Bachelor's Thesis Accounting

The effect of activity-based costing on decision-making and performance.

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Management summary

This study examines the cost allocation method activity-based costing. In this study will be investigated whether there are benefits for organizations using activity-based costing in decision-making and control, and whether organizations obtain a better manufacturing and financial performance when they use the activity-based costing system.

In order to give an answer to the research question: "Does activity-based costing have an effect on decision-making and performance?", a literature review is conducted. This literature review shows that the detailed data that are generated from the activity-based cost system can be used in decision-making. Detailed information is provided and managers can see which activities in a production process add value and which activities do not add value. On the basis of the detailed data, managers can make optimal decisions. Activity-based costing also has an effect on control within an organization. The result is that employees are more aware of the fact that the resources in the organization have to be shared, and that when someone uses a resource, they have to pay for it. This reduces moral hazard. By making use of activity-based budgeting, an organization can control managers or employees as well as costs even better.

The literature review shows that activity-based costing also has an effect on the manufacturing performance; quality improves, costs and manufacturing time are reduced. The benefits for the financial performance are harder to examine. Return on investment improves when activity-based costing is implemented in a diverse and complex organization. However, this depends not only on the cost system.

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1. Introduction

1.1. Problem indication

Cost information is an important source of information. Organizations use it in external reporting, but also within the organization cost information is essential. A manager uses this information as a basis for making decisions or as a basis for controlling the organization. He can for instance decide what the selling price of a product or service should be, or he can calculate what profit he can make. However, the allocation of costs to different departments of the organization is not that simple. Different methods exist to allocate costs, like the direct method or the activity-based method. The activity-based method is a refined costing system, which reduces the use of broad averages for assigning the costs of resources to cost objects (Bhimani et al., 1999). An activity-based costing system focuses on individual activities as the fundamental cost objects.

Activity-based costing can be used for the improvement of business processes, and as a consequence, it realizes competitive advantage (Turney, 1992). This is called activity-based management. Activity-based costing then is used in decision-making; to what extent this costing system influences the decision-making process will be expounded in chapter five. Another important thing to know is whether the decisions are influenced positively or negatively by the activity-based costing system. This is important to know, because organizations can use activity-based costing for better and more efficient decision-making when the influence is positive.

Activity-based costing might also have an effect on the control in an organization. Employees need to be motivated and controlled; activity-based costing could be the perfect solution to do this effectively. Do the employees in the company perform better with this costing system? And on the other hand, can costs be controlled well?

Some theories state that organizations that use an activity-based cost system perform better than organizations that do not use this system. But: to what extent? Are the revenues higher when using this costing system or does it not make any difference? And has it got any influences on the product quality?

1.2. Problem statement

Organizations always make costs for the products they sell or the services they offer. It is important to have good control over these costs; when the costs are not known within the organization, the managers do not know whether they make profit or not. However, when they are familiar with the costs they can make smarter decisions and keep everything in control. Organizations and academics searched for new and improved cost allocation methods with very detailed information for better decision making. Cooper and Kaplan (1988) started to introduce the cost system activity-based costing. By making use of this system, this study will examine whether this system is helpful to improve decision-making and control, and whether this system has an effect on the performance of an organization.

Firstly, activity-based costing and activity-based management will be defined and explained. Subsequently, the research will try to find out whether the usage of activity-based costing has an effect on the decision-making and control of the organization, and whether activity-based costing affects the performance or profitability of the company.

1.3. Research questions

This study will try to find an answer on the following research question:
"Does activity-based costing have an effect on decision-making and performance?"

In order to get a clear answer to this research question, there will be dealt with three sub questions:

- *What is implied by activity-based costing?*
- *What is the relationship between activity-based costing and decision-making and control?*
- *What is the relationship between activity-based costing and the performance of the organization?*

In their external reports, companies often do not state which cost system they use; it is hard find data about this subject. Therefore, a literature review will be conducted in order to answer the research questions.

1.4. Structure

In chapter two and three, the concepts cost allocation and activity-based costing will be explained, subsequently, the concept activity-based management will be dealt with in chapter four. The effect of activity-based costing on decision-making and control will be treated in chapter five. The sixth chapter will expound whether using the cost system activity-based costing has got an effect on the manufacturing or financial performance of an organization. Finally, a conclusion and recommendations for future research will be given.

2. Cost allocation

In an organization, costs are made for producing goods and extending services. Zimmerman (2009) defines costs as 'cash or other assets that must be surrendered or future claims that must be given in order to achieve a specific goal'. Costs can arise in different categories. In cost accounting, there are two important categories of costs: direct costs and indirect costs. Direct costs are easily traced to the product or service, like direct labor. Indirect costs however, cannot directly be traced to a unit produced, such as insurance and property taxes. Indirect costs are also called overhead costs.

Costs have to be allocated to different departments, products or processes, so they will not weigh down on the entire organization. Reasons for allocating costs are that an organization has to report revenues for external reporting and that the organization can estimate prices for the sales market (Zimmerman 2009). It is also used for decision-making and control, more about this is explained in chapter four.

The allocation of direct costs such as costs for material is quite simple; these costs can be directly traced to a certain cost object because the amount of material used per product is known. The cost object here is the product. However, the allocation of indirect costs or overhead costs gives a problem. Overhead costs cannot directly be traced to a production activity because these costs arise in providing benefit to different cost objects. The costs need to be spread among the different cost objects; this can be done in various ways with various costing systems.

For the allocation of costs firstly the cost object has to be defined. A cost object is a department, product or process to which costs will be allocated (Zimmerman 2009). The organization has to decide on basis of which cost object the overhead costs will be allocated. When this has been decided, the overhead costs can be allocated to the chosen cost object. To do this, the organization must choose an allocating method, for instance the activity-based cost method. The method chosen determines the amount of profit that will be gathered for a certain product: the amount of costs allocated to a certain product by using the direct method can be different from the amount of costs allocated using for instance activity-based costing.

Production volume is not the real driving force behind overhead costs; transactions dealing with quality or logistics are the real driving force (Miller and Vollman 1985). These transactions often are not proportional to the production volume, but the costs of the transactions are in fact allocated to the total production volume. In this way, the costs of the products possibly will be distorted and manufacturers will overstress product lines that are less profitable (Shank and Govindarajan 1988). Therefore, it is useful to apply a cost allocation system that allocates overhead costs based on multiple cost drivers. The activity-based cost system is a system that works with multiple cost drivers and using this cost system might be an advantage for the organization since the overhead costs will be allocated more accurately.

3. Activity-based costing

3.1. Concept

Companies used to produce only a few different products. Direct labor and material were the most important production costs and the indirect costs were low. However, nowadays companies offer more different products and a larger number of products than in the past and indirect costs have increased. Therefore it is harder to allocate these indirect costs accurately to the products. Costing methods will help the companies to allocate the costs as accurate as possible.

In a production process, products often need to be transferred from one location or department to another department, or products have to be inspected. These activities and other activities that will take place during the production process will cause costs for the company. Activity-based costing is based on the consumption of these activities (Andrade et al. 1997). Andrade states that the central idea of activity-based costing is that "activities consume resources and cost objects consume activities". The activity is the cost driver in this allocation method. The costs will firstly be allocated to the activities, and then the costs will be further allocated to the products. So, the costs for the activities that support production are treated as production costs. Often more than one activity is consumed during a production process, so activity-based costing is based on more than one cost driver. Other allocation methods are based on just one single cost driver.

Before a company can use activity-based costing, it has to determine all activities of the company that are relevant for the production. Subsequently, a unique cost driver will be identified, associated with the different activities. The information that the management attains through activity-based costing is very detailed, and it describes activities that are important for the profitability of the firm. The performance of certain activities is linked to the demand that these activities make on the company's resources. The revenues can be directly linked to the costs (Cooper & Kaplan 1992). The costs of the activities used for the production process are multiplied by the frequency in which the activities occurred. When this is accumulated, the bill of activities arises.

Using activity-based costing, the management of a company can determine the full cost price of a product. The basic concept is that the direct costs will be traced directly to the products, and the indirect costs will be allocated in accordance with the cost driver of the activities (Cooper & Kaplan, 1988). By doing this, detailed information about all activities is obtained. The managers within an organization can see precisely which activities are expensive and which activities add value to the product. The cost price that is calculated with activity-based costing as a base is different from the cost price that is calculated by using another cost allocation system, because overhead is allocated in a different way.

3.2. Cost drivers

Cooper and Kaplan (1991) distinguish four categories of cost driving activities. The first category is the unit-level activity: the costs for this activity arise for each unit produced, such as direct labor and costs of material. Batch-level activities are activities that are performed once for a group of products, independent of the size of the group; for example the setup of a machine. The third type is the product-sustaining activity, an activity to support the production of a product type. How often this activity takes place depends on the number of product lines, not on the number of products. All remaining activities are part of the capacity-sustaining activities, which are most of the time fixed costs such as plant security. The costs for these activities arise anyway, and do not depend on the number of products produced. This type of activities is a non-volume cost driver.

As the figure below shows, unit-level activities have the highest variability because these activities are different for each product. Capacity-sustaining or facility-sustaining activities have the lowest variability because they are the same for all products (Mitchell, 1994).

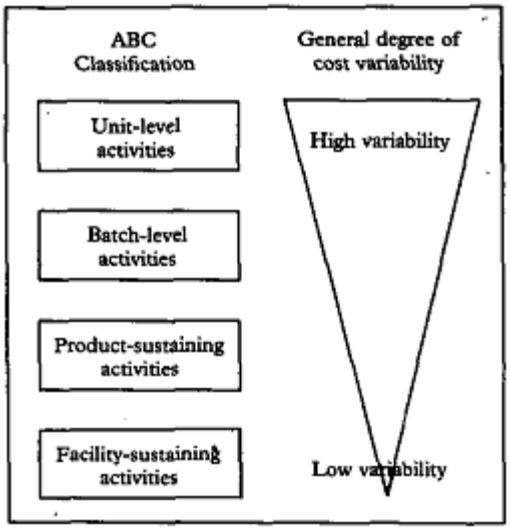

Figure 1. Cost hierarchy, Mitchell 1994.

The number of cost drivers determines the accuracy of the activity-based costing system. An activity-based costing system with many cost drivers has the disadvantage that it is costly and complex to understand (Merchant and Shields 1993). However, when the company uses many cost drivers, this will be more accurate than using only a few cost drivers (Babad and Balachandran, 1993). The chosen cost drivers also influence planning and control: production costs should be planned and controlled for each chosen cost driver. So if there are many cost drivers, this cannot be effective or efficient. The company has to find a balance between accuracy and costs or complexity.

When a company has to deal with many different cost drivers, it would be useful to select some cost drivers and to replace a single cost driver by a combination of the chosen cost drivers (Homburg 2001). In this way, multiple cost drivers are used but it seems uncomplicated because the cost drivers are combined. This leads to an accurate cost system and it reduces the overweighting of selected cost drivers.

3.3. Implementation

When a company decides to adopt activity-based costing, it firstly has to set up an implementation plan. Commitment by the management needs to exist to implement activity-based costing with success (Beheshti 2004). This commitment should be integrated in the business culture, by using training programs and team building efforts.

All employees should be involved so activities that do not add value can be determined quickly. According to Cooper et al. (1992), a plan has to be introduced before implementing activity-based costing, because otherwise the new system will only be used within the finance and control group. When the entire organization works with the activity-based costing system, the organization has an accurate understanding of which resources are consumed by which activities. All actions can be corresponding to this knowledge to improve the profit performance.

3.4. Successes and criticism

Foster and Swenson (1997) have analyzed the success of activity-based costing. Success can be measured in different ways. Foster and Swenson distinguish four types of success measures. The first measure is based on the use of activity-based cost information in decision making: it assumes that the more information from activity-based costing is used, the higher is the success of the implementation. The measure based on decision actions, holds that activity-based costing is viewed as successful when this information influences the decisions of the management. The second measure of success is based on the financial improvements in the company as a result of the usage of activity-based costing. Finally, the measure based on management evaluation of overall success of activity-based costing is a general measure. Studies show that when a large sample is used, there is evidence that activity-based costing has a positive effect to the manufacturing performance of an organization (Ittner et al. 2001). The usage of activity-based costing is also associated with higher quality levels, but it has no significant effect on the return on assets. The benefits of better manufacturing performance and higher quality levels arise from improved information by using of activity-based costing. The information about the product mix and strategic decisions is more detailed than without activity-based costing, so the manager has a better insight into the production activities and the economics of production. The information makes clear which activities add value and which activities do not, and it makes clear what the root drivers of the costs are (Anderson and Young 1999). By using this information, managers can try to reduce and optimize the manufacturing costs, for example by eliminating non-value adding activities in the production process. The manager can also try to identify activities which add extra

quality, and consequently invest in these activities (Ittner, 1999). Also, using activity-based costing, the price setting of a product is more accurate than when a traditional costing system is used.

Alternative methods for measuring the success of an activity-based cost system exist. Shields (1995) for example, discovered that the success of activity-based costing is linked to behavioral and organizational variables such as support from top management; the offer of training in implementing and applying activity-based costing; and performance evaluation. Technical characters are not associated with success. Innes et al. (2000) state that larger companies and companies from the finance sector adopt activity-based costing more often than smaller companies.

Naturally there are also researchers who criticize activity-based costing. Turney for example (1990) states that the activity-based costing system is too expensive and too intricate to implement. The system is complex and hard to understand for the users, so a company should offer trainings, and trainings are expensive. Another critic is that too many activities might be taken into account, by which it will still be difficult to have a good insight in the cost structure. Moreover, the management should not only base decisions on the information that comes from the activity-based cost system. For example, when a manager concludes that a certain product is not profitable according to the information from the activity-based cost system, he should not decide to just leave out this product, because it might be a product that satisfies the customer. Hence the manager must not only depend on the given information, but also keep in mind that the wish of the customer is important for the company to continue.

4. Activity-based management

4.1. Introduction

Activity-based costing not only is used for setting prices: when information from an activity-based costing system is used for the improvement of the business processes and the realization of competitive advantage, this is called activity-based management (Turney, 1992). The costing system also has a role in the process of improvement. It provides information about processes, points out priorities of improvement, motivates and influences appropriate behavior and measures the improvement effect (Turney & Stratton 1992). However, the costing system does not do this by itself. The true benefit can only be measured considering the actions of the management. The company will not achieve improvement without the decisions of the management.

4.2. Usage

According to Theunisse (1992), information from activity-based costing can be used in a company for four different purposes. These are (1) strategic costing, (2) profitability analysis, (3) cost reduction and (4) performance measurement.

Strategic costing generates new product costs. This leads to more acceptable prices for a company, while more information about the composition of the price is known.

Profitability analysis considers the profitability margin, the difference between costs and revenues. The company assumes that not all costs are linked to production, so not all costs have to be allocated to products. Using information from an activity-based costing system makes it clear which clients or regions are profitable, so the manager can put the emphasis upon these clients or regions.

Cost reduction can be obtained using the activity-based cost system for cost analysis. Cost drivers can be analyzed and with this data, the management can try to reduce costs of production. In a cost driver analysis, activity level drivers and cost input drivers come forward. The activity level drivers determine the frequency of an activity to be repeated, and the cost input drivers determine the total costs, for example the level of education of the employees.

Performance measurement helps managers to control their division. Activity-based costing helps to analyze success factors for the production, so the manager will have a control over the situation.

5. Activity-based costing and decision-making & control.

5.1. Decision-making

An activity-based cost system provides more detailed information about the activities used in a production process (Zimmerman 2009). Managers can analyze whether a specific activity adds value to a product or which activities are expensive. Managers can use this detailed information in their decision-making process: they can decide to eliminate activities that do not add value and in this way try to make the production process more efficient and less costly. All various allocation methods give different information, data from cost allocation systems other than activity-based costing are less detailed and a manager cannot see per activity whether it is profitable or not.

In decision making, the data that arise from an activity-based cost system can be used for short-term or long-term decisions. In short-term decisions, many costs are uncontrollable because for example, employees are appointed, investment decisions are made or contracts with suppliers are signed (Wouters, 1994). Greenwood and Reeve (1992) state that the data provided by activity-based costing systems is only a starting point in making decisions. An analysis of costs and revenues is required. This analysis will show how the costs of resources and the revenues will change as a result of a specific decision.

Wouters (1994) demonstrated that managers wish to use cost allocation methods because of uncertainty. In a model for a short-term decision, the contribution margin of the activity is certain, but it is uncertain whether there is a better option. The better option is blocked when the activity that gives a certain contribution margin is accepted. An activity-based cost system gives managers a better vision of the risk they take when they do not accept the activity that has a certain contribution margin. Therefore, information from activity-based costing is relevant for short-term decisions and more reliable decisions can be made.

When an organization applies activity-based costing, cost behavior patterns are more explicit, cause and effect are linked and average costs are provided in a detailed way

(Mitchell 1994). The detailed overview of the average costs is relevant for decision-making. By making use of this overview, the management can try to maximize profit on the short-run and on the long-run. An activity-based cost system cannot generate opportunity costs, but it can give a proxy measure of it, so managers can base their decisions upon this information. Activity-based costing gives a good indication of product costs on the long-run (Johnson & Kaplan 1987), because it takes into consideration that product costs vary over different time perspectives.

5.2. Control

Activity-based costing does not only have influence on decision-making and the control of cost drivers, but can also influence and control the behavior and motivation of employees through the impact on rewards and performance measurement. The first explanation for this control is, according to Zimmerman (1979), that through allocation the employees learn that the resources in the organization have to be shared. Activity-based costing reflects the way in which the organization makes use of the shared resources when the final output is produced. Overhead rates correspond to a set of taxes for using the resources. When a resource is used, tax is paid, so the management wishes to reduce the utilization of expensive resources and uses cost-effective standard resources. A second explanation is that cost allocation can reduce unnecessary consumption by managers. The activity-based cost system can strengthen its monitoring capacity and therefore can reduce moral hazard. Moral hazard occurs when costs of managerial responsibility are allocated from one area to another, where it becomes an influence on the financial performance of that area. The management of that area is then more motivated to reduce costs. A direct control link between the users of the output and providers of activities is also provided by activity-based costing through the cost driver rates.

The data from activity-based costing can be used for the control of costs as well. Lower-level managers have specialized knowledge of the cost drivers in their department: when there are many cost drivers, these lower-level managers have more control over the cost drivers within their department. The costs these cost drivers cause, can be controlled by the lower-level managers (Zimmerman 2009).

5.3. Activity-based budgeting

Another thing activity-based costing can provide to exercise control, is setting a budget (Mitchell 1994). In an organization, managers are responsible for everything that is linked to their department. Often they also get a budget, by which they are held responsible for the control of costs in their department. This budget can be set on the basis of activity-based costing; this is called activity-based budgeting (Brimson & Fraser 1991). When using activity-based costing for the budgeting however, the link with responsibility and ownership might be confused: an activity can cross several departments and it is not clear anymore who is responsible for what activity. It may be necessary to determine a matrix that describes the structure of the budgetary process (Bhimani & Piggot 1992).

Activity-based costing provides an activity profile which will be used as the basis to construct the budget. Furthermore, the cost driver volumes indicate the level of service, which can be the starting point for negotiations on the resource requirements of an activity (Noreen, 1991). Activity-based budgeting gives detailed financial feedback: for each activity, variance information will be determined (Cooper & Kaplan, 1992). Unused capacity or over-provision can be identified and a program for cost reduction can be established on basis of this information (Kaplan 1994).

6. Activity-based costing and performance

Performance measurement is defined as: ‘direct or indirect measures of actions of individuals or groups of individuals within the organization’ (Zimmerman 2009). Performance can also be the performance of the organization itself; whether the organization is profitable or not. One of the sub questions of this research was whether activity-based costing has an effect on the performance of an organization.

6.1. Manufacturing performance

According to Anderson and Young (1999), activity-based costing provides three types of benefits to the operational system of an organization: (1) improved quality; (2) lower costs and (3) reduced manufacturing time. By using information from activity-based costing, managers can reduce the number of non-value adding activities and in this way reduce the production costs. The efficiency of existing activities will be increased and the coordination with suppliers and customers will be improved. Also, activities which cause poor quality will be identified, as a result of which poor quality can be eliminated and the overall quality increases. A reduced manufacturing time is made possible by identifying certain non-value-adding activities that increase manufacturing time, such as counting. When these activities are known, investments can be made to reduce the cycle time of these activities and information can be generated to minimize delays.

Ittner, Lanen and Larcker (2002) demonstrate that the extensive use of activity-based costing leads to positive financial and operational performance. The use of activity-based costing is also positively associated to the plant’s quality level and it reduces the manufacturing time. Activity-based costing has no direct effect on the manufacturing costs, but it does have a significant indirect effect on these costs through cycle time and quality improvements.

Cooper (1989) argues that the net benefits of using an activity-based costing system depend upon the operational characteristics of a plant. For example, economic benefits from the use of activity-based costing increase when the company has greater product variety and broader product lines, because there is a difference in overhead consumption

by the products. Cooper also states that activity-based costing is more useful when more new products are introduced. The cost system then can measure differences between the old and new products in the use of overhead costs.

For some companies, the adoption of activity-based costing does not have an effect on the performance, for example when the activity-based costing system uses activities that are not important in the production process (Reeve 1995). Because the emphasis lies upon activities that are less important in the process, the performance cannot be measured efficiently.

6.2. Financial performance

The previous section showed that activity-based costing has an effect on the manufacturing performance. Some theories say that activity-based costing also influences the financial performance of an organization. Cagwin and Bouwman (2002) state that the return on investment improves when activity-based costing is implemented in a company that is diverse and complex, and in an environment where costs are important. It is also stated that manufacturing companies enjoy more benefits than non-manufacturing companies when using activity-based costing. However, the financial performance of a firm is not directly affected by the increased use of activity-based costing. The benefits in financial performance are influenced by specific environmental conditions, like a competitive or complex environment and sophisticated information technology (Pattison & Arendt, 1994). For other strategic business programs is hold that the improvement in financial performance of the firm is greater when these programs are used in combination with an activity-based cost system than when these programs are used without activity-based costing (Cagwin & Bouwman, 2002). Strategic business programs are programs such as just-in-time delivery and total quality management.

The financial benefits can also be increased by eliminating or decreasing the number of non-value adding activities. Non-value adding activities are costly while they do not add value to the product. This is already explained in chapter three; an activity-based cost system analyzes the activities used in a production process. A manager now can see which activities do and which do not add value to the product. By eliminating the

activities that do not add value, the net profit can be expanded (Anderson and Young 1999). Managers can also use activity-based costing to analyze profits that are obtained per brand, product line or region. With this information, the manager can decide to supply more products or reprice some products in a certain region and so acquire more profit, or stop supplying products in a non-profitable region (Cooper & Kaplan 1991).

7. Discussion and conclusion

7.1. Conclusion

This study examined whether the use of activity-based costing has an effect on the decision-making process of an organization, the control within the organization and the performance of the organization.

Activity-based costing has an effect on the decision-making process: more accurate decisions can be made. An activity-based cost system gives a detailed and accurate overview of all activities used in an organization and all costs connected with these activities. Managers base their decisions upon the detailed information generated with this system so this information influences the decisions of the managers. Because the information is very accurate, decisions fit in better with the available resources in the organization. Activity-based costing also reduces some uncertainty about the impact in the future of a decision. This makes decisions more reliable.

Activity-based costing also has an effect on the control of behavior and motivation of employees and on the control of costs. Employees become more aware of the fact that resources have to be shared and that the department that uses the resources has to pay for the use. The employees are motivated to use cost-effective standard resources. Also, activity-based costing can strengthen the monitoring capacity, what will reduce moral hazard. The organization can control employees and managers better by using activity-based costing.

Activity-based budgeting follows from activity-based costing, so activity-based costing also influences the kind of budget. To control the costs within the organization, an activity-based budget is given to the managers. The budget is very detailed and gives the managers detailed financial feedback. A plan to reduce costs can be set up using this feedback.

The literature review shows that activity-based costing also influences the manufacturing performance: quality improves, costs decrease and the manufacturing time is reduced because non-value adding and quality-decreasing activities can be determined when activity-based costing is applied. Whether the cost system influences financial performance as well, is harder to tell. Proven is that the return on investment improves

when activity-based costing is implemented in a complex firm where costs are important, but this is not only caused by the cost system. However, financial performance can be improved when the number of non-value adding activities is decreased to make more profit.

7.2. Recommendations for future research

Not much is known about the effect of activity-based costing on the financial performance of an organization. Cagwin and Bouwman (2002) described the relationship between financial performance and the cost system, but their research showed that activity-based costing only has a significant effect on the financial performance when various conditions are satisfied. In future research, this should be studied more detailed.

Also it should be useful to have more empirical data on the subject, so clearer conclusions can be drawn. However, this data is hard to collect because in their external reporting, organizations do not state which cost system they use. In a future research the data can be collected not by using data bases, but by sending a questionnaire to various companies. By analyzing this empirical data, the researcher can conclude whether activity-based costing has a significant influence on the financial performance of an organization.

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