

*activity based costing,  
data envelopment analysis,  
costs, activities, resources*

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## **PROPOSED MERGER OF DEA AND ABC METHODS IN ACCOUNTING FOR THE COST OF HIGHER EDUCATION**

These changes affect the expectations of managers who feel the need to have more and better information for decision making. Basic knowledge of the management should be the size of revenues and expenses incurred by the activity of an organization. Activity Based Costing has been implemented more and more often in practice. However, it also has several drawbacks. That is why in the literature it is combined with other methods, e.g. with the Data Envelopment Analysis method. The paper is presenting a modification of this combination, tailored for the needs of higher education costing.

### **1. INTRODUCTION**

Modern higher education is functioning in a changing environment, characterized by intense competition, volatile legal, political and social environment and the need for continuous innovation. These changes affect the expectations of managers who feel the need to have more and better information for decision making. Basic knowledge of the management should be the size of revenues and expenses incurred by the activity of an organization. Information provided by traditional costing models are no longer sufficient. That is why Activity Based Costing has been implemented more and more often in practice. However, it also has several drawbacks. One of its drawbacks is the problem of the determination of the consumption rate of cost driver, which is usually taken as equal for all the cost objects, which does not have to correspond to reality. And wrong cost driver consumption rates may lead to wrong conclusions about cost objects, even to rejection of a product which is in fact profitable and pro-

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motion of a product which generates a loss. That is why in the literature it is combined with other methods, e.g. with the Data Envelopment Analysis method. The Data Envelopment Analysis allows to judge objects in the most profitable light for them. Thus, if the cost drivers consumption rates are chosen individually, in the most profitable way for each cost object and this cost object still turns out to be non-profitable, then it is sure that it cannot be profitable. Such an approach has been proposed in the literature. The present paper is presenting a modification of this combination, tailored for the needs of higher education costing.

## 2. METHODS

### 2.1. ACTIVITY BASED COSTING METHODS

Method of Activity Based Costing ABC was developed in 1988 by Robin Cooper and Robert Kaplan. This concept is based on the assumption that the direct cause of the costs are action, activities. Implementation of these actions results in consumption of resources, which are a quantitative reflection of the cost<sup>1</sup>. In the literature we can find many examples of cost calculations by ABC method, mostly used as a two-stage model of cost allocation. In the first phase of cost allocation according to the described method, the costs of resources are allocated to separate actions thereby creating a so-called cost pools. To determine the cost of individual pools of activities, the following formula for computing is made<sup>2</sup>:

$$\pi_j = \sum_{s=1}^S c_s \cdot n_{js} \quad \text{for } j=1, \dots, J, \quad (1)$$

where:

- $\pi_j$  – the total cost of the  $j$ -th action,
- $n_{js}$  – consumption rate of the  $s$ -resource by the  $j$ -th action,
- $c_s$  – consumption of  $s$ -resource,
- $S$  – number of categories of resources.

Identification of the main actions consists of their diagnosis, as well as revealing their sequence and interrelationships. In determining the activities, the level of detail should be chosen in such a way that I will show the important links of cause – effect relationship between cost and cost object, and that it will not lead to excessive complexity and excessive costs of the ABC system. This step is certainly a creative

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<sup>1</sup> PIECHOTA R., *Projektowanie rachunku kosztów działań*, Difin, 2005, pp. 22–23.

<sup>2</sup> HAMBURG C., *Using relative profit san alternative to activity-based costing*, Elsevier, 2004, p. 389.

## 5. CONCLUSIONS

The functioning of higher education in a changing environment forces us to seek new solutions for cost accounting and cost reduction. Model of activity based costing proposed here will provide information on the type and amount of resources used. It will also enable an analysis of activities performed by the university and cost objects generated by universities, making it possible to eliminate the inefficient ones. But what is most important, it will allow for a more accurate determination of the cost of services provided. The combination of the methods Activity Based Costing and Data Envelopment Analysis deserves attention because it allows a wider and more correct use of the ABC at universities by eliminating the drawbacks of the standard ABC approach.

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