Lately, hospital studies are applying more and more the basic principles of ABC to healthcare organizations. Proponents of ABC argue that it helps healthcare organizations more accurately understand their costs and helps avoid suboptimal and often disastrous decisions about prices, product mix and planning and control [4,6–10]. The core idea behind ABC is that the production of a cost object (e.g. products, customers) generates activities which consume resources (e.g. wages, equipment). More specifically, the assignment of overhead costs through ABC occurs in two stages. First, the ABC model relies on *resource cost drivers* [7] to assign costs to different activity cost pools (e.g., medical wage costs are allocated to different activities such as supervision or delivering nurse care). Second, the further allocation of costs is performed in a second stage using *activity cost drivers*, which measure the demands a cost object places on an activity [7]. Designing an ABC model typically involves the steps shown in Panel A of Table 1.

While under traditional cost-accounting systems, overhead costs are treated as a homogeneous lump sum and are typically divided by a volume-related base (e.g., the total number of patient days), the ABC model achieves improved accuracy in the estimation of costs by using multiple cost drivers [19]. Additionally, the produced ABC information makes it more likely that healthcare managers will achieve greater understanding of processes and be more willing to pursue changes that increase the value and effectiveness of their organization [6–12].

Table 1
Activity-based costing versus time-driven activity-based costing.

Panel A: ABC	
Step 1	Identify the different overhead activities
Step 2	Assign the overhead costs to the different activities using a resource driver
Step 3	Identify the activity driver for ach activity
Step 4	Determine the activity driver rate by dividing the total activity costs by the practical volume of the activity driver
Step 5	Multiply the activity driver rate by the activity driver consumption to trace costs to orders, products or customers
Panel B: TDABC	
Step 1	Identify the various resource groups (departments)
Step 2	Estimate the total cost of each resource group
Step 3	Estimate the practical capacity of each resource group (e.g. available working hours, excluding vacation, meeting and training hours)
Step 4	Calculate the unit cost of each resource group by dividing the total cost of the resource group by the practical capacity
Step 5	Determine the time estimation for each event, based upon the time equation for the activity and the characteristics of the event
Step 6	Multiply the unit cost of each resource group by the time estimate for the event

Source: Everaert et al. [17].

Although the studies above found ABC providing healthcare management with a more detailed cost analysis and important cost- and value-enhancement opportunities, in practice ABC models are not easy to implement. For example, to build a traditional ABC model, you would survey employees to estimate the percentage of time they spend (or expect to spend) on the different activities and then assign the department's resource expenses according to the average percentage you get from your survey [16]. While this approach works well in a limited setting, difficulties arise when you try to roll this approach out on a large scale for use on an ongoing basis. The time and cost demands of creating and maintaining an ABC model on this large scale might then become a major barrier to widespread adaptation at most organizations [14,16]. And, because of the high cost of continually updating the ABC model, many ABC systems will be updated only infrequently, leading to out-of-date activity cost driver rates, and inaccurate estimates of process, product, and customer costs [20].

The accuracy of the cost driver rates when they are derived from individuals' subjective estimates of their past or future behavior has also been called into question [16,17]. Apart from the measurement error introduced by employees' best attempts to recall their time allocations, the people supplying the data – anticipating how it might be used – might bias or distort their responses. As a result, healthcare managers might argue about the accuracy of the model's estimated costs and profitability rather than address how to improve the inefficient processes, unprofitable products, and considerable excess capacity that the model has revealed [14,16].