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Theoretical framework and an overview of the cost drivers that are applied in universities for allocating indirect costs

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Abstract

The major task of cost accounting is connected with the allocation of indirect costs to cost objects. To allocate indirect costs (also called as overhead or common costs) to cost objects cost drivers are selected as the cost allocation bases. Selecting the cost drivers is critically important for developing costing methodology. In order to improve the accuracy and credibility of the allocation the most appropriate cost drivers should be selected, and more than one cost driver should be applied. Thus the decision on which and how many cost drivers to use is of critical importance. The number of cost drivers should be optimal, as an excess number of cost drivers could lead to skewed results. The aim of this article is to present the theoretical framework of the cost drivers, including the selection of cost drivers, and to report on the author's research on cost accounting. The article describes cost drivers, specifies their meaning, gives an overview of their classification, typologies, and also discusses the selection methods, relevant research papers and other issues regarding the cost drivers. The article also provides the first-time review of the study carried out on implementation of cost accounting in universities, including the use of cost drivers. The survey was conducted among different universities all over the world in the period from May to September 2013.

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1. Introduction

Appropriate information about the actual costs and allocation of costs to various activities and cost objects, and the comprehension of the origin of costs is of critical importance for each organization, including a university.

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Indirect costs assignment and the selection of appropriate accounting methods and techniques is one of the most challenging tasks in cost allocation in an organization. Indirect costs lack proper causal relationship with a cost object, and thus cost drivers are used to causally assign indirect costs to the cost object. In accounting literature the term indirect cost is also referred to as overhead cost or common cost.

Since the traditional cost accounting was considered to be a distortive accounting method, which provided inaccurate information about the costs, and ultimately led to not the most appropriate decisions, and as an accounting method it did not provide sufficient information about the costs and their origin in the organization, a search for new and more efficient allocation methods was initiated in order to prove the functional usefulness of the accounting information; hence the activity based costing (ABC) was developed (Sharma & Ratnatunga, 2007; Raz & Elnathan, 1999).

Today several universities use activity-based costing or apply its modifications, such as transparency approach to costing (TRAC), full economic costing (FEC) or full costing, as accounting technology (McChlery, McKendrick, & Rolfe, 2007; Dražić-Lutilsky & Dragija, 2012).

According to European University Association (EUA) full costing is an ability to identify and calculate all the direct and indirect costs per activity and/or project that need to be considered to accomplish these activities (Estermann & Claeys-Kulik, 2013).

Geri and Ronen, and also other researchers have pointed out importance of costing system or cost drivers and that the prime difference between the traditional absorption costing and activity based costing is the number and type of allocation bases, and in activity based costing terminology we understand the term allocation base as a cost driver (Geri & Ronen, 2005; Oduoza, 2009; Cokins & Căpușneanu, 2010).

Based on different researchers (for example Cooper and Kaplan (1988); Miller and Vollman (1991); Shank and Govindarajan (1993); Babad and Balachandran (1993); Foster and Gupta (1990), the main idea of activity-based cost drivers rests on the premise that volume related drivers are inadequate and should be replaced by non-volume related overhead, and more and diverse cost drivers are needed (Ahmed, 2005).

In an organization that has high overhead and a mix of products, projects or services using a single cost driver may distort the cost evaluation (Cooper & Kaplan, 1988).

It is required that the costs are logically and reasonably associated with the cost object when indirect costs are allocated. Thus, the choice of drivers should be carried out deliberately and with full awareness to ensure the accuracy of the costs; carefully selected cost drivers are the key issue for calculating costs accurately.

Many researchers (for example Geiger (1999); Cokins and Căpușneanu (2010); Răvaș and Monea, (2009); Dražić-Lutilsky and Dragija (2012); Sheng, (2009)) have drawn attention to the importance of the choice of drivers (Geiger, 1999; Cokins & Căpușneanu, 2010; Răvaș & Monea, 2009; Dražić-Lutilsky & Dragija, 2012; Sheng, 2009).

The decisions on the type of the cost drivers, and how many of them to select in order to allocate indirect costs accurately to the cost object, is crucial.

2. Theoretical framework of the cost drivers

Generally, cost driver is any factor, index, event or coefficient that causes a change in the costs and which is the basis for cost allocation.

Here are a few definitions of cost drivers formulated by different researchers:

- Cost driver is any factor that causes a change in the cost of an activity resulting in the activity, which consumes fewer or greater amounts of resources (Estermann & Claeys-Kulik, 2013)
- Cost driver is an event, associated with an activity that results in the consumption of firm's resources (Babad & Balachandran, 1993)
- Cost driver is an allocation base that presents the causality relation, according to the principle that any modification at the cost driver level would cause a change at the cost level (Răvaș & Monea, 2009)
- Cost driver is the driving factor that triggers costs, it is a mediating factor between cost object and directly related activities and its ultimately relevant resources (Sheng, 2009)

According to Sheng, a cost driver has some specific characteristics: concealment; relevance; applicability; accountability (Sheng, 2009).

Cost driver should have a causality relation with the activity and its cost; it should be measurable; it should anticipate and explain the use of the resources that were consumed during an activity; based on a resource capacity to support an activity (Răvaş & Monea, 2009).

Cost drivers should correctly show the relationship between a certain activity and cost objects. (Perčević & Dražić-Lutitsky, 2008; Dražić-Lutitsky & Dragija, 2012).

If a suitable cost driver is not included in the data base, or appropriate cost driver is unavailable, an alternative cost driver can be used (Ahmed, 2005).

Cost drivers have been classified and categorized in various ways. Based on different researches (for example Cooper and Kaplan (1988); Miller and Vollman (1991); Shank and Govindarajan (1993)) two main categories of cost drivers are described: volume based (traditional) and non-volume based cost drivers (Ahmed, 2005).

There are some more categories of cost drivers: activity-based cost drivers; structural or strategic cost drivers; executional cost drivers (Karu, 2008; Sheng, 2009; Ahn, 1998).

Foster and Gupta (1990) have classified cost drivers into volume, complexity, and efficiency (Ahn, 1998).

According to researchers there are two different categories of cost drivers: optional (of choice) and specifying (of determination) (Cokins & Căpuşneanu, 2010; Răvaş & Monea, 2009).

In terms of the level of allocation of indirect costs there are three types of cost drivers: resource cost driver; activity cost driver and cost object driver (Cokins & Căpuşneanu, 2010; Cokins, 2006).

Răvaş and Monea have pointed out that in the ABC three types of cost drivers are generally used: the transaction cost drivers; the duration cost drivers; the intensity cost drivers (Răvaş & Monea, 2009).

Goddard and Ooi have classified the cost drivers as the first stage cost drivers and the second stage cost drivers. The first stage drivers are used to distribute costs from service provider activity cost pools to service user activity cost pools; the second stage drivers are used to allocate the costs in the service user activity cost pools to the academic faculties and departments (Goddard & Ooi, 1998).

Cost drivers can be of unit, product, batch and facility level (Godil, 2013).

The underlying criteria for selecting and specifying cost drivers according to Cokins and Căpuşneanu are (Cokins & Căpuşneanu, 2010):

- Easy identification, use and understanding
- The existence of a direct relationship between indirect costs and cost drivers
- Positive or negative influence on staff
- Degree of complexity, diversity and variation or similarity of the product
- Degree of accuracy of calculation
- Degree of usefulness of information

Karu additionally points out that level of automation and information technology and labor intensity have to be taken into account in the selection of cost drivers (Karu, 2008).

In 1989 Cooper and Kaplan suggested three factors that needed to be taken into consideration when selecting a cost driver: cost of measurement (data availability); degree of co-relation; behavioural effect (Ahmed, 2005).

There are three selection methods of cost drivers the empirical method, which is based on the managers' experience to reasonably determine and estimate the cost drivers, which will be selected; the mathematical method for selecting cost drivers, referred to as the regression method; analytic hierarchy process (Sheng, 2009).

According Babad and Balachandran (1993); Sharman (1990); Turney (1991), the number of cost drivers depends on the type, size, number of activities and the diversity of organization (Ahmed, 2005).

The greater degree of accuracy, degree of product diversity, degree of volume diversity and using imperfectly correlated cost drivers means that a larger number of cost drivers are needed (Ahmed, 2005).

Cost driver selection must consider behavioural motivation, measurement credibility and cost of measurement issues (Geiger, 1999).

The basic principle of the ABC method appliance is in cost allocation by the most appropriate cost drivers which are causing cost to occur (Granof, Platt & Vaysman, 2000; Dražić-Lutitsky & Dragija, 2012).

Foster and Gupta (1990); Datar, Kekre, Mukhopadhyay and Srinivasan (1993); Banker, Potter and Schroeder. (1995); Duh, Lin, Wang and Huang. (2009) built both simple and multiple regression models, and used firm data to empirically test their models to select the best cost drivers (Wang, Du, Lei, & Lin, 2010; Datar, Kekre, Mukhopadhyay, & Srinivasan, 1993).

Wang, Du, Lei and Lin study followed their approach to build a series of regression models (Wang, Du, Lei, & Lin, 2010).

Researchers have also studied the cost driver optimization issue; specially Babad and Balachandran studied the optimal number of cost drivers and the selection of cost drivers, and proposed an algorithm to determine the optimal number of cost drivers (Babad & Balachandran, 1993). Levitan and Gupta proposed Genetic Algorithms to solve the optimization problem of cost drivers (Levitan & Gupta, 1996).

3. An overview of the Cost Accounting Questionnaire

The survey was carried out in the period from May to September 2013. The call to participate in the survey was firstly sent out in May, and repeated three times in the period from June to September 2013. The questionnaire, referred to as a Cost Accounting Questionnaire, has been designed in Tallinn University of Technology. The questionnaire has been developed to map the methods of cost accounting under which management decisions, including pricing, are made, and also to learn about cost accounting practices used in different universities.

The questionnaire survey was carried out among the financial managers. The survey provides an overview of 34 universities in different countries, including Australia, Austria, Belgium, Canada, Cyprus, Finland, Germany, Hungary, Latvia, Lithuania, the Netherlands, Norway, Pakistan, Singapore, Spain, Sweden, England and the United States.

The questionnaire covered the financial environment in general, and cost accounting in universities in more detail, including the accounting policies, the activities to which the costs are allocated, the cost drivers and the underlying principles for selecting cost drivers. In this article a detailed overview of the results of the survey regarding cost drivers is given.

The main questions linked with cost drivers, a short analysis of the answers, the discussion and the major trends occurring in the answers are shown below.

- The first question: Identify the cost objects for allocating costs in your university?

According to the answers the most used cost objects were structural unit (34% of respondents declared structural unit as cost object), project (25% of respondents declared project as cost object) and activity (20% of respondents declared activity as cost object), course (15% of respondents declared course as cost object). There were more cost objects named, such as client and curricula.

- The second question: What kind of drivers has your university used in cost allocation?

The questionnaire provided a list of cost drivers, among which the respondents had to mark the cost drivers applied in their universities, and add a particular cost driver, if it had not been included in the list. The most used cost drivers were the area in the working time of different employee groups, the number of different employee groups, the number of students and square meters. There were more cost drivers used, Table 1 provides a detailed overview of the cost drivers applied in universities based on the Cost Accounting Questionnaire.

FTE has to be considered as a full-time equivalent, which measures the number of employed persons or students in a way that makes them comparable.

Table 1. The cost drivers applied in universities (based on the data of the questionnaire, composed by the author of the article)

Used cost drivers picked from list (number of users)	Used cost drives additionally marked by universities (number of users)
time spent (31)	personnel costs (2)
square meters (24)	number of assets (1)
number of staff in FTE (17)	time capacity of the available teaching or research staff per activity (1)
number of students (16)	total direct cost (1)
number of academics in FTE (11)	tuition (1)
number on research staff in FTE (10)	result of research (1)
number of credits (10)	direct operating costs (1)
income (9)	number of students in FTE (1)
head count personnel (8)	total costs (1)
undergraduates (7)	
number of research projects (5)	
number of tutorial hours (4)	
number of graduations (4)	
teaching students (4)	
number of post-graduate students (4)	
number of research grant applications (3)	
student types (3)	
invoices processed (2)	
courses or subjects or credits (2)	
number of new enrolments (2)	
number of examinations (2)	
number of applications (1)	
number of lecture hours (1)	
graduate students (1)	

The study shows that from five to nine cost drivers are used in general, it means that 43% of the respondents use five to nine cost drivers. That result differs somewhat from the result of the study by Cropper and Cook, who showed that 50% of the respondents used or proposed from five to nine cost drivers. Cropper and Cook studied the state of costing within the higher education sector in the UK, and they also examined the number of cost drivers used or proposed. They reported that half of the respondents used or proposed from five to nine cost drivers; 40% of the respondents used or proposed from one to four cost drivers, and 10% of respondents used or proposed ten or more cost drivers (Cropper & Cook, 2000). The rest of the analysis results based on the Cost Accounting Questionnaire are shown in Table 2.

Table 2. The number of cost drivers used by universities in 2013 (based on the data of the questionnaire, composed by the author of the article)

Number of cost drivers	Number of respondents	% of respondents
1 to 4	11	37
5 to 9	13	43
10 or more	6	20

According to the Cost Accounting Questionnaire the maximum number of cost drivers was 18, and the least number of cost drivers used was only 1.

- The third question: What kind of time allocation method does your university use?

As the time spent was one of the most used cost drivers, time recording is also a very important topic. The administrative and technical complexities, such as time recording, are the main reasons for rejection or failure of costing methods. Therefore for contributing to this field it is extremely important to study the experience of other universities. The Cost Accounting Questionnaire paid attention to that subject. An overview of the used time recording methods is presented in Table 3.

Table 3. Time recording methods (based on the data of the questionnaire, compiled by the author of the article)

Time recording method	Number of users
Labor data report completed by employee and turned in weekly or monthly	9
Periodic estimates of time spent on activities completed by employee	9
Periodic evaluations completed by someone other than employee	7
Workload planning models	3
Proxies	3
In-year retrospective	2
Diaries	1
Labor data report completed and turned in biweekly	1

- The fourth question: Please note what kind of cost drivers you use to allocate following costs or activities of your university?

The cost drivers used for allocating a specific cost or activity were studied in more detail. The respondents had to include the cost drivers used in their universities to the list of costs or activities already provided in the questionnaire. The most used cost driver regarding personnel, IT, finance, legal and international relation services, marketing and auditing activity and staff facilities was FTE. FTE was also the most used driver regarding the administration of teaching, academic services, management and support activities of the institution and the management of the university. The most used cost driver regarding premises, estate, depreciation, loans and interests were square meters. The time spent was the most used cost driver regarding salaries, administration of research and the management and support activities of a department/college/school. The number of students was the most used cost driver regarding library services. The detailed study results, based on the Cost Accounting Questionnaire, are presented in Table 4. The results are grouped and presented identically according to respondents.

Table 4. The cost drivers used for allocating a specific cost and/or activity (based on the data of the questionnaire, composed by the author of the article)

Cost or activity	Cost driver (number of users)
Salaries	time spent (9), FTE (4), income (1), tuition (1), head count (1), personnel costs (1), budget/planning (1), direct cost (1), number of credits (1), structural unit (1)
Loans and interest	square meters (3), occupancy (1), capital spent (1), direct cost (1), personnel costs (1), FTE (1), time spent (1), income (1), structural unit (1)
IT/computer services	FTE (5), academic personnel and students (1), time spent (2), head count (1), tuition (1), income (1), student load (1), personnel costs (1), direct allocated salaries (1), activity (1), costs (1), structural unit (1)
Staff facilities	FTE (4), square meters (4), time spent (2), direct allocated salaries (1), income (1), tuition (1), academic personnel and students (1), personnel costs (1), costs (1), structural unit (1)
Premises/estate	square meters (9), occupancy (1), income (1), tuition (1), personnel costs (1), direct allocated salaries (1), time spent (1), academic personnel and students (1), structural unit (1)

End of Table 4

Cost or activity	Cost driver (number of users)
Depreciation	square meters (7), occupancy (1), direct allocated salaries (1), investments (1), number of assets (1), personnel costs (1), FTE (1), time spent (1), academic personnel and students (1), direct costs (1), structural unit (1)
Finance service	FTE (5), time spent (2), costs (2), activity (2), academic personnel and students (1), direct allocated salaries (1), equally across group (1), income (1), tuition (1), number of invoices processed (1), personnel costs (1)
Personnel service	FTE (6), time spent (2), costs (2), academic personnel and students (1), head count (1), direct allocated salaries (1), equally across group (1), income (1), tuition (1), number of invoices processed (1), activity (1), personnel costs (1)
Marketing activity	FTE (6), time spent (2), costs (2), income (1), activity (1), tuition (1), new students (1), academic personnel and students (1), personnel costs (1)
Academic services	FTE (4), time spent (2), number of students (2), activity (1), equally across group (1), graduate students (1), undergraduate students (1), tuition (1), number of credits (1), number of examination (1), number of invoices processed (1), academic personnel and students (1), researchers (1), costs (1), personnel costs (1)
Administration of teaching	FTE (6), number of student (3), time spent (2), academic personnel and students (2), direct to teaching allocated salaries (1), graduate students (1), undergraduate students (1), tuition (1), number of credits (1), number of examination (1), costs (1), personnel costs (1)
Administration of research	time spent (5), FTE (3), number of research grant application (2), research income (1), tuition (1), research project value (1), costs (1), number of grant (1), academic personnel and students (1), personnel costs (1), direct to research allocated salaries (1), turnover in third-party funds (1), result of research (1)
Legal activities	FTE (4), time spent (2), costs (2), income (2), tuition (1), academic personnel and students (1), personnel costs (1), activity (2)
International relation activities	FTE (3), time spent (3), graduate students (1), undergraduate students (1), international students number (1), number of students (1), tuition (1), number of examination (1), academic personnel and students (1), costs (1), personnel costs (1), activity (1)
Auditing activity	FTE (4), direct allocated salaries (1), equally across group (1), graduate students (1), undergraduate students (1), income (1), tuition (1), academic personnel and students (1), costs (1), personnel costs (1), time spent (1)
Library services	number of students (4), FTE (3), time spent (2), graduate students (1), undergraduate students (1), tuition (1), number of loans (1), academic personnel and students (1), costs (1), activity (1), researchers (1), personnel costs (1), direct allocated salaries (1)
Membership fees	income (2), cost (1), cost centre (1), tuition (1), personnel costs (1), time spent (1)
Management of university	FTE (5), costs (3), income (2), time spent (3), academic personnel and students (1), equally across group (1), direct allocated salaries (1), tuition (1), personnel costs (1)
Management and support activities of department/college/school	time spent (3), activity (3), costs (2), FTE (2), direct allocated salaries (1), global time capacity of the available teaching and research staff per activity (research and teaching) (1), graduate students (1), undergraduate students (1), tuition (1), number of credits (1), personnel costs (1)
Management and support activities of institutional level	FTE (5), costs (3), equally across group (1), graduate students (1), undergraduate students (1), income (1), tuition (1), personnel costs (1), time spent (1)

The lack of a common terminology and understanding in area of cost drivers in the higher education sector exists and leads to confusions and makes comparisons difficult. For example, are the named cost drivers (FTE, academic personnel and students, number of students) similar or not? What means exactly “research project value”? Are “budget/planning”, “structural unit” or “equally across group” cost drivers?

- The fifth question: Why has your university chosen such drivers?

The study on the causes for the selection of cost drivers indicates that the majority of cost drivers are chosen regarding the cause-and-effect relationship, and the selection is based on the availability of data. That particular

result of the study confirms the theory: the cost driver should have a causality relation with the activity and its cost. 37,0% of respondents declared only one reason to choose cost drivers. Some respondents declared more than one reason to choose cost drivers. A detailed overview of the causes for the selection of drivers, based on the Cost Accounting Questionnaire, is shown in Table 5.

Table 5. Cause of selecting cost drivers (based on the data of the questionnaire, composed by the author of the article)

Cause of selecting cost drivers	% of all respondents	number of respondents
Exists the cause-and-effect relationship	37,0	10
Easy access of the data	22,2	6
Biannual or annual data collection can be used, exists the cause-and-effect relationship	14,4	4
Easy access of the data, exists the cause-and-effect relationship	11,1	3
Biannual or annual data collection can be used	3,7	1
Easy access of the data, biannual or annual data collection can be used	3,7	1
Easy access of the data, biannual or annual data collection can be used, exists the cause-and-effect relationship	3,7	1
Recommended by authorities	3,7	1

4. Conclusion

A theoretical framework regarding with cost drivers is given and it is extremely important knowledge for universities. A detailed overview of used cost drivers, the causes for the selection of cost drivers is given, but, there are some problems. The lack of a common terminology and understanding in area of cost drivers in the higher education sector exists. Choosing appropriate cost drivers for a university is never easy. There is no standard and all-inclusive cost accounting system or costing model to suit each and every organization. Considering its specifics, university chooses its own cost accounting methods, including the cost drivers, activities and etc. To build up understanding and aware of costing and cost drivers is extremely important and to study the theoretical framework and experience of other universities is needed. In that field more and specific studies are needed.

The setup of the costing model should start by identifying the different activities that need to be financed, the selection of cost objects and the definition of cost drivers on the basis of which an allocation method can be built.

The decision on the number and type of cost drivers is of critical importance. The choice of drivers plays a significant role in ensuring the quality of cost accounting information. There is a common understanding that the use of more drivers provides more accurate results and that appropriate drivers should be used. However, there is also an understanding that the number of cost drivers should be optimal. Services offered by universities have become much more diverse, and the indirect costs account for an increasing proportion of university expenses, hence it should be taken into account that one cost driver is not adequate when indirect costs are high and the range of services diverse, as it may lead to completely distorted results. The selection of drivers should be performed with ultimate care and awareness, and there should be compromise between the accuracy, correctness and measurement costs. In further studies on cost drivers the research should primarily focus on content of cost drivers and the methods of the selection of drivers (empirical, regression or analytic hierarchy process) in more detail.

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