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## **Contribution Accounting – a planning and controlling tool to observe costs and profit achievements within management decisions**

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Contribution accounting combines and converts economic quantities and values to support managers in question of cost analysis and pricing. An efficient contribution accounting system ensures transparency and displays the fit of liquidity planning and market planning. It helps to compare costs and shows whether the business is achieving its profit goals. Generally spoken the core of accounting is collecting and analysing of financial data. But how then to take proper management decisions in a next step? Hence evaluation and prioritisation of data is very important for the decision takers. If the collected data is not capable of improving the quality of decisions, so why to produce it? This leads to the ultimate purpose of accounting: to achieve a comprehensive overview of financial issues on which to base management decisions. In summarisation, accountants have not only to collect financial data, they have to contrast costs and benefits as far as risks and opportunities. The typical sequential stages of accounting are displayed in figure 1.

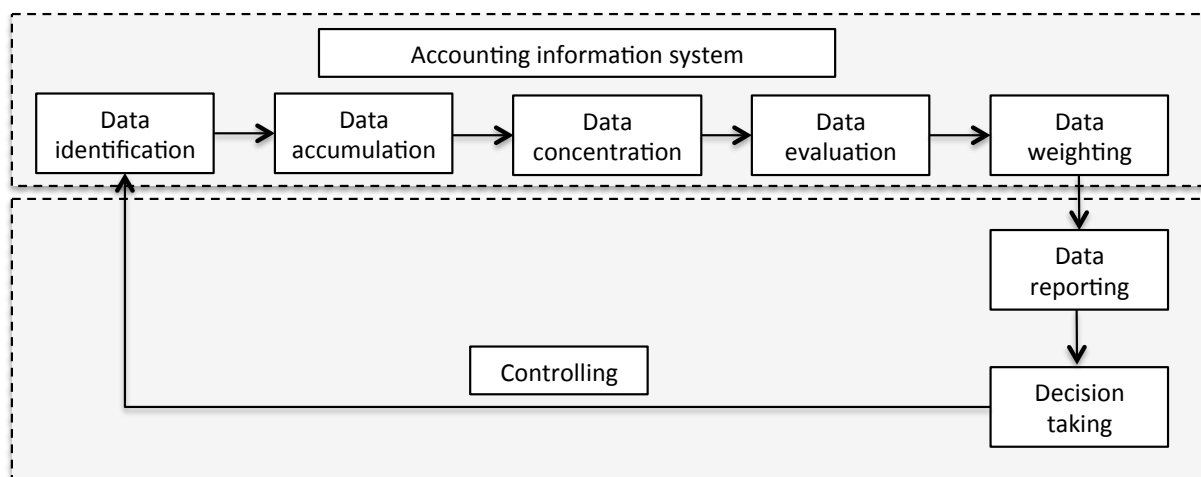


Fig. 1: Sequential stages of accounting

Out of this information decision takers are able to make proper adjustments and decisions. But therefore the purpose must be clear. So, the questions for whom and for what the information is needful and in which way it will be used is to be answered (Atril/Mc Laney 2013, 2012; Drury 2006;).

This leads us to a systemic management approach: Decisions must be taken out of a holistic point of view. But what does that mean for accounting? That means we can not only rely on *absorption* or the *full costing system*. We also have to take alternative costing systems in consideration.

This leads us to the benefit of the costing system known as *contribution accounting*.

### **1. Actual development of costs – weaknesses of the full costing system in the case of supporting proper management decisions**

At a glance: Cost center accounting establishes improved data availability for the origin of indirect costs. It should become clear where costs are occurring in an institution. But this is not always obvious. As in the case for cost center direct costs for example. Often they are only reflected by the introduction of alternative allocation methods (cost center indirect costs). With the use of the expense distribution sheet for example we can calculate particular so-called overhead rates for our costing purposes.

But in fact multiple factors call for the implementation of additional instruments to analyze costs. An isolated examination of costs conveys information in an inaccessible state. Out of this point of view it is getting obvious that the proportional relationship between direct and indirect costs (within the framework of overhead calculation) does not always correspond to the actual development of costs. The interlinking of these costs has an especially drastic effect if the percentage of indirect costs is very high (in the following we will give an example for this).

Decisions regarding the configuration of an educational program for example can lead to undesirable developments because conventional full costing does not take into account the nature of fixed costs. Apart from economic calculus, the conventional laws of microeconomics (law of mass production) continue with traditional cost analysis.

## 2. The costing system of contribution accounting

### 2.1. Direct Costing Contribution Accounting

Contribution accounting attempts, to eliminate the shortcomings of a purely full cost calculation. While conventional direct costing attempts to arrange indirect costs alternatively with the tools of cost center accounting/expense distribution sheet/overhead rate, contribution accounting reassesses the problem. At the center of focus are variable costs.

Contribution accounting thus focuses on the essential problem of where costs are incurred; as said, special attention is paid to variable costs. This examination of marginal costs is also called *direct costing*, because above all it involves examining *costs which are generated directly from cost objects (Horngren/Harrison/Oliver 2011)*.

Since fixed costs can only be indirectly and temporarily assigned to cost objects, this group of costs is not initially factored into contribution accounting.

### 2.2. Procedure of contribution accounting

The procedure and assertions of contribution accounting are simple: the difference between sales revenue and variable costs of each cost object is the contribution margin. The contribution margin indicates which contribution from cost objects is conducive for the coverage of fixed costs. For this reason, only an organization-wide or rather company-wide operational result needs to be calculated. One should differentiate between a contribution margin per unit and a contribution margin per period.

Contribution accounting in educational institutions for example generally exhibits the following framework (figure 2):

|                     | Department 1 | Department 2 | Department 3 | Department 4 | Total   |
|---------------------|--------------|--------------|--------------|--------------|---------|
| Revenue             | 46.785       | 52.345       | 40.327       | 64.000       | 203.457 |
| - Variable costs    | 22.500       | 18.000       | 14.000       | 20.000       | 74.500  |
| Contribution margin | 24.285       | 34.345       | 26.327       | 44.000       | 128.957 |
| - Fixed costs       |              |              |              |              | 88.147  |
| Operating result    |              |              |              |              | 40.810  |

Fig. 2: Basic pattern of contribution costing

Variable costs are subtracted from the revenues of individual departments, leaving the contribution margin. In the example shown above in figure 2, all departments contribute to the coverage of fixed costs with a positive contribution margin. Since fixed costs cannot be accurately assigned to individual cost objects, the sum of fixed costs is recorded in the accounts as a group. In the given example, the educational institution attains an operational result of 40,810 €, both from an absorption costing perspective as well as in a contribution accounting format.

A completely clear picture is offered for management decisions regarding educational programs. Since the revenue generated from all product groups is greater than the costs they created, a change in the program structure could only reluctantly be justified or warranted from an economic point of view. Of course this observation can be revised as soon as the contribution margin per unit is included in the analysis.

### 2.3. Management decision based on the contribution margin

In figure 2, a contribution accounting system has been arranged for an entire educational sector. From this perspective, department 4 achieves the highest contribution margin. However, if we incorporate the number of seminar lessons necessary to obtain the contribution margin of each department into our assessment, the figure is slightly different (figure 3):

|                          | Department 1 | Department 2 | Department 3 | Department 4 | Total   |
|--------------------------|--------------|--------------|--------------|--------------|---------|
| Revenue                  | 46.785       | 52.345       | 40.327       | 64.000       | 203.457 |
| - Variable costs         | 22.500       | 18.000       | 14.000       | 20.000       | 74.500  |
| Contribution margin      | 24.285       | 34.345       | 26.327       | 44.000       | 128.957 |
| Seminar hours            | 1.600        | 1.400        | 1.900        | 2.600        | 7.500   |
| Contribution margin/hour | 15           | 25           | 14           | 17           | 17      |

Fig. 3: Contribution margin per seminar hour

Figure 3 shows quite clearly that, from a purely economic perspective, department 2 generates a contribution margin of 25 € per educational unit (seminar lesson). This figure is nearly 50% higher than the contribution margin of department 4. In other words, the *productivity per unit (here: seminar lesson)* is much higher in department 2 than in each other department of the organization.

Under these conditions, it would be worth considering a change in the educational program, even if all departments are generating a positive contribution margin. The operational result would be improved if prevalent resources in department 2 were relocated, since the highest contribution margin is generated in this area. However, these considerations only make sense from an economic perspective if:

- the situation in the market would allow for the expansion of department 2 without having to lower prices
- the resources of an organization (for example the qualifications of the teaching staff) allow for such a shift of emphasis. For instance, relocating teaching personnel from the “Career/Data Processing” department to the “Languages” department certainly cannot always be put into effect
- long-term, strategic considerations focusing only on marginally profitable departments do not run contrary to one another

It must, however, be pointed out once more that for all necessities of business, in the department as well as in every other organization, the *primary decision must be: do the right thing!* Parochial schools, for instance, offer an educational mandate which must be implemented relatively independently of economic considerations. Only after the main preferences of an educational program have been taken into account can the scope of possibility resulting from contribution margins and management of resources be explored.

Under certain circumstances, priorities can be seen as being completely contrary to one another. Thus what an educational institution offers can be primarily and exclusively oriented toward economic objectives – questions of content are secondary in this case.

#### **2.4. Multi-step contribution accounting**

Focusing solely on the relationship between variable costs and sales revenue within the framework of direct costing contribution accounting (as was done in the possibilities already discussed) involves risks because a large portion of the costs (indirect costs and frequently fixed costs as well) are not subject to in-depth analysis.

In this case, communication within an institution centers on the term “contribution margin”. Direct costing contribution accounting discounts the fact that it is possible for a portion of fixed costs to be consistently and accurately assigned to certain products or at least product groups.

On the other hand, fixed costs are in reality only “fixed” for a short period of time. *Fixed costs can also be influenced in the long term.* For example, personnel costs for a teaching staff become “variable” as soon as the security of their positions is threatened.

In this way, as soon as long-term decisions must be made in a company, fixed costs must be taken into consideration. If it is necessary to effectively lower costs over a longer period of time, the lagging adjustment of fixed costs must be caught up on and ways to cut down on fixed costs must be found. It is therefore frequently attempted within contribution accounting to organize fixed costs gradually, in certain cost centers or areas. In this context, we call this “multi-step contribution accounting”.

The following steps are usually mentioned in the literature regarding this subject:

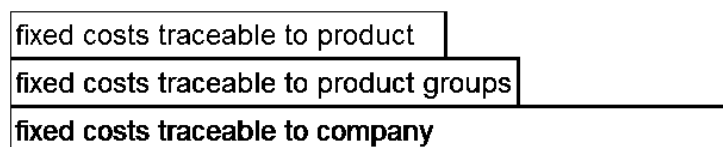


Fig. 4: Dissection of fixed costs

At which level a block of fixed costs is dissected depends on the structure of the organization. For instance, additional layers could be distinguished from one another which separately display locations or larger departments.

In our example in figure 5 below, we assume that the “products” of a department in our educational institution do not always cause fixed costs, but rather that “fixed product costs” only occur in two areas and can be clearly assigned to these areas.

Departments 1 to 3 are run by a fulltime employee, so that fixed costs which originate exclusively here are fixed product-group costs. The remaining block of fixed costs can be viewed as company-wide, meaning they are fixed company costs. These include costs for the administration of an entire educational department as well as for the management of an educational institution.

For the purpose of multi-step contribution accounting, one should already be striving for the clearest distinction of various product groups possible during the creation of cost centers.

In figure 5 it becomes clear that the products “Study Trips” and “Conference Center” exhibit fixed product costs. Additionally, it becomes clear that product-group specific costs amounting to 60,000 € can be assigned to the cost centers and products of departments 1, 2 and 3.

|                                               |                           | Dep. 1         | Dep. 2       | Dep. 3       | Dep. 4       | Study trips   | Conference Center | Total           |
|-----------------------------------------------|---------------------------|----------------|--------------|--------------|--------------|---------------|-------------------|-----------------|
| Sales revenue                                 |                           |                |              |              |              |               |                   |                 |
|                                               | Registration fees         | 29.000         | 14.000       | 12.000       | 18.000       | 80.000        | 90.000            | 243.000         |
|                                               | Subsidy                   | ---            | ---          | ---          | ---          | ---           | ---               | ---             |
|                                               | Total                     | 29.000         | 14.000       | 12.000       | 18.000       | 80.000        | 90.000            | 243.000         |
| -(minus) Variable costs                       |                           |                |              |              |              |               |                   |                 |
|                                               | Honorariums               | 24.000         | 11.000       | 9.000        | 17.000       | 45.000        | ---               | 106.000         |
|                                               | Sales input               | ---            | ---          | ---          | ---          | ---           | 70.000            | 70.000          |
|                                               | Sum                       | 24.000         | 11.000       | 9.000        | 17.000       | 45.000        | 70.000            | 176.000         |
| <b>Contribution Margin I</b>                  |                           | <b>5.000</b>   | <b>3.000</b> | <b>3.000</b> | <b>1.000</b> | <b>35.000</b> | <b>20.000</b>     | <b>67.000</b>   |
| -(minus) product-traceable fixed costs        |                           |                |              |              |              |               |                   |                 |
|                                               | Staff costs               | ---            | ---          | ---          | ---          | ---           | 90.000            | 90.000          |
|                                               | Administration/management | ---            | ---          | ---          | ---          | 30.000        | ---               | 30.000          |
| <b>Contribution Margin II</b>                 |                           | <b>5.000</b>   | <b>3.000</b> | <b>3.000</b> | <b>1.000</b> | <b>5.000</b>  | <b>-70.000</b>    | <b>-53.000</b>  |
| -(minus) product group-traceable fixed costs  |                           |                |              |              |              |               |                   |                 |
|                                               | Pedagogical management    | 60.000         |              |              | ---          | ---           | ---               | ---             |
| <b>Contribution Margin III</b>                |                           | <b>-49.000</b> |              |              | <b>1.000</b> | <b>5.000</b>  | <b>-70.000</b>    | <b>-113.000</b> |
| -(minus) fixed costs traceable to the company |                           | ---            | ---          | ---          | ---          | ---           | ---               | -120.000        |
|                                               |                           |                |              |              |              |               |                   |                 |
| Operating Result                              |                           |                |              |              |              |               |                   | -233.000        |

Fig. 5: Multi-step contribution accounting

### 3.5. The benefit of hourly rates in cost accounting

We have demonstrated that both absorption costing as well as marginal costing are prone to flaws. We would therefore like to present yet another basic option for the recording of indirect costs for accounting and design-based tasks in an index.

Up until now, we have clearly emphasized that especially indirect costs pose unique challenges to controlling and cost and performance accounting. The indicator “hourly rate of indirect costs” is modeled on a similar indicator from industrial firms, namely machine hourly rates. A machine hourly rate records indirect costs derived from machines per hour of machine operating time. Such an approach could be a way of working around overhead rates. One uses absolute values, thus eliminating the implicit, problematic interdependence of direct and indirect costs from further calculations. The purpose of this type of method is made clear in figure 6:

|                        | department<br>1 | department<br>2 | department<br>3 | department<br>4 | department<br>5 |
|------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| sum direct costs       | 22.500          | 18.000          | 14.000          | 10.000          | 30.000          |
| sum seminar<br>hours   | 488             | 322             | 223             | 200             | 501             |
| overhead costs         | 20.461          | 20.343          | 20.343          | 21.343          | 19.851          |
| seminar hourly<br>rate | 42              | 63              | 91              | 107             | 40              |

Fig. 6: Hourly rate per department/cost center or product

The example in Figure 6 displays clearly that the seminar hourly rate of department 1 is especially low in relation to those of departments 3 and 4. The decisive advantage of this method is that *the amount of direct costs has no effect on the amount of absorbed indirect costs*.

The calculation of seminar hourly rates in educational institutions can compensate for the disadvantages of contribution accounting and proportional overhead calculation. An account with average seminar hourly rates based on indirect costs cancels out the disadvantages of marginal costing. It forces one to view the situation through the perspective of long-term, necessary full costs. Still, it becomes clear once again that the validity of this figure is dependent upon the accuracy of the allocation of indirect costs to individual cost centers or cost objects.

### 3.6. Conclusion

In its basic form, contribution accounting omits each alternative allocation of indirect costs. Costs which cannot be directly assigned to a product (cost objective) are also not alternatively allocated. The previously determined *contribution margin I* conveys a message as simple as it is clear: the contribution margin offers information regarding the point at which a product renders an adequate contribution for the coverage of fixed costs.

This statement is of fundamental importance for management decisions regarding to the run a specific educational program (product range). More refined analyses of cost structure and development are excluded from the calculation. In turn, multi-step contribution accounting attempts to compensate for this flaw. If certain indirect costs can be assigned fairly accurate to a product group, than these product-group fixed costs are removed from *contribution margin I*. The situation of the costs in certain departments or cost centers can thereby be represented in more detail.

If we go back to our opening challenge to eliminate the shortcomings of a purely full cost calculation, than the multi-step contribution accounting offers some more strategic relevant benefits.

Contribution accounting helps in areas of decision making (Atril/Mc Leany 2013, p. 255):

- Pricing opportunities,
- Determining the most efficient use of scarce resources,
- Make-or-buy decisions,
- Closing or continuation decisions.

It shows clearly how costs will change related to a targeted output or other measureable factors of business related activities. This is of fundamental necessity for decision-making, planning and controlling.

“The preparation of budgets, the production of performance reports, and the provision of relevant costs for decisions all depend on reliable estimates of costs and distinguishing between fixed and variable costs at different levels” (Drury 2006, p. 273).

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