Development and Implementation of a University Costing Model

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This article analyses the advantages and disadvantages of costing models for public universities. The authors propose a new model which uses the best of the traditional and the newer activity based costing (ABC) models. The new model will be of interest to universities worldwide.

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The study on which this article is based was carried out to attempt to solve the problems typically encountered in the development of costing models for Spanish universities. The problems came to light in debates with university managers, whose information needs were not being met by the standardized costing models available to them. Traditional costing models needed to be compared with models that were more suited to controlling the performance and results of this type of institution in Spain. Activity based costing (ABC) was found to respond positively to at least some of the problems that managers were reporting. This article proposes a new model which combines the best of the traditional and the ABC models.

Costing in Spanish Universities

Traditional Spanish university costing models have tended to concentrate on the allocation and assignment of cost to a cost object (for example a particular degree course or a research project). This is based on an arbitrary distribution using bases for assignment (keys) that not have not, in many cases, corresponded to the real situation in respect of the level of services provided, nor to the nature of the activity undertaken in the cost centres. In particular, proposals have been made in Spain for costing models based fundamentally on budgetary information, in which the cost centres have been established by the organic structure of the budget, for example the SCAU model and in the model proposed by the Spanish Association of Accounting and Business Administration (AECA, 1997).

There are significant differences between university costing models used internationally. In Spain, for example, theoretical models have been developed, whereas in the UK, the universities have implemented costing models that have proven effective in the business world (Mitchell, 1996). Recent structural changes in UK universities—the result of a reduction in funding and a big increase in the number of students—have focused attention on the financial management of the universities and on their management accounting methods (Pendlebury and Algaber, 1997).

Spain is also facing structural changes and universities need to utilize increasingly scarce resources effectively, efficiently and economically (the three Es). The *University 2000* report (CRUE, 2000) suggested replacing traditional accounting methods with more objective models that give priority to the educational objectives, provide more stable funding, encourage the three Es, enhance the quality of the services provided, and improve a university's image. The report also emphasises the need for universities to identify the products and services that they offer, and to develop analytical accounting models which show all costs and therefore are more useful for decision-making.

In the early 1990s, the Spanish government became involved and developed a system of cost accounting for the universities (SCAU) through a collaboration between the General Inspectorate of the State Administration (IGAE) and the universities of Alcalá de Henares, Carlos III and the Autonomous University of Madrid. The SCAU is an adaptation of the theoretical model put forward in the standardized analytical accounting for autonomous public bodies (CANOA) project.

The Autonomous University of Barcelona has been using a system of analytical accounting since 1992 (Folch and Cordoba, 1996). This system identifies the costs of each centre of responsibility: the teaching centres, departments, support services, central administration, research institutes and centres. It identifies the cost of each degree course both in total and in unit terms, by student. In Barcelona's model the costs of the various cost centres are assigned to the macro-activities. Basically, there are three of these: teaching of

first and second cycle courses; research, third cycle courses and other studies; and, last, support services to the basic activities and to the university community. Once the costs have been assigned to the macro-activities by means of the teaching plan, taking the percentage of each department's resources that are dedicated to each degree course, the cost of the final product or service, i.e. the cost of each degree course, is obtained.

Currently, Spanish researchers are trying to adapt the official theoretical analytical accounting models to the particular characteristics of each university (see, for example, Alcarria, 2000). The system of analytical accounting proposed will be integrated in the information systems for financial and budgetary purposes and for physical resources. This integration will require annotations to be made in the analytical accounts based on the accounts kept in the budgetary and resources management, to which additional information necessary for the analytical model will have been added. According to Alcarria (2000), the model designed will be capable of identifying the budgetary expenditure and receipts that will be considered as charges in the analytical accounts.

The University of Cadiz has developed a full costing model, which can be used to calculate the cost of one credit in a course leading to a particular degree (or other similar qualification) taught in the university. First, the different cost centres are identified and classified from the expenditure units of the budget and allocated to each principal and auxiliary centre. The cost of each auxiliary management centre is then distributed between all the other centres with which it had had some relationship, or to the degree or diploma courses if the activity of the centre is directly related to specific courses. This distribution is made in function of a unit of work, that is, a distribution variable or key. Consequently, all costs will accumulate in the final cost centres (departments or centres) or in the degree or diploma course. Finally, when all the costs of the auxiliary centres have been distributed, the costs of the principal centres are assigned to the relevant degree or diploma course.

Higher Education in Spain

Spanish universities are organized in a matrix form. One or more degree courses are taught in each centre, faculty or school. The departments are the basic units of both teaching and research activities, and plan their teaching in accordance with the course of study corresponding to each degree. The centres provide administrative support to all the departments that participate in their degree courses, and are only responsible for an expenditure budget to meet the costs of administering the infrastructures and resources of the centre. The management team includes the rector and vice-rectors, who lead and manage all the activities related to teaching, research and other academic services, and are responsible to the governing board of the university. The administrative services and other support activities are performed by professional managers and staff. New laws of university finance are now coming into force in Spain which will require the university budget to show that objectives (programme contracts) have been completed.

To deliver this, final cost centres will need to be the departments, followed by the faculties and university schools. The costing model used will need to be more flexible than the budget. It will also be necessary to have a true internal audit, to avoid any bias that may result in errors in the calculation of the costs. A major difficulty in Spain will be obtaining data on the amortizations of the fixed assets, since currently, for many universities, budgetary information is available exclusively on investments and they lack information on the management of the assets. Finally, information systems and the attitudes of management and administration personnel will need to change.

An Alternative Costing Model

The ABC model considers that it is the activities that generate the costs, and that it is the activities that consume resources and not the products directly. ABC is a costing model that requires organizations to obtain data on costs by first defining a *pool* of activities, and abandoning the concept of the accumulation of costs indirectly in departments or centres. Each of these *pools* corresponds to a group of similar processes or a homogeneous set of activities, with the cost being assigned to the pool of activities through the common factor that they are generating these costs.

ABC is a private sector invention but has been adapted to the public sector, for example for hospitals (Paulus *et al.*, 2002) and universities (Cropper and Cook, 2000). In the ABC model, the process of cost accumulation in a university is different. If we wish to identify the cost of the activities carried out in the academic departments, and hence the cost of their different outputs, the process would involve:

- Making a study of the characteristics of the particular department.
- Discussing different levels of cost objects with the directors of the departments.
- Establishing the various generators of the cost of the activities, together with the *pool* of costs for possible activities, such as research, teaching, services and doctoral courses.
- Determining the outputs of each of the activities.
- Determining the other activities carried out in support of the principal activities (technical services, the activities of a faculty dean's office, or the activities of a particular vice rector's office).
- Finally, the costs of each of the activities by output in the academic departments are calculated, taking into account the resources of the department consumed both internally and outside the department.

Examples of Universities Using ABC

For a department, the cost objects in the ABC model would be the various different outputs in research, teaching and services. To determine these cost objects, a series of activities will have been established and the costs of the activities undertaken are evaluated. In the case of teaching, such activities could be a postgraduate course, a doctoral programme, or the teaching provided on a particular degree or diploma course.

The ABC model has been useful in working towards improving university management systems (see Scapens *et al*., 1994; Groves *et al*., 1994). Goddard and Ooi (1998) adapted the ABC model to distribute the University of Southampton's library costs to the faculties and departments that used it.

In the USA, the State of Kansas has used the ABC model to unify the objectives of the teaching and research staff with those of the departments, providing information for the assignment of resources to departments, university schools and faculties (Cox *et al*., 2000).

In Spain, however, there are very few examples of experience in the implementation of 'unofficial' costing models. A version of the ABC model was developed in Florida Universitaria in Valencia (Gil, 2001). The model was developed to cost a diploma in business studies (a course offered in association with the University of Valencia), the publications service and the school of languages. The first stage was to design a map of 42 principal activities, with a series of subactivities being grouped with each; for the principal activity of 'teaching', for example, the subactivities were co-ordination of material and presentation of material were included; in the principal activity of 'evaluation', the subactivities were examination preparation, supervision, correction, marking and review.

Principal activities defined were classified taking into account the variability of the cost in function of the volume of the services performed; the consumption of resources that occurred when launching the offer of a new service; and the activities that originated within the structure of the organization itself.

One of the advantages of the ABC model is that the institution itself has to determine which are its most important activities, the costs of those activities, and their output and the means of measuring it. So the reports obtainable from this type of process provide a greater understanding of the kinds of activities taking place, and hence of the costs incurred, in the academic community; this is particularly important now because universities are offering their services in an increasingly competitive environment. Disadvantages of ABC in universities are that quality is hard to measure, as is productivity, and it is difficult to properly assign the costs of the teaching personnel to each of the activities (Paulus *et al.*, 2002; Granof *et al*., 2000).

The Transparent Approach to Costing (TRAC) is a methodology developed to satisfy the UK government's requirements for increased transparency and accountability in the use of public funds (JCPSG, 1999, 2002). The TRAC methodology is broadly based on the principles of ABC. KPMG (2003) found that the TRAC methodology is 'fit for purpose' as a vehicle for providing cost information for central reporting purposes in order to improve public accountability. The methodology provides a framework which an individual institution can enhance to provide cost information for its own purposes, for example the costing of specific research and other projects.

However, Granof *et al*. (2000) found a number of limitations and problems with ABC:

- First, the system of accounting information existing in the University of Texas had to be revised since the information it provided was not sufficient to implement the model.
- Second, the teaching staff do not work a standard number of hours per week, therefore it was difficult to calculate the time that they dedicated to each of the defined activities.

- Third, the cost of the fixed assets or property was not calculated.

Comparing Costing Models

In the traditional costing models, no differentiation is made between the costs assigned to research, teaching, and service outputs. It is only the total costs of the other centres providing services that are allowed to accumulate in the departments, which are normally considered to be the final cost centres in the standardized models. In these cost models the different activities would not be disaggregated, whereas with the ABC model, reports could be presented showing the cost of all of the activities that the university wanted to control.

We analysed the differences between the traditional and the ABC costing models from several different perspectives:

- The accumulation of cost.
- The bases for cost allocation.
- The hierarchy of costs.
- The cost objects.
- The support provided to decision-makers.
- Cost control.
- Cost of implementing the system.

Our analysis was primarily to suggest a system appropriate for Spanish universities, but our recommendations will have currency internationally.

As explained above, the ABC model forces a university to determine what are its most important activities, what are the costs of its activities, what its output is, and how to measure the output. It makes the allocation of costs more accurate. In addition, it enables the cost of activities to be assigned correctly to various cost objects, such as students, courses and services, and it improves the evaluation of the effectiveness and efficiency of activities.

The advantages that we believe could be gained from the implementation of the ABC model in public institutions, such as the universites, are clearly related to the type of information that the accounting system would provide to those holding responsibility at any level in the organization. Traditional costing models are tools for cost control at the management level, but the ABC model can provide valuable information to the levels of policy decision-making in the university, particularly to the rectors and vice rectors. At the same time, relevant information could be utilized by those responsible for management and for administrative tasks.

The ABC model allows people to find out, whenever they need to, what is being done, how it should be done, and how much it is costing to do what is being done. Therefore, it is a clear instrument for control, not only of efficiency but also of effectiveness.

The ABC model must coexist with the budget in universities, and with the traditional cost models, since they would be complementary rather than mutually exclusive.

The New Model

Taking into account our comparison and research described above, we developed a model for the calculation and management of costs for the University of Cadiz. The model is based in part on the traditional costing models, since an important requirement is to continue and maintain the organic structure of the budget but in this case it is equally important to analyse each of the activities performed and their cost, in each unit, and to relate this cost with the budgeted expenditure actually consumed, for each activity. The useful information that was finally extracted from the application of this model included:

- The cost of each teaching credit, by academic department.
- The costs of subactivities performed by the departments.
- The cost of each degree course by student, together with the extent of under-utilization of resources by groups in each centre.

This information has been included as part of the documentation to be used by the working groups that have been formed to produce a strategic plan for the University of Cadiz.

The process commenced with the costs of the auxiliary centres. These include the vice-rectors' offices, the centralized services of the rector's office (services including personnel, financial management, and purchasing and contracting), IT services, maintenance, library serves, experimental courses and so on. The principal activities were the research, teaching and services provided in each department, and the costs of these activities were assigned directly to each of the degree courses, once the cost drivers for each course were defined.

The cost objects were the various different outputs in research, teaching and services. Each of the expenditure items defined in the budget were related to the activities carried out in the departments, together with other costs originating from the auxiliary centres. By

combining models we were able to analyse all of the University of Cadiz's costs, specifically, the cost of the teaching, research and the services undertaken in each centre and each department.

Conclusions

The model described in this article provides useful information for all decision-makers, not just for accountants. Our model could be used, for example, to devise rational policies for the approval or rejection of proposed doctoral programmes or postgraduate courses, or for the admission of students.

The need for public accountability has increased considerably recently, and may now be more intense in the universities than in other types of public institution. Managers and politicians have to demonstrate the benefits of the programmes and activities funded with public money, and show that these activities are managed within approved cost limits. To do this they require useful and reliable management accounting.

Our new method of calculating costs allows public universities, irrespective of where they are located, to meet two important objectives. The first is to manage more efficiently the resources of these institutions by being able to identify activities and their costs, and by being able to obtain information on the results achieved by the departments and faculties or the centres that support them. The second is to exercise proper control over the legal execution of the budget; it should never be forgotten that ensuring the expenditure of public funds in accordance with the law is another of the important objectives that the accounting systems of a public university must fulfil. ■

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