Foundations of Accounting & Finance

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Week - 07

Lecture – 30

Activity Based Costing - Part II

Activity Based Costing

Adoption of activity-based costing is a superior method for allocation of overhead. Regarding the 4 or 5 overheads in question, have I examined ABC for all of them? No, I have only applied it to setup labour. However, for the remaining 4 overheads, I haven't implemented activity-based costing. Let us address this by utilizing the activity-based costing.

Let us examine the same 3 products: A, B, and C. The calculations of direct material and labour cost are indicated below from the previous analysis.

	A	B	C
Direct materials per unit	20	30	10
Direct labor per unit	10	6.67	5

Now, let us address each overhead individually.

1) Set up cost

Let us begin by addressing setup labour, specifically the activity of machine setup. The activity driver for this is the number of times the machine is set up and the corresponding hours of labour consumed for each setup.

For product A, which requires 200 hours of setup labour, and product B, which requires 600 hours, and for C, which requires 2200 hours due to the multiple production runs. Each production run necessitates a setup, and for A, with only one production run, it requires 10 hours of setup labour per unit, costing $20 per hour, totalling $200. For B, with three production runs, it requires 30 hours of setup, resulting in a cost of $600, and so forth. Therefore per unit the set up labour cost would be 0.02 for A, 0.04 for B and 0.44 for C.

We have accurately determined the setup costs based on the number of hours spent on setting up the machine for each product.

2) Receiving cost

Let us move on to the next aspect: receiving costs. Now, imagine I'm spending around $300,000 on receiving. Unlike the setup labour, the cost of receiving isn't necessarily related to the material cost. For instance, receiving a small component might incur high costs, while receiving a large component might involve relatively low expenses. Therefore, the number of times and the number of components received significantly impact the receiving cost.

Let us consider the following assumptions: suppose we are implementing just-in-time management (JIT). Under JIT, material is received once for every production run. For product A, with only one production run, receiving occurs once. On the other hand, product C, with 10 production runs, involves receiving 10 times more frequently. Moreover, the number of components received also plays a role. For instance, product A comprises five components received once, resulting in five receiving instances. Conversely, product B, with six components received three times, leads to 18 receiving instances. Similarly, product C, with 10 components received 10 times, amounts to 100 receiving instances.

Therefore, if we allocate receiving costs based on these factors, the allocation should reflect the effort involved in receiving. This effort is determined by the number of times components are received. Hence, the activity driver is the number of times components are received.

Allocating receiving costs accordingly, we find that for product A, with a total cost of $300,000, the allocated cost per unit is approximately $1.22. For product B, it's around $2.93, and for product C, it's about $48.78.

3) Machine usage

Let us discuss machine usage, which amounts to $700,000. Machine usage relies on the number of machine hours utilized per unit. In this context, the total machine usage hours stand at 10,000, equating to a cost of $70 per hour of machine operation.

The activity driver for machine usage is the number of hours the machine operates for each unit of the product. Specifically, for product A, requiring one-fourth of an hour per unit, the cost is $17.50. Product B, needing one-third of an hour, incurs a cost of approximately $23.33 per unit. Lastly, for product C, requiring half an hour, the cost amounts to $35 per unit.

4) Packing cost

Let us move to packing costs. Packing is driven by the number of shipments. Assuming bulk packing for industrial goods, the number of shipments becomes the activity driver. Hence, the packing cost allocation is based on the ratio of shipments.

For product A, with one shipment, the ratio is 1:5:20 for A, B, and C, respectively. The total packing cost is $200,000. To calculate the per-unit cost, we divide the total packing cost by the total units manufactured.

For product A, the per-unit packing cost is approximately $0.77. For product B, it is around $2.56, and for product C, it is roughly $30.76. Therefore, packing costs are distributed based on the number of shipments.

5) Engineering cost

Now, let us address engineering costs. Determining the activity driver for engineering can be challenging due to its diverse nature. It involves various tasks such as designing, creating dies, and research and development, making it difficult to pinpoint a specific driver.

In such cases, a subjective assessment is often used, relying on discussions with key personnel like design and production managers. This subjective assessment involves estimating the workload distribution for each product.

For instance, based on discussions, it is determined that engineering workload is divided approximately as follows: 25% for product A, 35% for product B, and 40% for product C. While subjective, this assessment is based on evidence gathered from discussions and observations.

Allocating the engineering cost involves multiplying the total engineering expenditure (which is $500,000) by the respective percentages for each product and then dividing by the number of units produced for that product.

For product A, the per-unit engineering cost is approximately $12.50. For product B, it is around $11.66 per unit, and for product C, it is approximately $40 per unit. This method ensures that engineering costs are allocated based on estimated workload distribution rather than arbitrary measures.

Total cost as per ABC

So, what's the total cost according to activity-based costing (ABC)? The total cost as per ABC includes engineering, packing, machine, receiving, setup, direct labor, and direct materials per unit. After calculating, the total cost per unit is approximately $62.01 for product A, $77 for product B, and $169.99 for product C.

	A	B	C
Direct materials per unit	20	30	10
Direct labor per unit	10	6.67	5
Set up	0.02	0.04	0.44
receiving cost per unit	1.22	2.93	48.78
machine cost per unit	17.50	23.33	35.00
packing cost per unit to be allocated on number of shipments 1:5:20	0.77	2.56	30.77
Engineering -ratio of 25% for A 35% for B and 40% for C	12.5	11.67	40
Total Cost as per ABC	62.01	77.20	169.99

Comparison of Costing Systems

	Cost Per Unit		
	A	B	C
Volume-based system			
Conventional	$105.70	$87.16	$52.85
Refined conventional	73.62	96.28	89.74
ABC	**62.02**	**77.24**	**169.84**
Selling Price	**162.61**	**125.96**	**121.55**

So, let us compare the costing systems. Initially, under the conventional method, the costs for products A, B, and C were $105, $87, and $52 respectively. However, with a refined method, the costs changed to $73 for A, $96 for B, and $89 for C.

But when we analyse the costs using activity-based costing (ABC), we find that the cost for product A is only $62, indicating a potential profit of $100 per unit. Product B's cost is $77, allowing for a substantial margin considering its selling price of $125. On the other hand, for product C, the cost is $169, which contrasts sharply with the selling price of $121, revealing a much narrower margin than initially assumed.

This comparison highlights the discrepancies between traditional costing methods and activity-based costing, emphasizing the importance of adopting a more accurate and insightful approach to cost analysis.

Comparison of profitability per unit

	A	B	C
Conventional System			
Profit/unit	$56.91	$38.80	$68.70
Gross Margin	35%	31%	57%
Refined conventional System			
Profit/unit	$88.99	$29.68	$31.81
Gross Margin	55%	24%	26%
ABC System			
Profit/unit	$100.59	$48.72	($48.29)
Gross Margin	62%	39%	Negative

The comparison of profitability per unit reveals a contrast between the conventional approach and the reality uncovered by activity-based costing (ABC). Initially, the conventional method suggested margins of 35 for A, 31% for B, and 57% for C. However, upon closer examination with ABC, the actual margins are 62% for A, 39% for B, and negative for C.

This discrepancy highlights the danger of relying solely on conventional costing methods, which can lead to misleading conclusions about product profitability. In the scenario where one might consider focusing solely on the seemingly profitable product C, disaster can happen. By disregarding the actual costs allocated by ABC and overestimating the profitability of C, a company risks facing significant issues. The absence of avenues for cross-subsidization exposes the true high costs associated with product C, leading to unsustainable operations and eventual closure.

Inference from the example

The key inference from this example is the critical importance of accurately allocating costs based on activity drivers. By identifying the relevant activities and their drivers, and then allocating costs accordingly, businesses can ensure precision in their cost calculations.

This example vividly illustrates that incorrect cost allocation can lead to misguided decisions that are not viable. For instance, if one were to rely on conventional costing methods, they might believe that product C is profitable when, in reality, it is not. This could lead to incorrect pricing strategies, such as reducing prices for products A and B or increasing prices for C, based on inaccurate cost assumptions.

However, by implementing activity-based costing (ABC) and allocating costs based on the activities driving those costs, businesses can gain a clearer understanding of the true cost of each product. This allows for more informed decision-making regarding pricing, resource allocation, and product strategies.

Applications of Activity based Management

ABM implementation is widespread in a variety of applications outside manufacturing, including:

- Health Care
- Banking
- Telecommunications
- Retailing
- Transportation

Conclusions

In the upcoming class, we will focus on decision-making using cost accounting information. We will explore the specific components of cost accounting that are crucial for making informed decisions. Further, we will also deal with a problem on the ABACUS and work through it to sharpen our understanding and application of cost accounting information.