

# Exploring the Relationship between Industry Characteristics and the Adoption of an Innovative Cost Accounting Method: A Literature Review on the Greek Context

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## Abstract

In this research, we assess the applicability of Activity-Based Costing (ABC) methodology across various industries in a developing country context. Through a comprehensive review of articles focusing on ABC implementation within specific sectors in Greece, we employed a multiplication rule in keyword research to identify key patterns. Our findings highlight that industries such as construction, medical, and pharmaceuticals exhibit a higher suitability for ABC, primarily due to the presence of costly equipment in their total assets. ABC proves instrumental in accurately allocating costs, particularly in managing the expenses associated with valuable equipment to prevent both overvaluation and undervaluation. Furthermore, sectors like hotels and education demonstrate significant potential for ABC system implementation. However, in smaller companies where employees engage in diverse tasks, a cautious approach to ABC implementation is crucial, necessitating the use of appropriate information systems.

## Keywords

Activity Based Costing, Construction, Education, Public Sector, Hospitality, Hotels, Management Accounting, Medical Sector

## 1. Introduction

Cost accounting systems are tools of tremendous importance for managers to minimize the information asymmetry between them and the different expenditures consumed from each department of businesses. Managers should be in-

formed of each cost, to predict the efficiency or inefficiency of each product or activity. Therefore, the appropriate accounting system is very important, since undervaluation or overvaluation of an activity or a product will lead to a false conclusion regarding the managers' prospects for this product or activity. Activity Based Costing is a costing tool that contributes to the well-being of a company. In this study, we are analyzing the unique traits of companies that belong in the same sector that make Activity Based Costing (ABC) a suitable costing method for these kinds of companies.

We made a review of the articles that exclusively researched for the ABC implementation for a specific industry sector, in Greece. We gathered publications and empirical studies of our interest by launching a keyword search on Google Scholar. Specifically, we focused on using appropriate keywords in the title of the studies, in the Google Scholar search engine. We used a number of different word combinations following the multiplication rule, where we multiplied the different words for Greece with the various expressions for "Activity Based Costing".

Our results indicated that construction, medical and pharmaceutical companies are more suitable to ABC costing method due to the existence of expensive equipment. We believe that the characteristic of ABC method to proportionally allocate indirect cost helps sectors with expensive equipment to avoid overvaluation and undervaluation of their equipment. Moreover, hotel and education sectors are two sectors that suit to the ABC method, but the managers must know the tools and use the appropriate Information Systems to appropriately allocate the costs to the right activities.

Our results contribute to an extensive literature regarding cost accounting methods in developing countries. We explain that the Greek sample is important since it has specific traits that contribute to the existing literature. There are three main contributions of this research to the existing literature. First, we contribute to prior literature by analyzing the appropriate traits of four sectors that make ABC implementation a suitable accounting cost method. Secondly, we contribute to the ABC literature in developing countries by indicating the way that ABC helps small companies to appropriately allocate their costs. In this way, the small companies have more prospects to extend their business. Finally, we contribute by introducing the multiplication rule to the key word research, when the research concerns two specific terms in the title. In this way, the researchers know the total number of the combinations' input in research tools to have all the possible combinations.

Our study is divided into six sections. The second section is the theoretical framework where we briefly explain cost management structure and Activity-Based-Costing (ABC) theory. The third section is compromised by our research methodology. The fourth section is compromised by the results that were included in the studies of our final sample. The fifth section includes the specific traits of the sectors in our sample that suits to ABC implementation. Finally, the sixth section is the conclusions.

## 2. Theoretical Framework

### *Cost models (or cost system): Their contribution to information asymmetry and decision-making*

Cost model (or cost system) is a model or system that determines the identification of the multiple costs that compromise the companies' functions, their categorization and their assignment to the appropriate products or activities. Specifically, cost model (or cost system), is a tool that companies use to have a better understanding of the costs that compromise the functions of the businesses (Kaplan et al., 1982). To achieve this, managers should analyze the main functions of the cost model (Vazakidis et al., 2009). This analysis must include (Cooper and Kaplan, 1988a; Cooper and Kaplan, 1988b; Pohlen and La Londe, 1994; LaLonde and Pohlen, 1996):

- 1) Evaluation of inventory and measurement of the cost of goods and services sold for financial purposes;
- 2) Estimation of the cost of activities, products, services, and customers;
- 3) Provision of economic feedback to managers about process efficiency.

The provision of economic feedback to managers is of significant importance since managers owe a tool that minimize the information asymmetry between them and the different departments in the company. This is one of the important purposes of a cost model, which is gathering and analyzing data from companies' functions to gain useful information for decision-making. Therefore, the usefulness of a cost model may be evaluated depending on its capacity to generate the right information to make efficient managerial decisions (Thanasas, 2013). According to prior literature (Pohlen and La Londe, 1994), companies need more detailed financial and nonfinancial information to identify opportunities for taking costs out of the supply channel and for re-engineering their logistics processes. The success of these efforts will largely depend on the ability of the firm's cost accounting system to trace costs to specific products, customers, supply channels, or logistics activities (Thanasas, 2014). Furthermore, logistics cost will become more important in product pricing decisions as firms seek to reduce costs and attain a competitive advantage (LaLonde and Pohlen, 1996).

### *Differences between production process costs and product costs*

After synthesizing the relative literature (Kaplan et al., 1982; Cooper and Kaplan, 1988a; Cooper and Kaplan, 1988b), the main costing systems can be categorized based on the:

- 1) Production process costs
- 2) Product costs

According to prior studies (Garrison et al., 2010), these systems are different by structure. Production process costs consist of systems, which are based on the peculiarities of the conditions that the production department operates e.g. the production of one unit or thousands units. The categories of production process costs are:

- 1) Job-order costing
- 2) Process costing

According to prior literature (Garrison et al., 2010), Product costs consist of systems, which are based on the methods used to calculate the costs. The categories of product costs are:

- 1) Direct (or variable or marginal) costing
- 2) Absorption (or full) costing
- 3) Activity Based Costing (ABC)

The basic principle of Activity Based Costing is that the cost objects (e.g. products, clients etc.) “consume” activities, which consume resources (e.g. payments, materials etc.).

#### ***Activity-Based-Costing***

The Activity-Based Costing method is an innovative costing method that aims at the ideal distribution of costs per product unit and the application of the method, as well as its most ideal performance, depends on the correct separation of its characteristics, which are the following:

- 1) Activities
- 2) Cost Drivers

The basic principle of Activity Based Costing is that the cost objects (e.g. products, clients etc.) “consume” activities, which consume resources (e.g. payments, materials etc.).

#### ***Activities***

Activity as a general concept could be defined as an action, or a set of actions performed with the purpose of collecting and processing elements that work together and seek to achieve some common goal. Activities are divided into primary and secondary activities (Brimson and Antos, 1994), primary activities are the activities that directly contribute to the central mission of a department or an organizational unit. For example, market research and continuous adaptation of services to customer requirements.

Secondary activities support a single division of the company and should increase the effectiveness and efficiency of the primary activities in that division.

#### ***Cost Drivers***

The burden of the cost entities with the cost of the activities is achieved by identifying a mechanism, through which the cost of each activity is transferred to the appropriate entities. The mechanism consists in identifying the carriers of the costs of the activities to the agencies (Anastasios Hatzis, 2003). These carriers are the cost drivers of operations.

One or more fixed business elements are taken as cost drivers of the activities, e.g. the production batches of each product, or the time of the production process by product, the service time during the provision of services, etc.

#### ***Differences between Absorption Costing and Activity Based Costing (ABC)***

Absorption costing uses a two-step process to account for the company’s in-

direct and support costs, i.e. operating costs are allocated to cost centers and then, to the products of the production process.

Absorption costing allocates costs from cost centers to products typically using drivers or volume bases, such as direct labor, machine hours, raw materials purchased, and units produced. Due to the fact that many indirect and auxiliary resources are not used in proportion to the number of units produced, these systems can give highly inaccurate figures for the costs of support activities actually used by the different types of products.

The ABC focuses its attention on activities tracing the use of all resources, by the activities performed and linking the costs of these activities to products, services and customers. The ABC systems more accurately measure the cost of activities that are not proportional to the volume of products produced. Cost pools are defined based on activities rather than functional cost centers. Cost drivers are used to allocate activity costs to products (Table 1).

Furthermore, the main differences between the Activity-Based Costing with Traditional Costing Methods are presented in Table 2 (Karadağ et al., 2009).

**Table 1.** Comparison of direct and absorption costing (Garrison et al., 2010).

Absorption Costing		Activity-based costing
Product cost	<ul style="list-style-type: none"> <li>• Direct materials</li> <li>• Direct Labor</li> <li>• Variable Manufacturing overhead</li> </ul>	Product cost
Period Cost	<p><b>Fixed manufacturing overhead</b></p> <p>Variable selling and administrative expenses</p> <p>Fixed selling and administrative expenses</p>	Period cost

**Table 2.** Comparison of activity-based-costing and traditional costing methods.

Traditional costing	Activity-based costing
Only manufacturing costs are assigned to products	Manufacturing as well as non-manufacturing costs can be assigned to products (some manufacturing costs may be excluded from product costs)
Selling, general and administrative expenses are period expenses	Selling, general and administrative expenses can be assigned to products if there is a cost effect relation between them
A single overhead rate is used for the entire factory: direct labour- or machine-hours	A number of overhead cost pools exist, with different allocation bases
Costs of unused capacity are assigned to products	Costs of idle capacity are not assigned to products (only the costs of capacity they use)

### 3. Methodology

The method of this review study is based on the collection of the articles that studied the application of ABC in Greek industry sectors. We collected and reviewed academic publication that searched for the ABC appliance in Greece. In our initial data collection analysis, we gathered publications and empirical studies of our interest by launching a keyword search on Google Scholar. Specifically, we focused on our research to use appropriate keywords to have the best possible results. We searched specifically for articles and case studies that contained in their title the word “Greece”, “Hellenic” or “Greek” and different combinations for cost accounting, such as “cost management”, “Activity Based Costing” etc. We used a number of different word combinations following the multiplication rule, where we multiplied the different words for Greece with the various expressions for “Activity Based Costing”. The different combinations of word that we searched specifically in the title of the studies are disclosed in **Table 3**.

**Table 3** indicates the results of our research, which constitute our initial sample of studies. Our initial samples were forty-five (45) studies regarding the implementation of ABC in Greece. We excluded three (3) studies that were dissertations. Then, we excluded nine (9) studies that concerned another field of studies. Moreover, we excluded sixteen (16) studies that concerned ABC implementation in Greece, in a more general approach or multiple sectors that did not concentrate on a specific sector. Finally, we excluded five (5) studies that were existing in our sample more than one time. Our final sample of articles and case studies is compromised by twelve (12) studies, which refer to ABC appliance on specific sectors. The article collection procedure is indicated in **Table 4**.

**Table 3.** Composition of initial sample of studies: term combination.

Terms combination used in the research	Number of studies
Greece and Activity-Based-Costing	5
Greece and ABC Costing	1
Greece and ABC	8
Greece and Cost Management	1
Greek and Activity Based Costing	5
Greek and ABC Costing	2
Greek and ABC	14
Greek and Cost Management	5
Hellenic and Activity-Based-Costing	3
Hellenic and Cost Management	1
Initial Sample of Studies	45

## 4. Results

The results disclosed twelve (12) articles and case-studies relative to our research. We observed that only five (5) sectors have been specifically investigated for Activity-Based-Costing implementation, in Greece. This is an interesting part, since the existence of these sectors, gave us a hint of the sectors that ABC is more suitable to implement, which we will further analyze in this study. The sectors are presented in **Table 5**.

In this part, we have to mention that the sixteen (16) articles, excluded in the article collection procedure (see **Table 5**), were published to a great extent from 2000 to 2010. Most of the studies in our final sample were published after 2010. This indicates the starting point of the academic literature to acknowledge the ABC method and then, study its suitability for each sector. **Figure 1** presents the years that our final samples of studies were published.

### 4.1. Construction Sector

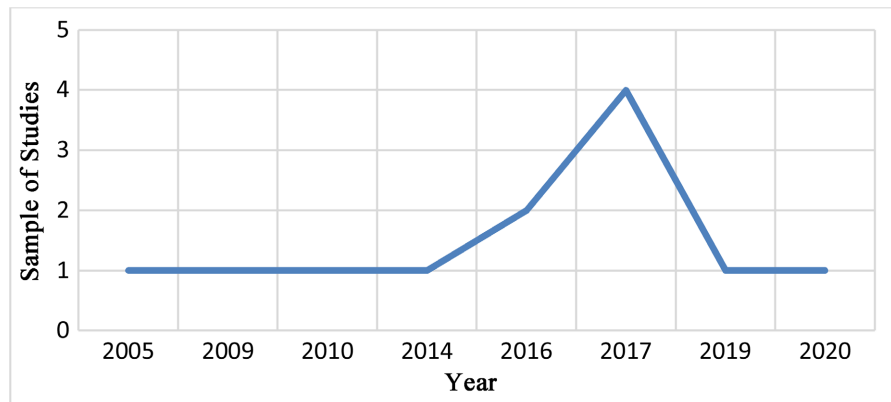
According to prior literature, construction companies are characterized by lots of overhead expenses and complexity in production (Goumas, 2019). The handling of these expenses creates an issue that construction companies should face on a daily basis. These are the main issues that ABC implementation is more suitable to these types of industry and it is a well-known implemented method in constructions companies overseas (Goumas, 2019). The incredible amount of expenses is an issue that we also met in the other sectors, which plays a significant

**Table 4.** Article collection procedure.

Article collection procedure	Number of studies
Initial sample of studies resulted from the research in <b>Table 3</b>	45
Dissertations	3
Other field of studies	9
General approach to ABC implementation in Greece	16
Studies disclosed in our sample more than once	5
Final Sample of studies	12

**Table 5.** Sector disclosed in our sample.

Sector	Number of studies
Construction	1
Hospitality (Hotels)	3
Education	2
Public	4
Hospitals	2
Final sample of studies	12



**Figure 1.** Time allocation of the years that the final samples of studies were published.

role to understanding of ABC suitability.

#### 4.2. Hospitality (Hotel) Sector

Hospitality sector, and specifically, hotel sector constitutes a great percentage in our final sample of studies. There is a high adoption rate of ABC system in hotel industry (Pavlatos and Paggios, 2009). In prior literature, this rate is considered “satisfactory”, since researchers have a wider sample to conduct their analysis. According to prior literature, the adoption of ABC method in hotels concerns a wide range of management accounting. The hotels that adopted ABC methods have done the implementation to all core areas of management accounting, especially in pricing decisions and customer’s profitability analysis (Pavlatos and Paggios, 2009). The hotel industry is highly competitive and its information-intensive nature requires the provision of useful and accurate cost accounting information (Diavastis et al., 2016). There is empirical evidence which indicate that ABC interaction with Accounting Information Systems (AIS) users improved hotel financial performance (Diavastis et al., 2016). On the contrary, the nonusers of ABC method support that the existing accounting systems in their hotels are satisfactory enough to switch to a different costing method. Moreover, the cost to replace the existing costing methods with ABC would be in high levels (Pavlatos and Paggios, 2009).

#### 4.3. Education

The correspondence of educational institutes to innovative cost methods’ implementation is also an issue that captured the attention of researchers, in prior literature. Education sector is a sector, where the managers are willing to implement innovative methods to increase competitiveness. However, educational institutes must be capable of comprehending the associated operational adjustments to implement an innovative costing method (Sorros et al., 2017). Empirical results, in prior literature, indicate that educational institutes do not have the appropriate qualification to accurately allocate costs. Moreover, there is a lack in data regarding overheads (Sorros et al., 2017).



#### 4.4. Public Sector

According to prior literature, ABC method have helped public sector to accurately allocate costs to avoid overvaluation and undervaluation. This trait of ABC enhances operational efficiency and profitability, in this sector (Kosmas and Dimitropoulos, 2014). Moreover, it is a tool that contributes to the smooth transition of traditional public corporation to lean corporation (Angelopoulos and Pollalis, 2017). Specifically, Angelopoulos and Pollalis (2017) mention three fundamental points that contribute to this transition:

- 1) Exact measure of activities cost (prevents distortion)
- 2) Definition of non-value added activities
- 3) Introduction of lean thinking to the employees of the corporation

#### 5. The Specific Traits of a Sector That Suit to ABC Implementation

Hospitals belong to a key sector to understand the significance of ABC implementation in specific sectors. According to prior literature, hospital industry has an extensive variety of expensive products that can be used as a tool to allocate costs (Kastanioti et al., 2016; Antonoglou et al., 2017). In this part of our research, we questioned ourselves whether there are specific industry traits that make ABC methods a suitable tool for managers. In the medical section, one thing that was widely discussed was the expensive equipment. We believe that companies with expensive equipment face a problem of overvaluation of this equipment. For example, the payment of the doctor who is the main user of an expensive equipment should be proportionally allocate to sum of all the different activities, which the doctor conducts, and not exclusively to the use of the equipment. This is the part where activity based costing makes the difference. Moreover, the existence of construction companies in our final sample enhances our findings, since there is expensive equipment in this sector. Therefore, the characteristic of ABC method to proportionally allocate indirect cost helps sectors with expensive equipment such as construction, pharmaceutical and medical companies to avoid overvaluation of their equipment.

Expensive equipment is significantly different from the nature of hotel and educational sector. In this part, we had to find the connection between a construction's company expensive equipment and the provisions of services of an educational institute. Hotel and educational institutes are also two types of sectors that domain in our research. However, the fact that the results according to the suitability of ABC implementation were vague, gave as the connection we were searching to analyze its suitability to these sectors in our research. Hotels and educational institutes are based on provision of services. However, in a developing country such as Greece, there is a variety of small companies in these sectors. The size of the firms determines its complexity. In complex firms, the activities are categorized and conducted by specific departments. In a small firm, the different activities are categorized and most of the times, they are conducted

by the same person. For example, a school teacher might organize an event or an activity for the students, which are different activities from teaching. Therefore, the companies must be capable of comprehending the associated operational adjustments to implement Activity Based Costing (Sorros et al., 2017). These companies have to use Information systems to allocate the cost to the appropriate activities. If the service-based companies have the appropriate tools to correctly implement ABC, this costing method is the most appropriate. For example, with ABC implementation, the managers understand that an expensive salary to a teacher that also participates in event planning, is not overvalued since there is no need to hire an event organizer.

## 6. Conclusion

We separated the sectors in our analysis into two categories. The first category is compromised by sectors with expensive equipment such as construction, medical and pharmaceutical companies. We believe that the characteristic of ABC method to proportionally allocate indirect cost helps sectors with expensive equipment to avoid overvaluation or undervaluation of their equipment. The second category is compromised by firms that provide services to a great extent of their businesses' functions. Especially, in small companies, where the employees conduct various task, the ABC must be carefully implemented with the use of appropriate information systems. Information systems will help the managers to allocate the appropriate costs to each employee and conduct an objective financial analysis.

Further research should be conducted on this issue, since appropriate cost methods are a significant tool for managers to minimize the information asymmetry and have better knowledge of their company. Another issue that should be more thoroughly discussed is the ABC implementation in developing countries abroad. Moreover, further research must be exclusively conducted for the sectors mentioned (Construction, education, hospitality, public, medical and pharmaceutical) in European or in a worldwide level. Finally, there are several techniques such as probit regression, logit regressions or meta-analysis that would evolve cost accounting research.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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