

Management Accounting

7th Edition

- Link 16.A –
Iteration Method

The reason for the application of the iteration method is that computers, on which we run the cost allocation routines, are not good at dissolving equations. However, a computer is good at computing, that is why it is called a computer. Next, we present a cost allocation method suitable for software solutions. It is called iteration, derived from the Latin word *ire* (= to walk). It works like the equation method, but the cost allocations are made step by step. This means we start the cost calculation of total costs from primary costs and add secondary costs step by step. The first step is based on the primary costs and further steps are based on the previously allocated costs. After the total cost calculation, final costs are determined. As more iterations we compute, as more accurate costs become.

To show the iterations, we prepare an MS-Excel spreadsheet. It is displayed

$$\begin{aligned}\alpha_{JA} &= 10/148 = \mathbf{6.76\%} \\ \alpha_{WJ} &= 100/200 = \mathbf{50\%} \\ \alpha_{WA} &= 100/148 = \mathbf{67.57\%} \\ \alpha_{WC} &= 50/950 = \mathbf{5.26\%} \\ \alpha_{CA} &= 38/148 = \mathbf{25.68\%}. \\ \alpha_{JC} &= 400/950 = \mathbf{42.11\%}.\end{aligned}$$

to:

	Concept development	Webdesign	Java programming	Admin
from:				
Concept development	0	0.052631579	0.421052632	0
Webdesign	0	0	0	0
Java programming	0	0.5	0	0
Administration	0.256756757	0.675675676	0.067567568	0

in Figure 1 and shows the values for the HEISFELD Ltd. case.

In the top lines, the spreadsheet shows mutual cost centre support structure. The structure is indicated by values for α . For most accurate calculations, the α -values are shown as fractions. However, MS-Excel discloses them as a digital values. For instance, α_{JA} – which represents the percentage of the Administration support for the Java Programming cost centre – is entered in as: 10/148. The display on MS-Excel shows 0.067567568, which we round to the nearest 1/100 percentage for display. To demonstrate the accuracy of the calculations, the display in Figure 1 is with multiple digits after the decimal point.

The α -values result from the performance planning (above). See them below as percentages. 0.067567568 now shows as 6.76%.

Figure 1: HEISFELD Ltd.'s cost centre support structure

Like the equation method, the iteration process calculates the total costs at first. The total costs include primary costs and costs received from other cost centres. In contrast to the equation method, the cost allocations now work step-by-step. The first cost portion received from the sending cost centres results from primary costs. Concept Development receives: $(38/148) \times 47,360 = \mathbf{12,160.00 \text{ EUR}}$ from Administration. Website Design receives from Concept Development secondary costs to the extent of: $(50/950) \times 53,200 = \mathbf{2,800.00 \text{ EUR}}$, from Java Programming to the extent of: $(100/200) \times 24,000 = \mathbf{12,000.00 \text{ EUR}}$ and from Administration to the extent of: $(100/148) \times 47,360 = \mathbf{32,000.00 \text{ EUR}}$. In total, the received costs add up to: $2,800 + 12,000 + 32,000 = \mathbf{46,800.00 \text{ EUR}}$. Java Programming cost centre receives: $(400/950) \times 53,200 = \mathbf{22,400.00 \text{ EUR}}$ from the Concept Development cost centre and: $(10/148) \times 47,360 = \mathbf{3,200.00 \text{ EUR}}$ from Administration. In total, the received costs' sum is: $22,400 + 3,200 = \mathbf{25,600.00 \text{ EUR}}$. Administration does not receive costs as it is an auxiliary cost centre.

In the lower part of Figure 2, the sent costs are recorded. They equal to:

- Concept Development: $2,800 + 22,400 = \mathbf{25,200.00 \text{ EUR}}$.
- Website Design: 0.00 EUR .
- Java Programming: $12,000.00 \text{ EUR}$.
- Administration: $12,160 + 32,000 + 3,200 = \mathbf{47,360.00 \text{ EUR}}$.

By the next iteration step, the cost transfer is based on the costs from the previous allocation step only. The costs

received by Concept Design from the 1st step are $12,160.00 \text{ EUR}$. The costs received by the 2nd step equal to zero, because the sending cost centre (Administration) does not receive support from other cost centres. Website Design receives costs from the Concept Development to the extent of: $(50/950) \times 12,160 = \mathbf{640.00 \text{ EUR}}$, from Java Programming to the extent of: $(100/200) \times 25,600 = \mathbf{12,800.00 \text{ EUR}}$ and from Administration zero. The total value of received costs is: $640 + 12,800 = \mathbf{13,440.00 \text{ EUR}}$. The cost received by Java Programming equals: $(400/950) \times 12,160 = \mathbf{5,120.00 \text{ EUR}}$ from Concept Development and zero from Administration. The costs sent by the 2nd step equal to:

- Concept Development: $640 + 5,120 = \mathbf{5,760.00 \text{ EUR}}$
- Website Design: 0.00 EUR
- Java Programming: $12,800.00 \text{ EUR}$
- Administration: 0.00 EUR

Although an approach that contains a lot of iteration steps becomes more and more accurate, we are aware that after a while values disclosed at 2 digits after the decimal point do not change significantly anymore by further iterations.

For our case study, we terminate the iteration procedure after 3 runs.

After the calculation of total costs, the final costs are calculated as total costs less stepwise sent costs. This is a similar approach to the equation method.

Study the values depicted in Figure 2 for HEISFELD Ltd. You will notice that the

iteration process arrives the same final costs as the equation method.

to:				
	Concept development	Webdesign	Java programming	Admin
from:				
Concept development	0	0.052631579	0.421052632	0
Webdesign	0	0	0	0
Java programming	0	0.5	0	0
Administration	0.256756757	0.675675676	0.067567568	0
Total costs:				
Primary costs (0 step)	53,200.00	30,100.00	24,000.00	47,360.00
received costs 1 st step	12,160.00	46,800.00	25,600.00	0.00
received costs 2 nd step	0.00	13,440.00	5,120.00	0.00
received costs 3 rd step	0.00	2,560.00	0.00	0.00
	65,360.00	92,900.00	54,720.00	47,360.00
Sent costs:				
Sent 1 st step	25,200.00	0.00	12,000.00	47,360.00
Sent 2 nd step	5,760.00	0.00	12,800.00	0.00
Sent 3 rd step	0.00	0.00	2,560.00	0.00
	30,960.00	0.00	27,360.00	47,360.00
Final costs:				
	34,400.00	92,900.00	27,360.00	0.00

Figure 2: HEISFELD Ltd.'s iteration process

In the case study HEISFELD Ltd., the allocation is based on budgeted and full costs. In case the company applies a partial cost Accounting system, it only takes proportional costs into consideration. There is no need to run an internal cost allocation based on fixed costs, as all fixed costs are closed-off to the Profit and Loss account.

To show the procedure in a partial cost Accounting system, we apply the

internal cost allocation based on the iteration method for proportional primary costs. Check Figure 16.9 in the textbook for the primary costs. It gives: $PC_{W,prop} = 10,100.00$ EUR, $PC_{C,prop} = 33,000.00$ EUR, $PC_{J,prop} = 4,000$ and $PC_{A,prop} = 7,360.00$ EUR The iteration process is disclosed in Figure 3.

To double-check the results, we apply the equation method based on proportional costs.

$$TC_C = 33,000 + (38/148) \times TC_A$$

$$TC_W = 10,100 + (100/200) \times TC_J + (100/148) \times TC_A + (50/950) \times TC_C$$

$$TC_J = 4,000 + (10/148) \times TC_A + (400/950) \times TC_C$$

$$TC_A = 7,360.00 \text{ EUR}$$

At first, we calculate the total costs for
Concept Development:

$$TC_C = 33,000 + (38/148) \times 7,360 = \mathbf{34,889.73 \text{ EUR}}$$

By the next step, we calculate the total
costs in the Java Programming cost
centre:

$$TC_J = 4,000 + (10/148) \times 7,360 + (400/950) \times 34,889.73 = \mathbf{19,187.71 \text{ EUR}}$$

The total costs in the Website Design
cost centre are:

$$TC_W = 10,100 + (100/200) \times 19,187.71 + (100/148) \times 7,360 + (50/950) \times 34,889.73 = \mathbf{26,503.13 \text{ EUR}}$$

Now, we can calculate the final costs of
the cost centres.

$$FC_C = TC_C \times (1 - (400/950) - (50/950)) = \mathbf{18,363.02 \text{ EUR}}$$

$$FC_W = TC_W \times (1 - 0) = \mathbf{26,503.13 \text{ EUR}}$$

$$FC_J = TC_J \times (1 - (100/200)) = \mathbf{9,593.86 \text{ EUR}}$$

$$FC_A = 0.00 \text{ EUR}$$

We compare the sum of final costs to the
total of proportional primary costs:
 $18,363.02 + 26,503.13 + 9,593.86 =$
54,460.01 EUR. The total of the
proportional primary costs equals:
 $33,000 + 4,000 + 10,100 + 7,360 =$
54,460.00 EUR.

See below the result of the iteration
process. Although values are disclosed
at 2 digits after the decimal point MS-
Excel calculates more precisely in the
background. Check Figure 3.

	to:			
	Concept development	Webdesign	Java programming	Admin
from:				
Concept development	0	0.052631579	0.421052632	0
Webdesign	0	0	0	0
Java programming	0	0.5	0	0
Administration	0.256756757	0.675675676	0.067567568	0
Total costs:				
Primary costs (0 step)	33,000.00	10,100.00	4,000.00	7,360.00
received costs 1 st step	1,889.73	8,709.82	14,392.03	0.00
received costs 2 nd step	0.00	7,295.48	795.68	0.00
received costs 3 rd step	0.00	397.84	0.00	0.00
	34,889.73	26,503.13	19,187.71	7,360.00
Sent costs:				
Sent 1 st step	15,631.58	0.00	2,000.00	7,360.00
Sent 2 nd step	895.14	0.00	7,196.02	0.00
Sent 3 rd step	0.00	0.00	397.84	0.00
	16,526.71	0.00	9,593.85	7,360.00
Final costs:	18,363.02	26,503.13	9,593.85	0.00

Figure 3: HEISFELD Ltd.'s iteration process based on proportional costs

For cost monitoring based on cost centre efficiency checks, HEISFELD Ltd. must run a 1st level allocation and check variances based on cost centre data. As we mentioned in the previous chapter (15), cost monitoring takes place at the senders and before internal cost

allocations. To detect deviations where they occur, monitoring checks the auxiliary cost centres, too.

Based on incremental costs, the predetermined overhead allocation rates are:

$$POR_{C,prop} = FC_{C,prop} / Output_C = 18,363.02 / 500 = 36.73 \text{ EUR/C-h}$$

$$POR_{W,prop} = FC_{W,prop} / Output_W = 26,503.13 / 300 = 88.34 \text{ EUR/W-h}$$

$$POR_{J,prop} = FC_{J,prop} / Output_J = 9,593.85 / 100 = 95.94 \text{ EUR/J-h}$$

$$POR_{A,prop}: n/a$$

*In a partial cost Accounting system, all fixed costs, here to the extent of 20,000 + 20,200 + 20,000 + 40,000 = **100,200.00 EUR**, are closed-off to the Profit and Loss account.*

We provide an overview of the procedure of performance planning and

cost allocations below. Note, that we must calculate/plan performance at first and before cost allocations can take place: