

The True Cost-to-Serve in Nursing Homes: A Methodological Issue in Applying Activity-Based Costing

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The healthcare sector is marked by intense competition, escalating costs, service personalization, quality standards, financial constraints, and increased demand. Healthcare organizations must implement efficient cost management systems to navigate this intricate environment. The debate persists in the literature regarding the optimal cost accounting system for healthcare: traditional cost-center-based or activity-based costing (ABC). This article delves into the factors influencing the selection of a suitable cost accounting system, examining the implementation of ABC in an Italian nursing home. A methodological challenge emerged during the ABC implementation, relevant to all healthcare facilities serving diverse elderly populations. The article explores this issue, evaluates potential solutions and their impacts, and determines the approach enabling managers to accurately assess service costs and uphold service quality.

Keywords: activity-based costing, cost-to-serve, cost accounting system, cost centers, healthcare, nursing home

INTRODUCTION

The health emergency that has hit the world in the last years has brought back into the spotlight the awareness of how healthcare is fundamental to the welfare of people worldwide, especially in the future.

According to the estimates of “World Population Prospects 2019”, the global population is getting older and in need of health care: the over 65s will represent about one in six people by 2050, so many people in the world will benefit from social and welfare care (United Nations - Department of Economic and Social Affairs, 2019).

The increase in life expectancy translates into the need to guarantee health care to more people, for longer. This implies greater investments in scientific research and health technology and, above all, in providing services with high-quality standards to elderly people and patients (Ranabhat & Jakovljevic, 2023).

Nursing homes host people with very different physical and mental situations, so they must provide services that satisfy several and different needs. Their guests, therefore, do not consume the same services provided with the same intensity and frequency. Consequently, the cost incurred by the firms to serve them could be quite different.

Despite the increasing number of services consumed by guests, the different intensity and frequency of their use — due to the normal aging process of the population — and the different needs of the people hosted, the (private) prices charged by the firms and the (public) tariffs imposed and defined by public authorities are often characterized (in Italy for example, and in many other European countries) by substantial uniformity. It means pricing has no reference or connection with the cost-to-serve the guests.

In other words, nursing homes provide delicate, complex, and numerous services to guests who do not consume the same services with the same intensity and frequency, and they have to meet a general growing demand for healthcare. Consequently, these firms and, in general, all health organizations need to know the cost sustained to serve each guest (or each guest segment), to understand whether the price systems or the tariffs are profitable (Barber, Lorenzoni, & Ong, 2020).

Given the critical importance of precise pricing, contingent upon the efficient allocation of economic resources and the correlation between actual resource consumption in patient service provision (costs) and resultant health outcomes (Flessa & Dung, 2004), healthcare firms are compelled to invest significant time and effort in establishing a robust cost accounting system. Such a system should accurately calculate the ‘true’ cost of services provided to maximize the efficiency of service provision processes and assist firms in achieving their social objectives through satisfactory and valuable performance.

This article addresses this topic by analyzing the implementation of a cost accounting system in an Italian nursing home to calculate the true costs of the services provided and the true ‘cost-to-serve’ the guests. It focuses on the Activity-based Costing system and analyzes in depth the aims, the benefits, and the critical issues which emerged during its design and implementation.

The paper is structured into two main sections.

The first section reviews relevant literature to delineate the current state of knowledge on the topic and highlights the contribution of our research.

The subsequent section provides a detailed description of the design of an Activity-based Costing system in an Italian nursing home, emphasizing methodological challenges inherent in its application to this sector.

LITERATURE REVIEW

The Need for Healthcare Firms to Adopt a Cost Accounting System

The health system is fundamental to the social well-being and health of people worldwide. Although the healthcare services delivery is affected by many political and economic factors (Cupertino de Barros, Pereira, Correia, & Ferrinho, 2022), healthcare organizations aim to provide high quality services to the greatest number of people (Arnaboldi & Lapsley, 2005; Sheingold & Hahn, 2014). According to Niñerola et al. (2021), health and accessibility are central to healthcare.

The social aims of these firms often lead to assessing their performance based on non-strictly economic values, such as the level of guest satisfaction. However, the economic perspective, the efficiency, and effectiveness of the provision processes are very important to assess the global performance of these firms (Antić & Sekulić, 2016). For example, a correct price setting is crucial for the performance of healthcare firms, as it can be an enabler for promoting the quality of the services provided (Barber et al., 2020).

A further trigger for managing the efficiency and effectiveness of healthcare firms comes from the dynamism of this sector. The presence of both profit and nonprofit firms makes the sector more dynamic and competitive by stimulating firms to save costs (Alves, Beck da Silva Etges, Neto, & Polanczyk, 2018; Ivanková, Kotulič, Gonos, & Rigelský, 2019).

The health industry faces the challenge of ensuring the delivery of adequate quantities and qualities of health services amidst constrained financial resources and escalating costs (Aldogan, Austill, & Kocakülâh, 2014; Goldberg & Kosinski, 2011).

Due to higher costs of raw materials, supplies, health spending is one of the fastest growing elements in EU countries (Piscopo, Groot, & Pavlova, 2024). Since the 1960s public health expenditure (PHE) has been gaining a central role in the budgets of European countries, recording increasingly higher PHE rates as a percentage of Gross Domestic Product (GDP) over few years.

For example, we report the results of a survey carried out by Lau, Fung & Pugalis (2014) in fourteen different European countries between the 1970s and 2008, which estimates the trend of health expenditure. Figure 1 shows how Italy, despite not having reached the European average, has had a constant and linear increase in the financial resources used for health policy (Lau et al., 2014).

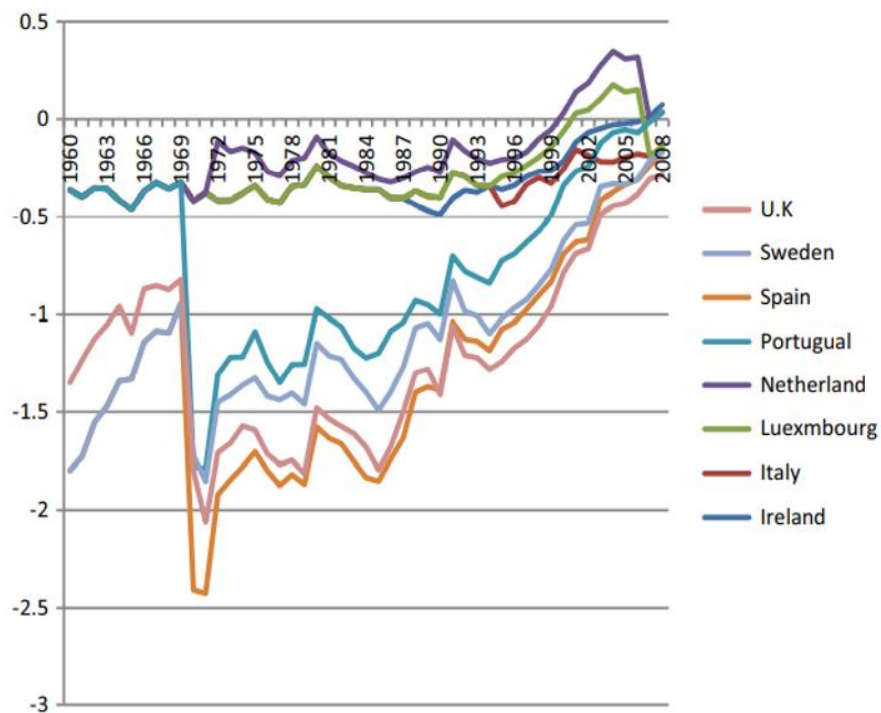
Public health expenditure began to decrease from 2010: over the last ten years, the Italian health charge decreased by 0.2% concerning GDP. These are the years just after the 2008/09 financial crisis. Since 2013, financial spending, although below the European average, has slowly started to grow until it had a leap in 2020, as shown in Figure 2 (OECD & European Union, 2022).

From 2020 the financial resources allocated to the national health system have been increasing, due to the global pandemic from SARS_COV (OECD, 2020).

The scarcity of financial resources is a phenomenon that affects the whole healthcare industry: profit and non-profit healthcare firms must face one of the major problems for healthcare, i.e. cost containment (Cugini & Pilonato, 2014).

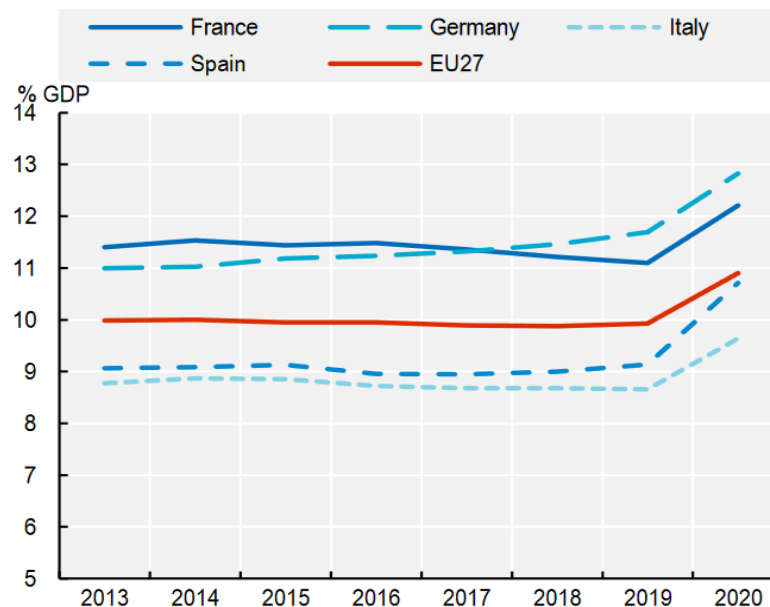
Although with different methods and times, most European countries must face periods of economic crisis and austerity, which involve cost containment measures, including health costs (Correia, Carapinheiro, Carvalho, Silva, & Dussault, 2017).

FIGURE 1
DEVELOPMENT OF HEALTH EXPENDITURE IN SOME EUROPEAN COUNTRIES



Source: Lau, Fung & Pugalis, 2014

FIGURE 2
DEVELOPMENT OF HEALTH EXPENDITURE IN RELATION TO GDP IN SOME EU COUNTRIES, 2013-2020



Source: OECD Health Statistics 2020, Eurostat Database cited by OECD & European Union, 2022

These reforms aim to keep the national public debt under control through significant cuts in the budget for public health expenditure (Grima, Spiteri, Jakovljevic, Camilleri, & Buttigieg, 2018).

However, health policies - with which allocate financial resources to health firms- are designed by politicians who do not often consider that the functioning of health organizations is more complex than they believe and that, for this reason, policy measures can also have negative effects on the quality of services provided (Correia et al., 2017).

The imperative facing healthcare firms lies in their capacity to uphold high-quality services amidst diminishing financial resources. In a patient-centric organization, success hinges on the ability to deliver superior services at minimized costs. Alves et al. (2018) emphasize that the meticulous oversight of processes, activities, and costs is a prerequisite for achieving this objective. In essence, the convergence of medical expertise and managerial acumen is paramount to optimize healthcare firms' operational efficiency and efficacy (Kuhlmann et al., 2013).

In this context, a cost management tool has the potential to emerge as a formidable strategic asset, furnishing invaluable insights for evaluating the authentic 'cost-to-serve,' bolstering pricing reliability, and facilitating precise management and communication of service quality to guests and their families (Aboagye & Degboe, 2011; Hilsenrath, Eakin, & Fischer, 2015; Carroll & Lord, 2016; Ghilan et al., 2021; Da Silva Etges et al., 2022).

Regrettably, the literature has yet to provide a definitive consensus on the most suitable cost measurement system for evaluating efficiency and performance within this sector (Rajabi & Dabiri, 2012; Aldogan et al., 2014; McClintock et al., 2019; Koolmees et al., 2021), as indicated by various contributions referenced below.

“Each budgeting method has its pros and cons and must meet certain requirements. Each of these methods is selected and implemented depending on the infrastructure and conditions of each country and its organizations. For this purpose, before implementing any of the methods [...], these infrastructures are first analyzed, and then one of the [...] methods is selected accordingly” (Homauni et al., 2023, p. 1899).

“Although value-based healthcare (VBHC) views accurate cost information to be crucial in the pursuit of value, little is known about how the costs of care should be measured” (Leusder et al., 2022, p. 1).

“Health care organizations may lack sophisticated accounting systems and consequently, health economists may be unfamiliar with cost accounting terminology, which may lead to discrepancy in terms used in the economic evaluation literature and management accountancy” (Špacírová et al., 2020, p. 529).

The Identification of the Right Cost Accounting System

There are various approaches in the literature for measuring and controlling a firm’s costs. However, it is possible to classify them in two categories, often presented in opposition: the traditional cost system based on cost centers, and the cost accounting systems based on the activities (Chan, 1993; Carroll & Lord, 2016; Papadaki & Popesko, 2016; Javid, Hadian, Ghaderi, Ghaffari, & Salehi, 2016; Cunnama et al., 2016; Özkaya, 2021).

The traditional cost accounting system primarily allocates costs to organizational units, such as cost centers. Still, it often fails to pinpoint the sources of a company’s value addition, namely, its added-value activities (Shoemaker & Kelly, 2019).

Activity-Based Costing (hereafter referred to as ABC) adopts a comprehensive, process-oriented approach, focusing on organizational activities. Costs are meticulously assigned to the activities undertaken to produce a final output, whether it be a customer, product, or service (Johnson & Kaplan, 1987; Brimson, 1998; Cooper, 1989; Upda, 1996; Kaplan & Cooper, 1998; Grant, 1999; Carù & Cugini, 1999; Waters, Abdallah, & Santillán, 2001; Lievens, Van Den Bogaert, & Kesteloot, 2003; Arnaboldi & Lapsley, 2005; Goldberg & Kosinski, 2011; Antić & Sekulić, 2016; Alves et al., 2018; Niasi, Fazaeli, Hamidi, & Viaynchi, 2019; Aujirapongpan, Promma, Theinsathid, Deelters, & Meechai, 2020; Niñerola et al., 2021).

In Table 1 we have summarized the main differences between the two methods.

**TABLE 1
ABC SYSTEM VS COST CENTERS SYSTEM**

	ABC system	Cost Centers system
Basic assumption	Activities are at the origin of the company’s costs. The cost of the product depends on the activities involved in its production.	Products are at the origin of the company’s costs. The cost of the product depends on its physical and technical characteristics.
Object of cost calculation	It can measure the cost of any object that consumes activities: product, service, customer, etc.	It is designed to measure the cost of the product of manufacturing firms.
Cost containers	The intermediate level of cost allocation is represented by the activities that can be aggregated in processes.	The intermediate level of cost allocation is represented by the organizational units: each one could become a cost center.
Approach and vision	It is horizontal, transversal, looking at the processes crossing the firm.	It is vertical, hierarchical, looking at the firm’s organizational pyramid.
Focus	The focus is on the firm’s activities and processes.	The focus is on the firm’s organizational structure.
Value added	By focusing on activities, it allows managers to distinguish between value-added and non-value-added activities.	By focusing on the organizational units, it does not consider the activities carried out inside the units or across them.

	ABC system	Cost Centers system
Cost to serve	It provides detailed information to enable the output of each activity consumed by the customers to be measured.	The cost centers do not generate value-for-customer. Only some activities can generate it.

Thanks to its inherent characteristics, ABC offers a superior level of cost precision compared to traditional cost center-based systems, which typically adhere to a hierarchical and vertical organizational structure, where cost centers align with organizational units (Carù & Cugini, 1999).

Furthermore, ABC functions as a more analytical framework, enabling managers to discern non-value-added activities and subsequently enhance both the quantitative (efficiency) and qualitative (effectiveness) performance of these activities (Antić & Sekulić, 2016).

The more detailed information about activities and processes gives the possibility to measure the true cost of the services provided: this information is fundamental, especially in healthcare (Hilsenrath et al., 2015), for evaluating strategic decisions (Niasti et al., 2019), for strengthening the link between cost accounting and management (Wnuk-Pel, 2010; Niasti et al., 2019) and for showing the actual profitability of each services provided (Waters et al., 2001).

A comprehensive understanding of resource consumption within activities and processes enables managers to evaluate costs per service and per patient over both short and long-term periods (Moreno, 2007). This capability proves particularly invaluable in nursing homes, where guests often require increasingly intensive and frequent care due to the natural aging process.

In the intricate landscape of healthcare firms, characterized by a diverse array of services and substantial indirect costs, ABC equips managers to evaluate the performance of various cost objects - be it products, services, processes, activities, or customers - providing more comprehensive and detailed cost monitoring than traditional systems (Aldogan et al., 2014).

However, despite its advantages, ABC presents challenges like any managerial tool. For instance, the exhaustive listing of activities can render its implementation cumbersome (Goldberg & Kosinski, 2011). Moreover, a critical aspect of ABC implementation is data collection, necessitating collaborative efforts between managers and employees (Moreno, 2007).

The application of ABC in healthcare is relatively recent, and there are still only a few studies in this sector (Niñerola, Hernández-Lara, & Sánchez-Rebull, 2021). Several authors highlighted the effectiveness of ABC in healthcare, compared with the traditional system, and identified the main potential benefits that this system offers (Moreno, 2007; Cugini & Pilonato, 2014; Popesko, Papadaki, & Novák, 2015; Javid et al., 2016; Namazi, 2016).

Nevertheless, the literature continues to present inconclusive findings regarding the optimal costing methods within the health service sector (Carroll & Lord, 2016). For instance, Popesko (2013) contends that cost analysis methods reliant on cost centers have demonstrated inadequacies in accurately gauging resource consumption and may offer limited support for managerial decision-making.

Conversely, ABC emerges as a potentially more precise and timely tool for healthcare firms in cost monitoring and service optimization, owing to its capacity for identifying and addressing non-value-added activities.

Several studies underscore the ABC system's methodological benefits to the healthcare sector. Some proponents argue that ABC ensures efficient cost measurement and control, facilitating a precise understanding of the allocation of human and technical resources within the organization (Chan, 1993; Smith, 2005; Cugini & Pilonato, 2013). Notably, ABC is praised for its ability to identify non-value-adding activities, thus optimizing resource allocation and supporting the establishment of benchmarking measures (Cinquini et al., 2007).

However, others contend that applying ABC in the healthcare sector, and the service industry more broadly, presents considerable complexity (Santana, 2014). Challenges include the prevalence of high levels of indirect costs, particularly those associated with technology, as well as the diverse nature of

services demanded by users (Cinquini et al., 2007). Furthermore, critics highlight the potential arbitrariness in implementing the ABC framework and the substantial data collection requirements (Smith, 2005).

Kazemi & Hassan Amirabadi Zadeh (2015) used the ABC system to estimate the cost price of inpatient part of Valie_asr Hospital, in Iran. Following the traditional steps traced by the literature to design the ABC scheme, authors determined the costs of each remedial activity and services involved in patient care, finally finding that the cost information obtained are more reliable and comprehensive.

According to the research conducted by Niñerola et al. (2021), based on a literature review carried out on over five hundred articles published in the period between 1989 and 2019, there are only a few cases of ABC application to healthcare companies, in fact, with a review covering thirty-one years, only about nineteen articles per year were collected. Moreover, only a few articles analyze the adoption of ABC or its evolution “Time-Driven Activity-Based Costing” (TDABC) in healthcare firms, and most of these have mainly focused on a firm’s department or health treatment - none of them has analyzed the firm as a whole.

Indeed, some articles focus on ABC or TDABC in healthcare, and the ABC implementation is limited to a specific department or treatment; none of them consider the entire organization. As the authors state: *“The present review covering [...] highlights that applying these cost systems has been more relevant in specific health areas or departments”* (Niñerola, et al., 2021, p.11). For example, Lievens et al. (2003) applied ABC to the Radiotherapy Department (RT Department) of the Leuven University Hospital to assess its efficiency. Yook, Yi & Kim (2019) investigated the potential differences between the use of ABC and TDABC in allocating costs of activities carried out in the Pediatrics Department of a university hospital in South Korea.

The scarce examples of the application of ABC in nursing homes or its application to a single health department/treatment are probably the reason why the methodological issue covered by this article has not yet been addressed in the literature.

The Measurement of the Cost-to-Serve in a Nursing Home

Particularly widespread in Europe and with a huge importance for people’s health, the nursing and care firms are characterized by: a growing demand for the services they provide; a high amount of indirect costs; an articulated organizational structure; a demand for customization and high-quality standards; increasing costs; and fewer financial resources especially from the public authorities. Moreover, nursing homes host particular guests, who are very different in terms of physical and mental characteristics, with special and different needs (Carey, Zhao, Snow, & Hartmann, 2018; Raes et al., 2020; Grabowski, 2022)

We are therefore dealing with complex firms, operating in a competitive sector with a strong social impact. And this is probably one of the reasons that explains the importance that the literature attributes to measuring and managing these companies’ costs. Despite this, the debate on which is the most suitable cost accounting system is still open, and there is still no example of the application of a valid cost accounting system to a nursing home (Smith & Fottler, 1981; Schlenker, Shaughnessy, & Yslas, 1985; Wodchis, 1998; Hicks et al., 2004).

Our article aims to offer a contribution to fill this gap through the design and implementation of a cost measuring system that includes all the processes of an Italian nursing home, aiming to identify the most suitable system to measure the cost of the services offered.

During the design of the ABC system, we encountered a methodological challenge that, to our knowledge, has not been explicitly addressed in existing literature. While numerous articles extol the advantages of ABC application and discuss factors influencing its implementation - such as increased customer demands, dynamic competitive environments, potential employee misconduct, and organizational structural complexities - none specifically address this issue in the context of healthcare firms, especially nursing homes, whether profit or non-profit (Javid et al., 2016; Niñerola et al., 2021; Wnuk-Pel, 2010; Goldberg & Kosinski, 2011; Hilsenrath et al., 2015; Antić & Sekulić, 2016; Arnaboldi & Lapsley, 2005; Moreno, 2007; Bahadori et al., 2012; Fiedler et al., 2014).

Therefore, recognizing this gap, we sought to address this issue by conducting an in-depth analysis of two alternative approaches, aiming to explore their respective effects, benefits, and limitations within the context of healthcare firms, particularly nursing homes, whether profit or non-profit.

THE IMPLEMENTATION OF THE ABC SYSTEM TO A NURSING HOME

Overview of the Firm

The firm analyzed is a care and nursing home located in the province of Udine, in the North-East of Italy. It was founded in 1894 thanks to a bequest and had the purpose of helping the poor of the municipality mainly with financial subsidies made available by the will. After the Second World War, the firm was transformed into a new institution with the legal status of a Public Institution of Assistance and Charity and exclusively provided retirement home services. Since 2006 the firm has been a nonprofit organization that provides health and social care services to elderly people.

The facility caters to a diverse spectrum of elderly individuals, ranging from those who are independent and seeking residential living arrangements to those requiring round-the-clock care and assistance.

The facility accommodates over two hundred patients with diverse pathologies and needs, organized into four departments according to their characteristics and health statuses:

- Guest Department I, for the care of people with dementia (DMT dept.)
- Guest Department II, specifically dedicated to self-sufficient guests (SSG dept.)
- Guest Department III, for partially self-sufficient guests (PSSG dept.)
- Guest Department IV, for non-self-sufficient guests (NSSG dept.).

Most of the care activities for guests are conducted within the four departments, while additional support services are provided by six Organizational Units: Kitchen, Pharmacy, Laundry, Maintenance, Accounting & Control, and General Management.

Previously, the firm operated under a cost accounting system structured around cost centers, facilitating cost tracking for the four departments and six organizational units. This system served as the foundation for budgeting and implementing a responsibility accounting framework.

In 2019, the regional government expressed its intention to review nursing home fees, prompting the general manager to seek a cost accounting system capable of accurately measuring the firm's true service costs for guests. Recognizing the limitations of the traditional cost measurement system in providing the desired insights, the decision was made to implement an ABC system.

The design and implementation of the ABC system followed established methodologies outlined in the literature (Kaplan & Cooper, 1998; Brimson, 1998; Smith, 2005; Goldberg & Kosinski, 2011). Initially, an organizational context and structure analysis was conducted through interviews with managers and employees, along with documentary analysis (Moreno, 2007; Fiedler et al., 2014). Subsequently, the sequential steps of ABC were executed (Grant, 1999; Arnaboldi & Lapsley, 2005; Bahadori et al., 2012; Fiedler et al., 2014; Javid et al., 2016):

1. Identification of activities and processes of the entire firm.
2. Calculation of the costs of the activities.
3. Definition of the activity drivers.
4. Allocation of intermediate activities to final activities.
5. Attribution of activity costs to cost objects.

During the initial phase, we conducted a comprehensive analysis to identify all activities conducted across the organization. This process involved reviewing documentary sources such as the Accounts Plan and conducting interviews with various stakeholders including managers, employees, doctors, nurses, and health workers.

The complete list of activities performed within both guest departments and organizational units is provided in Table 2.

TABLE 2
THE FIRM'S ACTIVITIES AND ORGANIZATIONAL UNITS

		Activities	Organizational units
1	1	Shift change management and coordination	Dept. I: Dementia
2	2	Dressings, washing and therapies	Dept. I: Dementia
3	3	Lifting and daily hygiene	Dept. I: Dementia
4	4	Assisted bathing	Dept. I: Dementia
5	5	Distribution & administration of meals	Dept. I: Dementia
6	6	Accompanying to the bathroom	Dept. I: Dementia
7	7	Distribution & administration of snacks & beverages	Dept. I: Dementia
8	8	Mobilization (bedsores care)	Dept. I: Dementia
9	9	Guest linen management	Dept. I: Dementia
10	10	Cleaning/tiding of bedside tables, wardrobes, beds	Dept. I: Dementia
11	11	Putting to bed	Dept. I: Dementia
12	12	Stimulation, animation and entertainment activities	Dept. I: Dementia
13	13	Night surveillance	Dept. I: Dementia
14	14	Control & arrangement of drugs	Dept. I: Dementia
15	15	Administration of therapies	Dept. I: Dementia
16	16	Glucose preparation	Dept. I: Dementia
17	1	Shift change management and coordination	Dept. III: PSSG
18	2	Dressings, washing and therapies	Dept. III: PSSG
19	3	Lifting and daily hygiene	Dept. III: PSSG
20	4	Assisted bathing	Dept. III: PSSG
21	5	Distribution & administration of meals	Dept. III: PSSG
22	6	Accompanying to the bathroom	Dept. III: PSSG
23	7	Distribution & administration of snacks & beverages	Dept. III: PSSG
24	8	Mobilization (bedsores care)	Dept. III: PSSG
25	9	Guest linen management	Dept. III: PSSG
26	10	Cleaning/tiding of bedside tables, wardrobes, beds	Dept. III: PSSG
27	11	Putting to bed	Dept. III: PSSG
28	12	Stimulation, animation and entertainment activities	Dept. III: PSSG
29	13	Night surveillance	Dept. III: PSSG
30	14	Control & arrangement of drugs	Dept. III: PSSG
31	15	Welcome new entrants	Dept. III: PSSG
32	16	Pharmacy management	Dept. III: PSSG
33	17	Resignations	Dept. III: PSSG
34	1	Shift change management and coordination	Dept. II: SSG
35	2	Dressings, washing and therapies	Dept. II: SSG
36	3	Lifting and daily hygiene	Dept. II: SSG
37	4	Assisted bathing	Dept. II: SSG
38	5	Distribution & administration of meals	Dept. II: SSG
39	6	Accompanying to the bathroom	Dept. II: SSG
40	7	Distribution & administration of snacks & beverages	Dept. II: SSG
41	8	Mobilization (bedsores care)	Dept. II: SSG
42	9	Guest linen management	Dept. II: SSG
43	10	Cleaning/tiding of bedside tables, wardrobes, beds	Dept. II: SSG
44	11	Putting to bed	Dept. II: SSG

45	12	Stimulation, animation and entertainment activities	Dept. II: SSG
46	13	Night surveillance	Dept. II: SSG
47	14	Control & arrangement of drugs	Dept. II: SSG
48	1	Shift change management and coordination	Dept. IV: NSG
49	2	Dressings, washing and therapies	Dept. IV: NSG
50	3	Lifting and daily hygiene	Dept. IV: NSG
51	4	Assisted bathing	Dept. IV: NSG
52	5	Distribution & administration of meals	Dept. IV: NSG
53	6	Accompanying to the bathroom	Dept. IV: NSG
54	7	Distribution & administration of snacks & beverages	Dept. IV: NSG
55	8	Mobilization (bedsores care)	Dept. IV: NSG
56	9	Guest linen management	Dept. IV: NSG
57	10	Cleaning/tiding of bedside tables, wardrobes, beds	Dept. IV: NSG
58	11	Putting to bed	Dept. IV: NSG
59	12	Stimulation, animation and entertainment activities	Dept. IV: NSG
60	13	Night surveillance	Dept. IV: NSG
61	14	Control & arrangement of drugs	Dept. IV: NSG
62	15	Administration of therapies	Dept. IV: NSG
63	16	Welcome new entrants	Dept. IV: NSG
64	1	Health area direction	General management
65	2	Personnel management	General management
66	3	Project management	General management
67	4	Firm coordination	General management
68	1	Purchase & arrangement of drugs and health material	Pharmacy
69	2	Departments supply	Pharmacy
70	3	Loading/unloading warehouse	Pharmacy
71	1	Washing/ironing/mending kitchen material and uniforms	Laundry
72	2	Labeling/washing linen and clothes of guests	Laundry
73	3	Sheet/towel washing	Laundry
74	1	Breakfast and snack preparation	Kitchen
75	2	Lunch and dinner preparation	Kitchen
76	3	Menus, customized diets & food management	Kitchen
77	1	Employees' safety	Maintenance
78	2	Hydraulic, electrical and building maintenance	Maintenance
79	3	Transporting people and material	Maintenance
80	4	Warehouse and supplies management	Maintenance
81	1	Financial accounting & management control	Accounting & control
82	2	Receipts and payments	Accounting & control
83	3	Guest management	Accounting & control

The Methodological Issue and the Research Question

The methodological issue came to light upon completing the initial design phase, specifically during our examination of activities within the four guest departments.

It was observed that each guest department comprised fourteen activities sharing identical names and descriptions, as detailed in Table 3.

TABLE 3
THE SIMILAR ACTIVITIES PERFORMED IN THE FOUR GUEST DEPARTMENTS

	Activities
1	Shift change management and coordination
2	Dressings, washing and therapies
3	Lifting and daily hygiene
4	Assisted bathing
5	Distribution & administration of meals
6	Accompanying to the bathroom
7	Distribution & administration of snacks & beverages
8	Mobilization (bedsores care)
9	Guest linen management
10	Cleaning/tiding of bedside tables, wardrobes, beds
11	Putting to bed
12	Stimulation, animation and entertainment activities
13	Night surveillance
14	Control & arrangement of drugs

At first, we presumed that the fourteen activities identified in each department were transversal activities, common in service companies where activities utilize resources from multiple departments to generate outputs (Carù, Cugini & Zerbini, 2010; Cugini & Pilonato, 2013). However, it became evident upon closer examination that each of the fourteen activities yielded distinct and measurable output.

Nevertheless, during interviews with departmental employees, we noted striking similarities in the descriptions of these activities across the four departments, with differences primarily in the intensity and frequency of output consumption. This discrepancy, not documented in existing literature, prompted us to investigate whether it was an isolated occurrence or a prevalent phenomenon in other nursing homes.

A cursory analysis revealed similar patterns in five additional nursing homes, three located in a different region (Northwest Italy). The variation primarily stemmed from differences in guest demographics, resulting in varying numbers of guest departments across facilities.

We can thus assume that this scenario is common in nursing homes. If this holds true, a methodological issue arises: How should these similar activities be treated within the ABC system? There are two primary alternatives.

The first approach treats the fourteen activities as unique to each guest department. Consequently, the initial step of the ABC system yields eighty-three activities, as detailed in Table 2.

The second approach consolidates similar activities into fourteen activity pools (as listed in the table 4): each activity pool draws resources (technical and human) from all four guest departments, with its output serving guests across these departments. This results in thirty-nine activities at the first step, as illustrated in Table 4.”

TABLE 4
THE FIRM'S ACTIVITIES UNDER THE SECOND APPROACH

Activity pools concerning the four guest depts:			
1	1	Shift change management and coordination	Depts. I, II, III, IV
2	2	Dressings, washing and therapies	Depts. I, II, III, IV
3	3	Lifting and daily hygiene	Depts. I, II, III, IV
4	4	Assisted bathing	Depts. I, II, III, IV
5	5	Distribution & administration of meals	Depts. I, II, III, IV
6	6	Accompanying to the bathroom	Depts. I, II, III, IV
7	7	Distribution & administration of snacks & beverages	Depts. I, II, III, IV
8	8	Mobilization (bedsores care)	Depts. I, II, III, IV
9	9	Guest linen management	Depts. I, II, III, IV
10	10	Cleaning/tiding of bedside tables, wardrobes, beds	Depts. I, II, III, IV
11	11	Putting to bed	Depts. I, II, III, IV
12	12	Stimulation, animation and entertainment activities	Depts. I, II, III, IV
13	13	Night surveillance	Depts. I, II, III, IV
14	14	Control & arrangement of drugs	Depts. I, II, III, IV
Activity pools concerning two guest depts:			
15	1	Administration of therapies	Dept. I: Dementia; Dept. IV: NSG
16	3	Welcome new entrants	Dept. III: PSSG; Dept. IV: NSG
Other Activities concerning the guest depts:			
17	2	Glucose preparation	Dept. I: Dementia
18	4	Pharmacy management	Dept. III: PSSG
19	5	Resignations	Dept. III: PSSG
Activities concerning the organizational units:			
20	1	Health area direction	General management
21	2	Personnel management	General management
22	3	Project management	General management
23	4	Firm coordination	General management
24	1	Purchase & arrangement of drugs and health material	Pharmacy
25	2	Departments supply	Pharmacy
26	3	Loading/unloading warehouse	Pharmacy
27	1	Washing/ironing/mending kitchen material and uniforms	Laundry
28	2	Labeling/washing linen and clothes of guests	Laundry
29	3	Sheet/towel washing	Laundry
30	1	Breakfast and snack preparation	Kitchen
31	2	Lunch and dinner preparation	Kitchen
32	3	Menus, customized diets & food management	Kitchen
33	1	Employees' safety	Maintenance
34	2	Hydraulic, electrical and building maintenance	Maintenance
35	3	Transporting people and material	Maintenance
36	4	Warehouse and supplies management	Maintenance
37	1	Financial accounting & management control	Accounting & control
38	2	Receipts and payments	Accounting & control
39	3	Guest management	Accounting & control

The fourteen similar activities conducted in the guest departments can be counted separately in each department (first approach) or collectively once (second approach). Each approach yields different effects on the design of the ABC system.

The first notable effect pertains to the total number of cost containers: in the first alternative, the firm must manage eighty-three activities (as shown in Table 2), whereas the second alternative requires only thirty-nine cost containers—comprising sixteen activity pools and twenty-three individual activities (as detailed in Table 4). The substantial disparity in the total number of activities between the two alternatives could potentially pose a significant implementation challenge for the ABC system.

The second effect becomes apparent at the conclusion of the second step of the ABC design, when we calculate the costs associated with the eighty-three activities. Surprisingly, we discover that the fourteen similar activities conducted across the four guest departments consume varying amounts of costs.

Despite their apparent similarity, the firm allocates the resources to these activities differently, or in significantly different quantities.

To illustrate this aspect more vividly, Fig. 2 demonstrates the varying intensity with which the fourteen activities consume resources (costs) across the four departments. Notably, the total costs incurred by these activities consistently vary, with some exhibiting particularly pronounced differences.

For instance, the ‘lifting and daily hygiene activity’ incurs substantial costs in Department I (guests with dementia) but minimal costs in Department II (self-sufficient guests). Similarly, the ‘assisted bathing activity’ accrues significant costs in Department IV (non-self-sufficient guests) but minimal costs in Departments I and III (partially self-sufficient guests). Furthermore, the ‘meal distribution and administration activity’ demonstrates considerable discrepancies, with the highest costs in Department IV and the lowest in Department II.

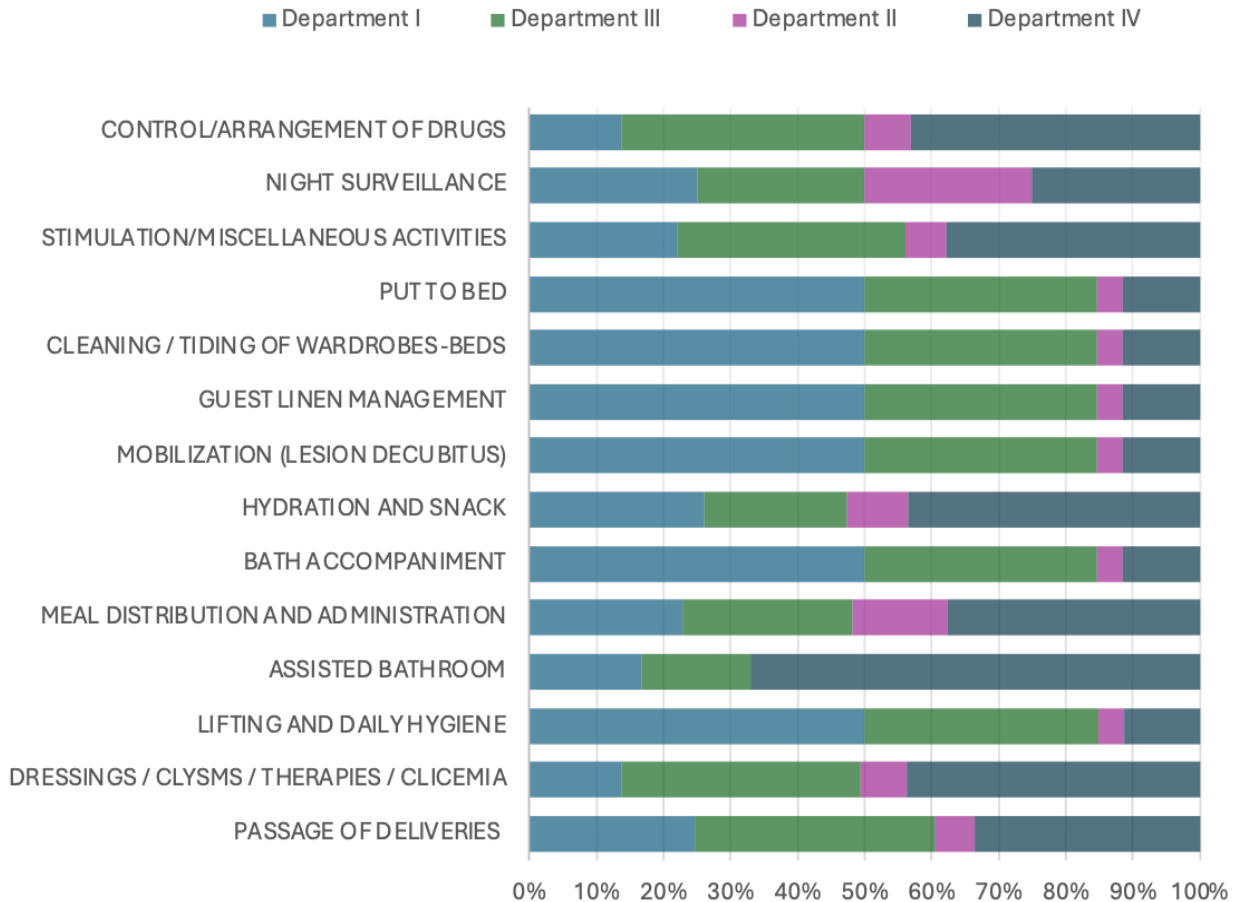
This observation underscores a critical consideration: the same activity can incur varying costs depending on the department in which it is performed. This discrepancy raises questions about the true similarity of these activities and provides a compelling rationale for considering the first approach. After all, if activities exhibit distinct cost profiles, they may not be as similar as initially assumed.

Furthermore, another crucial factor to consider is personnel management within guest departments. In nursing homes, personnel management can adopt one of two approaches: periodic rotation between departments or dedicated staff assigned to each department. Opting for periodic rotation facilitates managing replacements for holidays, illness, or emergencies.

The firm has chosen the latter approach: nurses and healthcare professionals are assigned to specific departments based on their expertise, technical skills, personal attributes (such as age, aptitude, attitudes, character, physical strength, and health status), and experience. These considerations are directly aligned with the needs of the guests they serve. Additionally, staff members receive periodic and specialized training to enhance or acquire the requisite skills for their assigned departments. This strategic decision significantly impacts the total personnel costs of each department and the quality of services provided.

The third effect surfaced upon completing the third step of the ABC design, where we evaluated the cost of services provided by the firm. Nursing homes cater to elderly individuals with varying levels of service consumption (frequency and intensity of the services utilized) — resulting in the need to calculate the ‘cost to serve’ each guest. This cost is contingent upon the extent of service utilization by different patients, which can vary within and across departments.

FIGURE 3
COSTS OF THE SIMILAR ACTIVITIES OF THE FOUR GUEST DEPARTMENTS



To categorize service consumption patterns, we identified two distinct types of activities (refer to Table 5):

- **Differential consumption activities.** Guests across departments consume these activities with varying intensity (time spent) and frequency (number of times they use the same activity). For instance, activities like ‘stimulation activities’ and ‘control and arrangement of drugs’ are utilized more frequently and intensely by guests in Department IV (non-self-sufficient) compared to those in Department II (self-sufficient) and Department III (partially self-sufficient). This variation in consumption can be attributed to differences in guests’ levels of self-sufficiency or other underlying pathologies, which may differ even within the same department.
- **Non-differential consumption activities.** These activities are consumed relatively uniformly across all patients. For example, activities such as ‘guest linen management,’ ‘shift change management and coordination,’ and ‘cleaning/tidying of wardrobes & beds’ are performed with consistent intensity and frequency, irrespective of the type of patients in the four departments. However, some activities may exhibit differential consumption patterns across departments: ‘putting to bed’ is non-differential in Departments II and III, and differential in Departments I and IV; the same applies for ‘accompanying to bathroom’.

Efforts were made to utilize activity pools to calculate the cost of individual services provided. However, these cost containers were insufficiently granular to account for the differential consumption processes described above. To accurately determine the true cost-to-serve, measuring the output of each

activity consumed by individual guests is imperative, necessitating the level of detail provided by the first approach.

In summary, the third step of ABC implementation underscores that the calculation of service costs is influenced by the specific characteristics of guests, which may vary even within the same department. Thus, from a ‘cost to serve’ perspective, the four guest departments do not align with patient segments, which are inherently more numerous and ‘transversal’ than departments.

TABLE 5
THE CONSUMPTION OF THE SIMILAR ACTIVITIES

	Activities	Guest consumption
1	Shift change management and coordination	Non differential
2	Dressings, washing and therapies	Differential
3	Lifting and daily hygiene	Differential
4	Assisted bathing	Differential
5	Distribution & administration of meals	Differential
6	Accompanying to the bathroom	Differential
7	Distribution & administration of snacks & beverages	Non differential
8	Mobilization (bedsores care)	Differential
9	Guest linen management	Non differential
10	Cleaning/tiding of bedside tables, wardrobes, beds	Non differential
11	Putting to bed	Differential
12	Stimulation, animation and entertainment activities	Differential
13	Night surveillance	Non differential
14	Control & arrangement of drugs	Non differential

CONCLUSION

The paper has explored implementing the ABC system for calculating the costs of services provided by a healthcare firm.

The cost center system already in use by the firm enabled it to track the costs incurred by the guest departments and organizational units, facilitating budgeting and responsibility accounting. While the traditional system, based on cost centers, is effective for these purposes, our analysis reveals its limitations in addressing more intricate and specific information requirements.

If managers require information on “where” (in which organizational units) costs are being incurred, the existing cost center system proves highly effective and efficient. Calculating costs across ten cost centers (comprising four departments and six organizational units) is straightforward and quick. Most cost items are specific to individual cost centers, such as personnel, depreciation, maintenance, and materials, with only a few common expenses like electricity, building costs, and heating and air conditioning plants.

This system suits managers needing to understand resource consumption per organizational unit for budgeting and responsibility accounting purposes. However, the cost center system falls short for insights into service costs, cost-to-serve metrics, process efficiency enhancements, and understanding the origine of value-added and value-for-customer. A more detailed system, like ABC, can elucidate the underlying reasons behind cost allocations and understand ‘why’ (i.e., ‘to do what’) the costs are sustained.

Introducing an ABC system in a nursing home setting has brought forth an unexplored design dilemma not previously discussed in the literature.

This challenge arises due to the nature of activities within these firms, where most activities across guest departments share striking similarities. Consequently, the pivotal question emerges: should these activities be treated as distinct entities or grouped into activity pools? This decision carries significant

weight, as these activities form the backbone of service provision and thus directly impact cost-to-serve and customer value.

Despite the absence of guidance in existing literature, our analysis delved into the primary repercussions of the two design alternatives on the cost measurement system.

We assert that identifying the optimal solution necessitates a thorough comprehension of the objectives driving the cost measurement system.

Indeed, the most effective cost measurement system isn't necessarily the most intricate or elaborate; rather, it aligns its complexity with the intricacies of the firm and its informational requirements.

The first approach to cost accounting is more analytical and seemingly more intricate compared to the second approach. Consequently, if the implications of both approaches are clear, the crucial question becomes: Which system best caters to the knowledge needs of the nursing firm?

Suppose management requires a more analytical cost accounting system (compared with the traditional one), particularly to discern the costs associated with various activities. In that case, the second approach, utilizing activity pools, emerges as the optimal solution. This system offers more analytical cost information, enabling managers to understand the reasons and locations where costs are incurred, facilitating efficiency improvements, and pinpointing sources of customer value.

Conversely, the first approach is the only viable alternative if management seeks to ascertain the cost of individual services provided — the true cost-to-serve — in order to:

- Compare it with pricing structures (price or tariff) to gauge service/guest profitability.
- Conduct simulations regarding future profitability based on different customer mixes.
- Ensure precise management of costs, quality, and customer satisfaction.
- Support activity-based management to optimize processes, costs, and performance.

The advantages of this approach are as described above, albeit with the drawback of requiring a higher number of cost containers.

In summary, the analysis of the case study enables us to achieve four main objectives. First, it demonstrates an application of the ABC system to a healthcare firm in its entirety, offering a comparison with the traditional cost accounting system.

Second, it brings attention to a methodological issue in designing the ABC system, a topic previously overlooked in the literature but pertinent to healthcare companies employing this system throughout the organization.

Third, it outlines the various options available to address this issue and comprehends the primary implications associated with each option.

Fourth, it identifies the key factors that must be considered to make the appropriate choice, aligning with the real needs of the firm.

In conclusion, it's important to acknowledge the limitations inherent in this study, typical of case-based analyses. The healthcare firm examined may not represent all healthcare firms, and while interviews with managers from other healthcare firms validate the existence of similar issues, variations in forms and characteristics across different firms cannot be ignored. Therefore, the effects observed in this study may not be universally applicable, necessitating further research in this direction.

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