MANAGEMENT ACCOUNTING

A CASES APPROACH

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ALWAYS LEARNING

PEARSON

Management Accounting

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Table 2.14 Use hours and overhead per activity from text to calculate cost per hour

	P	*A*	*M*	*T*	*Total*
Hours	5 465	3 060	17 335	3 085	xxx
Overheads (€000)	1 115	1 417	2 627	3 371	8 530
€/hour	204.03	463.07	151.54	1 092.71	

In this calculation it is important to observe that total overhead costs are given in thousands of euros in the original text. Here, after the calculation, all numbers are expressed in €/hour. Next, we need to remember how products are using those hours (Table 2.15).

Table 2.15 Hours per unit per activity

Component	*P*	*A*	*M*	*T*
1	1 600	800	5 000	800
2	540	510	750	510
3	75	100	85	125
4	1 050	250	3 500	650
5	2 200	1 400	8 000	1 000

Now we need to combine Tables 2.14 and 2.15 to find cost per unit of product. For each cell in Table 2.14 we multiply by the appropriate cost per hour from Table 2.15. For example, preparations for component 1 (top left corner) cost:

$$204.3 \times 1600 = 326.4$$

After performing such calculations for all cells in Table 2.15, we find Table 2.16 showing total activity cost for each product.

Table 2.16 Assign costs from activities to calculate total costs per component

Component	*P*	*A*	*M*	*T*	*Total*	*Volumes*	*Per unit*
1	326.4	370.5	757.7	874.2	2 328.8	10 000	233
2	110.2	236.2	113.7	557.3	1 017.3	3 000	339
3	15.3	46.3	12.9	136.6	211.1	500	422
4	214.2	115.8	530.4	710.3	1 570.7	5 000	314
5	448.9	648.3	1 212.3	1 092.7	3 402.2	20 000	170
Total activity cost					8 530.0		

Now we have handled all the normal activities, allocating their costs per unit of product according to how much time each product needs from every activity. If you compare the numbers, please note that most of these costs are machine costs, not costs of labor. But there could also be some costs of indirect labor, i.e. foremen or experts who are not working explicitly with each unit of product. All regular working time was, as you might remember, included in the first section, dealing with direct labor and direct material.

Before going on, we might also note that the most expensive product in the activity analysis appears to be component 3, the budget product. Actually this is not very surprising, because production volumes are so low that just getting the equipment ready for a series of products will probably influence the total working time quite a lot. This is an important point that was not shown at all in the traditional labor-based full cost analysis.

We still have not dealt with all the costs. The next item will be order costs. According to the text, there were 95 orders to share €605 000 of order costs. Table 2.17 shows this.

Table 2.17 Order cost per order and component

Order cost (€)	*Orders*	*Cost per order (€)*
605 000	95	6 368

Component	*No of orders*	*Total order cost (€000)*
1	20	127
2	20	127
3	10	64
4	20	127
5	25	159
Total	95	605

Finally, there is the general product cost that was left over. But, knowing that all products have to be designed and budgeted for and entered on to the company price list and costing system, it appears that the accountants wanted to let all components share these costs equally, just because they are there. Table 2.18 shows the outcome. Finally, we have to add all the costs together in our industrial ABC analysis (see Table 2.19).

Table 2.18 General product cost per component

Cost (€)	*Components*	*Cost per component (€)*
205 000	5	41 000

Table 2.19 Add ABC costs together

Component	*DL €000*	*DM €000*	*Activities €000*	*Orders €000*	*General €000*	*Total €000*	*Per unit €*
1	1 150	1 340	2 329	127	41	4 987	499
2	270	426	1 017	127	41	1 882	627
3	45	63	211	64	41	424	848
4	725	770	1 571	127	41	3 234	647
5	1 680	2 960	3 402	159	41	8 242	412
Totals	3 870	5 559	8 530	605	205	18 769	

Studying Table 2.19 we can see that cost numbers have changed a lot. You will easily see there are important changes in cost per unit compared with Table 2.12. Components 2 and 3 have become much more expensive. Components 1 and 5 have become somewhat cheaper. But the unit cost does not show the whole truth. In fact, it looks like the average cost per unit might have increased, and this is actually not the case. That impression occurs because the products with small volumes have become more expensive and the products with large volumes have become cheaper.

If you compare the total costs per component, instead of unit costs, you will see that the most important change has occurred in components 2 and 5 but not in component 3. The total costs (€000) of component 2 have increased by:

$$1882 - 1348 = 536.$$

This is a much bigger change than in any other product. On the other hand, the total costs (€000) of component 5 have decreased by:

$$8695 - 8242 = 453.$$

Those two changes are probably more important for the company than the increase in the unit cost of component 3. Especially in a competitive situation it is important to know that the cost of component 5 is much lower than we thought. If there is intense price-cutting going on in the market, it will be good to know that they can stay in business with their biggest product for longer than we used to think!

But how long can they stay in business if prices fall? For an example, let us look at component 5. If prices were to fall, we now know that they can follow competitors down beyond €435 (Table 2.12) to €412 (Table 2.19). But beyond that, what?

Well, here is one of the problems with our analysis so far. Everybody used to cost analysis according to the full cost method in Table 2.4 knows that the full cost is not a price limit. Since there are allocated fixed costs, it might be a good idea to stay in the market and to sell the product even if the market price falls below €434. Now we know that the firm can follow the price leader at least down to €412. But what then? Could they go down further, if necessary?

Yes, they could, because there might still be fixed costs influencing the calculations. But we do not know the true limit. We need to do some more thinking!

Full ABC

At this point, I have to admit to the reader that I have not told the whole truth about this case. There is a story behind it, and now we need to know the story.

Actually I was invited to the Electronic Parts Co. when the above results were to be presented at a manager's meeting. I was sitting at the front, on the right, listening to the young controller who had performed the study in the little company. Beside me sat the chief accountant of the group to which the company belonged, a somewhat elderly, extremely senior person in accounting. We were enjoying the presentation at the beginning, and it was obvious that the controller felt very happy about his findings.

After a while, however, my bench-buddy became uneasy. He was a very determined man and suddenly he took over the whole session and sent the young controller back to his seat: 'Thank you very much, young man. Please sit down! Now, these were some very interesting results! But please, everybody, remember to take responsibility as managers of this company. You see, these numbers may never be known outside this room! Look at those unit costs of component 3! Costs are €848 instead of €433! What do you think our salesmen will do when they learn about that?'

'Actually, I don't even need to ask. Everybody understands that they might stop selling component 3 because they cannot raise the price that much. And then, please look at those order costs in Table 2.17! If they stop selling component 3 there will be only 85 orders instead of 95 and the order costs of all other products will rise. Our volumes will fall and unit costs will balloon. This is a potential disaster for the company!'

Of course, everybody was upset. After all, it was quite a dramatic message and it came from a very influential source. But what did the man say? He said that if one product is discontinued, then the other products will become more expensive. But that is not true. If one product is discontinued, then there will be more unused capacity, but that does not make the other products more expensive. It just raises the cost of unused capacity.

However, if someone decides to allocate the costs of unused capacity to the products, it appears he might be right. That is what they do in traditional full costing and that is why traditional full costing is so dangerous. Unused capacity is a cost to the company, but it is not a cost in terms of the products. Therefore we have to start anew to rework the calculation to eliminate unused capacity altogether. This will give us real ABC.

First, we shall pick up the costs of DL and DM, just as we did in the industrial ABC.

After that, we need to rework the costs of the activities, allocating costs to all available hours instead of just looking at those hours that were actually serving products (see Table 2.20 and remember Table 2.10).

Table 2.20 Available hours per activity

	P	*A*	*M*	*T*	*Total*
Available hours	5 600	4 800	17 400	6 000	xxx
Overhead cost (€000)	1 115	1 417	2 627	3 371	8 530
€/unit	199.11	295.21	150.98	561.83	

Now the costs per hour are much lower than before. Here we allocate all costs to all available hours irrespective of how those hours are being used. Each product should pay for the the time spent on it, no matter how much time is not spent on it.

Next, bring back the table of hours used (Table 2.21). Combining Tables 2.20 and 2.21 we get a very different allocation of activity costs (Table 2.22).

Table 2.21 Hours per unit per activity

	P	*A*	*M*	*T*
1	1 600	800	5 000	800
2	540	510	750	510
3	75	100	85	125
4	1 050	250	3 500	650
5	2 200	1 400	8 000	1 000

Table 2.22 Assign costs from activities to products and calculate cost per unit and totals per component

Component	*P*	*A*	*M*	*T*	*Total*	*Volumes*	*Per unit*
1	319	236	755	449	1 759	10 000	176
2	108	151	113	287	658	3 000	219
3	15	30	13	70	128	500	255
4	209	74	528	365	1 176	5 000	235
5	438	413	1 208	562	2 621	20 000	131
Allocated activity cost					6 342		
Cost of unused capacity					2 188		
Total costs					8 530		

In Table 2.22 we have identified the true activity costs of components and also the true costs of unused capacity. We can see that there is a considerable cost for unused capacity which has been messing up our calculations. Now we are almost finished. We need only make a similar adjustment to the order costs and to add the general product cost (Table 2.23).

Table 2.23 Find order cost per order and component, considering total order capacity

Order cost (€)	*Capacity*	*Cost per order (€)*
605 000	120	5 042

Component	*No of orders*	*Total order cost (€000)*
1	20	101
2	20	101
3	10	50
4	20	101
5	25	126
Allocated costs	95	479
Costs of unused capacity		126
Total costs		605

Note that in Table 2.23 part of the order cost was allocated to unused capacity and only the cost of active hours was allocated to the actual orders. But in the final section, general product cost per component, there is no information about unused capacity. Therefore these costs will again be fully allocated to products. They are shown in Table 2.24.

Table 2.24 General product cost per component

Cost (€)	*Component*	*Cost per component (€)*
205 000	5	41 000

Finally, adding all costs of full ABC together, we get the allocation in Table 2.25.

Table 2.25 Add ABC costs together

Component	*DL €000*	*DM €000*	*Activities €000*	*Orders €000*	*General €000*	*Total €000*	*Per unit €*
1	1 150	1 340	1 759	101	41	4 391	439
2	270	426	658	101	41	1 496	499
3	45	63	128	50	41	327	654
4	725	770	1 176	101	41	2 813	563
5	1 680	2 960	2 621	126	41	7 428	371
Totals	3 870	5 559	6 342	479	205	16 455	
Idle capacity	0	0	2 188	126	0	2 314	
Total costs	3 870	5 559	8 530	605	205	18 769	

When comparing the results of the three calculations, you will find that the full ABC allocation is, on average, lower than the others. Here, costs of idle capacity are not allocated to the products as in the two other models. Because of that we get a much more realistic picture of the true production costs of each product. If a product does not cover its costs in this situation there is a good reason to consider discontinuing that product, unless the lack of profitability is thought to be temporary. This is not the case in either of the two first approaches to costing.

When I lecture on these things and present this solution to experienced managers, they often have difficulties. Almost always someone will say something like: 'Your calculation is wrong because you did not allocate all costs to the products.'

A question like this is quite worrying because it shows that there is some kind of *a priori* assumption that all costs have to be allocated to products. To me it is obvious that the cost of products should comprise the cost of those resources that are consumed in producing the products. On the other hand, the cost of those resources that are not consumed by products will have to be allocated to something else. Otherwise they will just make us confused and, on the whole, inflate our opinion of the cost of the products.