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Homework #3: Cost Allocation and ABC Costing

1 Define cost pool, cost allocation, and cost-allocation base.

Cost Pool:
A cost pool groups similar costs, often by department or service center. It's like a bucket where related costs are collected. For example, all IT-related expenses might be combined into an "IT Cost Pool."

Cost Allocation:
This is the process of distributing costs from a cost pool to different cost objects, like products or departments. Think of it as dividing the expenses in our "cost bucket" among the products or services that benefited from them.

Cost-Allocation Base:
It's the measure or factor used to allocate costs from a pool. For instance, if IT costs are divided based on the number of computer users in each department, then "number of computer users" is the cost-allocation base. It helps ensure that costs are shared fairly.

2 How are indirect (aka overhead) cost allocation rates calculated?

To calculate the indirect (overhead) cost allocation rate:

1. Identify **Total Indirect Costs**: Sum all indirect costs for a period.
2. Choose a **Cost-Allocation Base**: Common bases include machine hours or direct labor hours.
3. Compute the **Allocation Rate** using the formula:

{Allocation Rate} = {Total Indirect Costs} / {Total of the Cost-Allocation Base}

3 What is broad averaging, and what consequences can it have on costs?

Broad Averaging:
Broad averaging allocates indirect costs using a single, company-wide rate, ignoring the actual overhead each product or service consumes.

Consequences:

1. **Inaccuracy:** It can lead to over-costing some products and under-costing others.
2. **Misguided Decisions:** Inaccurate costs can result in poor pricing, product mix, and investment decisions.
3. **Competitive Disadvantages:** Incorrectly priced products can become either uncompetitive or less profitable.

4 What is costing system refinement? Describe three guidelines for refinement.

Costing System Refinement:
Improving a costing system to allocate costs more accurately.

Three Guidelines for Refinement:

1. **Direct Cost Tracing:** Wherever possible, directly trace costs to specific products or services.
2. **Expand Indirect Cost Pools:** Use multiple cost pools tailored to different departments or activities, rather than one broad pool.
3. **Use Cost Drivers:** Allocate indirect costs using drivers that have a cause-effect relationship with the costs, ensuring a more accurate allocation.

5 What is an activity-based approach to designing a costing system?

Activity-Based Costing (ABC):

ABC is a costing method that assigns costs to products based on the activities they require.

Identify Activities: Determine all tasks and processes involved in production.
Assign Costs to Activities: Allocate costs to these activities.
Distribute Costs to Products: Use the extent to which each product uses these activities to allocate costs to individual products or services.

6 The controller of a retail company has just had a $50,000 request to implement an ABC system quickly turned down. A senior vice president, in rejecting the request, noted, "Given a choice, I will always prefer a $50,000 investment in improving things a customer sees or experiences, such as our shelves or our store layout. How does a customer benefit by our spending $50,000 on a supposedly better accounting system?" How should the controller respond?

The controller could reply:

1. **Better Pricing:** ABC helps us price products accurately, benefiting customers by avoiding overpricing or underpricing.
2. **Efficient Spending:** By identifying cost inefficiencies, we can reinvest savings into direct customer improvements.
3. **Optimal Product Selection:** Knowing true product costs allows us to offer a better product mix, enhancing customer choices.
4. **Business Sustainability:** Accurate costing ensures our long-term viability, guaranteeing consistent customer service and product availability.

In short, while ABC is a behind-the-scenes change, its benefits can directly and indirectly enhance the customer experience.

7 A services firm, has the following condensed budget for the year:

Revenues		$50,000,000
Total costs:		
Direct costs		
Professional Labor	$ 20,000,000	
Indirect costs		
Client support	25,000,000	45,000,000
Operating income		$ 5,000,000

The firm has a single direct-cost category (professional labor) and a single indirect-cost pool (client support). Indirect costs are allocated to jobs on the basis of professional labor costs.

Required:
1.Calculate the annual budgeted indirect-cost rate for the firm.
2.The markup rate for pricing jobs is intended to produce operating income equal to 10% of revenues. Calculate the markup rate as a percentage of professional labor costs.
3.The firm is bidding on a consulting job for a client. The budgeted breakdown of professional labor on the job is as follows:

Professional Labor Category	Budgeted Rate per Hour	Budgeted Hours
Director	$200	9
Partner	100	24
Associate	50	100
Assistant	30	220

Calculate the budgeted cost for the client's job. How much will the firm bid for the job if it is to earn its target operating income of 10% of revenues?

1. **Budgeted Indirect Cost** = Total Indirect Costs (Client Support) / Total Direct Costs (Professional Labor)

   = $25,000,000 / $20,000,000 = 125% of professional labor costs

2. **Markup Rate** = Budgeted Revenue / Operating Income

   = $50,000,000 ÷ $20,000,000 = 250% of direct professional labor costs

3. **Budgeted Costs:**

Direct costs:		
Director, $200 × 9	$1,800	
Partner, $100 × 24	2,400	
Associate, $50 × 100	5,000	
Assistant, $30 × 220	6,600	$15,800
Indirect costs:		
Consulting support, 125% × $15,800		19,750
Total costs		$35,550

Let R represent the revenue (or bid price) that the firm aims to earn to achieve the target margin.

$$R - 0.10\,R = \text{Total Costs}$$

The left side represents the total revenue minus the desired operating income (which is 10% of the revenue). This essentially gives us the total costs that can be incurred while maintaining a 10% margin.

Given that the total costs for the job are $35,550:

$$0.90\,R = \$35,550$$
$$R = \$39,500$$

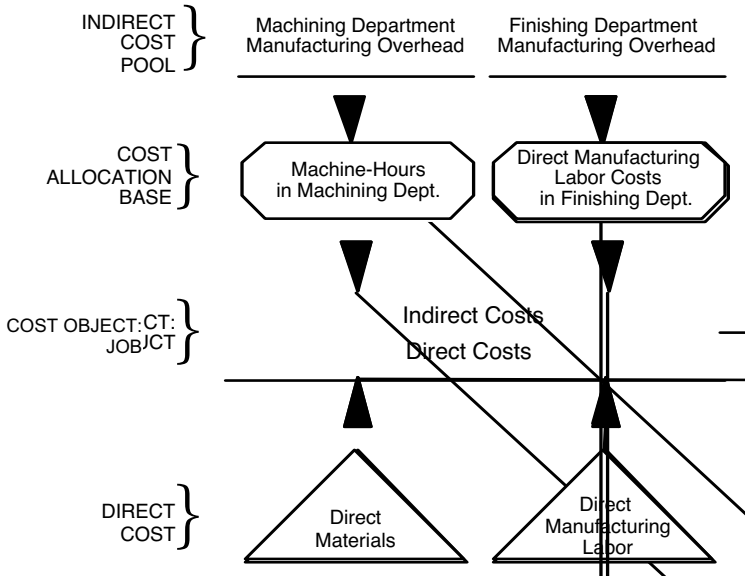
This gives us the bid price (revenue) the firm should set to achieve the target margin.

The result, $39,500, is the amount the firm should bid for the client's job to ensure they achieve their target operating income of 10% of revenues.

8 A company's plant has a machining department and a finishing department. The company's costing system uses two direct-cost categories (direct materials and direct manufacturing labor) and two manufacturing overhead cost pools (the machining department with machine-hours as the allocation base and the finishing department with direct manufacturing labor costs as the allocation base). The annual budget for the plant is as follows:

	Machining Department	Finishing Department
Manufacturing overhead costs	$10,660,000	$8,000,000
Direct manufacturing labor costs	$ 970,000	$4,000,000
Direct manufacturing labor-hours	26,000	160,000
Machine-hours	205,000	31,000

An overview of the job-costing system is:



Required:

1. What is the budgeted manufacturing overhead rate in the machining department? In the finishing department?

2. During the month of January, the job-cost record for Job 431 shows the following:

	Machining Department	Finishing Department
Direct materials used	$16,150	$ 3,000
Direct manufacturing labor costs	$ 350	$ 1,300
Direct manufacturing labor-hours	30	50
Machine-hours	150	20

Compute the total manufacturing overhead cost allocated to Job 431.

3. Assuming that Job 431 consisted of 400 units of product, what is the cost per unit?

4. Why might the company use two different manufacturing overhead cost pools in its costing system?

1. **Budgeted manufacturing overhead divided by allocation base:**
   a. **Machining Department:**

$$\frac{\$\ 10,660,000}{205,000 \text{ machine hours}} = \$52 \text{ per machine hour}$$

   b. **Finishing Department:**

$$= \frac{\$\ 8,000,000}{\$\ 4,000,000}$$

$$= 200\% \text{ of direct manufacturing labor costs}$$

2. Machining Department overhead ($52 x 150) = $ 7,800

Finishing Department overhead (200% of $1300) = $ 2,600

Total manufacturing overhead allocated = $10,400

3. Total Costs of Job 431:

Direct Costs:

Direct Materials: Machining Department = $16,150

Finishing Department = $ 3,000

Direct manufacturing Labor = $ 1,650

Indirect Costs:

Machining Department overhead = $ 7,800

Finishing Department overhead = $ 2,600

Total costs = $31,200

Per unit cost of Job 431 : $ 78 per unit

4. A uniform cost pool is one where all costs share a similar linkage, either cause-and-effect or benefits-received, to the cost-allocation base. The firm probably thinks its manufacturing overhead costs aren't all uniform. Specifically, costs in the Machining Department are driven by machine-hours, while those in the Finishing Department correlate with direct manufacturing labor expenses. The firm feels that the advantages of utilizing two separate cost pools—increased accuracy in product costing and improved cost management capabilities—outweigh the complexities of adopting a more intricate system.

9 A company manufactures products that differ significantly in their complexity and their manufacturing batch sizes. The following costs were incurred this year:

a. Indirect manufacturing labor costs such as supervision that supports direct manufacturing labor, $935,000
b. Procurement costs of placing purchase orders, receiving materials, and paying suppliers related to the number of purchase orders placed, $650,000
c. Cost of indirect materials, $234,000
d. Costs incurred to set up machines each time a different product needs to be manufactured, $392,000
e. Designing processes, drawing process charts, and making engineering process changes for products, $236,900
f. Machine-related overhead costs such as depreciation, maintenance, and production engineering, $865,000 (These resources relate to the activity of running the machines.)
g. Plant management, plant rent, and plant insurance, $498,000

Required:

1. **Consider two types of products made by the company. One product is complex to make and is produced in many batches. The other product is simple to make and is produced in few batches. Suppose that the company needs the same number of machine hours to make each type of product and that the company allocates all overhead costs using machine-hours as the only allocation base. How, if at all, would the products be mis-costed? Briefly explain why.**
2. **How could an Activity-Based-Costing System be helpful to the company in managing its business?**

1. Products with more intricate production processes that are made in multiple batches will consume more batch-level overhead resources than simpler products produced in fewer batches. If the organization relies solely on machine-hours for overhead allocation, both intricate and simple products will receive an equal overhead cost per item, since they both use the same machine-hours. This means the intricate product, which uses more resources, will be allocated a cost that's too low, and the simpler product, which uses fewer resources, will be allocated a cost that's too high.

2. By using activity-based costing, the company can pinpoint the costs of individual tasks and how these costs relate to specific products. This knowledge can aid the company in several ways:

    a. **Pricing and Product Focus:** Understanding the resource demands of different products aids in accurate pricing and identifying profitability. This can lead to a focus on more lucrative products.

    b. **Cost Management:** Insights into activity costs can drive process improvements and cost reduction initiatives. For instance, the company might aim to reduce activity costs (like setups or order processing) by a set percentage, while eliminating non-value-adding tasks.

    c. **Design Evaluation:** Management can assess and adopt new designs for better efficiency by understanding how product and process designs impact activities and associated costs.

    d. **Operational Planning:** The data from the ABC system can guide the planning and management of activities, helping decide which tasks should be carried out during a period and at what expense.

10 A company produces two products, Product Y and Product Z. The company's simple costing system has two direct-cost categories (materials and labor) and one indirect-cost pool. The simple costing system allocates indirect costs on the basis of machine-hours. Recently, the owners of the company have been concerned about a decline in the market share for Product Y, usually their biggest seller. Information related to the company's production for the most recent year follows:

	Product Y	Product Z
Units sold	**3,200**	**1,800**

Selling price	**$125**		**$200**	
Direct material cost per unit		**$30**		**$45**
Direct manufacturing labor cost per hour	**$16**		**$16**	
Direct manufacturing labor hours per unit		**1.50**		**2.25**
Production runs	**40**		**85**	
Material moves	**72**		**168**	
Machine setups	**45**		**155**	
Machine hours		**5,500**		**4,500**
Number of inspections	**250**		**150**	

The owners have heard of other companies in the industry that are now using an activity-based costing system and are curious how an ABC system would affect their product costing decisions. After analyzing the indirect-cost pool for the company, the owners identify six activities as generating indirect costs: production scheduling, material handling, machine setup, assembly, inspection, and marketing. The company collected the following data related to the indirect-cost activities:

Activity	Activity Cost	Activity Cost Driver
Production scheduling	**$95,000**	**Production runs**
Material handling	**$45,000**	**Material moves**
Machine setup	**$25,000**	**Machine setups**
Assembly	**$60,000**	**Machine hours**
Inspection	**$8,000**	**Number of inspections**

Marketing costs were determined to be 3% of the sales revenue for each product.

Required

1. Calculate the cost of Product Y and Product Z under the existing simple costing system.

2. Calculate the cost of Product Y and Product Z under an activity-based costing system.

3. Compare the costs of the products in requirements 1 and 2. Why do the simple and activity-based costing systems differ in the cost of Product Y and Product Z?

4. How might the company use the new cost information from its activity-based costing system to address the declining market share for Product Y?

1. **Simple costing system:**

Total indirect costs = $\$95{,}000 + \$45{,}000 + \$25{,}000 + \$60{,}000 + \$8{,}000 + 3\%[(\$125 \times 3{,}200) + (\$200 \times 1800)] = \$255{,}800$

Total machine-hours = $5{,}500 + 4{,}500 = 10{,}000$

Indirect cost rate per machine-hour = $\frac{\$255{,}800}{10{,}000} = \$25.58$ per machine hour

Simple Costing System	Product Y	Product Z
Direct materials ($30) (3,200 units); ($45) (1,800 units)	$96,000	$81,000
Direct labor ($16) (1.5) (3,200 units); ($16)(2.25)(1,800 units)	$ 76,800	$ 64,800
Indirect cost allocated to each job.		
($25.58) (5500 machine hrs); ($25.58)(4500 machine hrs.)	$140,690	$ 115,110
Total costs	$ 313,490	$ 260,910
Total cost per unit (3200 units; 1800 units)	$97.97	$144.95

2. **Activity-based costing system:**

Activity (1)	Total cost of activity (2)	Cost Driver (3)	Cost Driver Quantity (4)	Alloc. Rate (5) = (2) / (4)
Production scheduling	$95,000	Production runs	125*	$760.00
Material handling	$45,000	Material moves	240*	$187.50
Machine setup	$25,000	Machine setups	200*	$125.00
Assembly	$60,000	Machine hours	10,000*	$6.00
Inspection	$8,000	# of inspections	400*	$20.00
Marketing		% of revenues		$0.03 per $ of sales

*Sum of Product Y and Product Z

ABC System	Product Y	Product Z
Direct materials	$96,000	$81,000
Direct manufacturing labor	$ 76,800	$ 64,800
Indirect costs allocated:		
Production scheduling ($760 per run × 40; 85)	$ 30,400	$ 64,600
Material handling ($187.50 per move × 72; 168)	$ 13,500	$ 31,500
Machine setup ($125 per setup × 45; 155)	$ 5,625	$ 19,375

Assembly ($6 per machine hour × 5500; 4500)	$ 33,000	$ 27,000
Inspection ($20 per inspection × 250; 150)	$ 5,000	$ 3,000
Marketing (0.03 x $125 x 3200; 0.03 x $200 x 1800)	$ 12,000	$ 10,800
Total costs	$ 272,325	$ 302,075
Total cost per unit (3200 units; 1800 units)	$ 85.10	$ 167.82

3. Cost per unit	Product Y	Product Z
Simple Costing System	$ 97.97	$ 144.95
Activity-based Costing System	$ 85.10	$ 167.82
Difference	$ 12.87	- $ 22.87

Compared to the ABC method, the basic costing system charges too much to Product Y and too little to Product Z. Product Y utilizes 1.72 machine-hours for every unit, whereas Product Z utilizes 2.5 machine -hours. In the straightforward system, overheads are assigned based on machine-hours consumed by each product. However, the ABC analysis indicates that the proportion of costs for production runs, material movements, and setups is even greater for Product Z compared to Product Y than the 2.5 to 1.72 machine-hour ratio. This leads to a larger share of indirect costs being attributed to Product Z in the ABC method.

4. The company can leverage insights from the ABC system to adjust its pricing strategy. Under the basic system, Product Y had a profit margin of 21.6% and Product Z had 27.5%. But the ABC analysis shows a margin of around 32% for Product Y and about 16% for Product Z. This suggests the company might reduce Product Y's price to attract more customers and consider raising the price of Product Z, depending on market competition.
Additionally, the firm can utilize ABC data to enhance its operational efficiency. By scrutinizing each indirect cost category, the company can identify opportunities to maintain service quality while utilizing fewer resources or decreasing the costs associated with these resources. Implementing these improvements can lower costs, bolster competitiveness, potentially decrease prices to capture a larger market share, and ultimately enhance profitability.

11 A bank is examining the profitability of its Premier Account, a combined savings and checking account. Depositors receive a 2% annual interest rate on their average deposit. The bank earns an interest rate spread of 3% (the difference between the rate at which it lends money and the rate it pays depositors) by lending money for home-loan purposes at 5%. Thus, the bank would gain $60 on the interest spread if a depositor had an average Premier Account balance of $2,000 this year

($2,000 ? 3% = $60).

The Premier Account allows depositors unlimited use of services such as deposits, withdrawals, checking accounts, and foreign currency drafts. Depositors with Premier Account balances of $1,000 or more receive unlimited free use of services. Depositors with minimum balances of less than $1,000 pay a $22-a-month service fee for their Premier Account.

The bank recently conducted an activity-based costing study of its services. It assessed the following costs for six individual services. The use of these services this year by three customers is as follows:

	Activity-Based Cost per "Transaction"	*Customer* A	B	C
Deposit/withdrawal with teller	$2.50	44	49	4
Deposit/withdrawal with ATM	$0.80	12	24	13
Deposit/withdrawal on prearranged monthly basis	$0.50		0	14 58
Bank checks written	$8.20	8	2	3
Foreign currency drafts	$12.10	6	1	5
Inquiries about account balance	$1.70	7	16	6
Average Premier Account balance for the year		$1200	$700	$24,900

Assume Customer A and Customer C always maintain a balance above $1,000, whereas Customer B always has a balance below $1,000.

Required

1. **Compute this year's profitability of Customer A, Customer B, and Customer C Premier Accounts.**
2. **Why might the bank worry about the profitability of individual customers if the Premier Account product offering is profitable as a whole?**
3. **What changes would you recommend for the bank's Premier Account?**

	A	B	C	Total
Revenues				
Spread revenue on annual basis (3% × ; $1,200, $700, $24,900)	$ 36.00	$ 21.00	$747.00	$ 804.00
Monthly fee charges ($22 ×; 0, 12, 0)	0.00	264.00	0.00	264.00
Total revenues	36.00	285.00	747.00	1,068.00
Costs				
Deposit/withdrawal with teller $2.50 × 44; 49; 4	110.00	122.50	10.00	242.50
Deposit/withdrawal with ATM $0.80 × 12; 24; 13	9.60	19.20	10.40	39.20
Deposit/withdrawal on prearranged basis $0.50 × 0; 14; 58	0.00	7.00	29.00	36.00
Bank checks written $8.20 × 8; 2; 3	65.60	16.40	24.60	106.60
Foreign currency drafts $12.10 × 6; 1; 5	72.60	12.10	60.50	145.20
Inquiries $1.70 × 7; 16; 6	11.90	27.20	10.20	49.30
Total costs	269.70	204.40	144.70	618.80
Operating income (loss)	$(233.70)	$ 80.60	$602.30	$ 449.20

1. The presumption that both Customer A and Customer C maintain balances over $1,000 monthly while Customer B's balance remains below $1,000 implies that only Customer B incurs the monthly fees.

   Note: This solution attributes the entire spread to the "deposit side" of the bank. In practice, this spread can be shared between the "deposit" and "loan" segments of the bank.

2. Cross-subsidization among Premier Accounts happens when gains from some accounts are negated by losses on others. The combined profit from the three customers stands at $449.20. Customer C's account is notably profitable at $602.30, whereas Customer A's account registers a significant loss. Customer B's account turns a minor profit, primarily due to the $264 monthly charges. It's doubtful that Customer B will continue to bear these steep fees, and it's also questionable if the bank would want to impose such fees, considering customer relations.

   The data also indicates varied usage patterns of bank services among customers. For instance, both Customer A and B frequently interact with tellers and often check their account balances compared to Customer C, hinting at cross-subsidization. This situation should alarm the bank. Competitors might recognize that accounts like Customer C's—high-balance with low activity—are lucrative. Simply offering complimentary services to such customers won't retain them if rivals present better interest rates. There's a potential risk that competitive pressures may diminish the interest spread the bank earns from the profitable high-balance, low-activity accounts it manages to hold onto.

3. The bank could consider the following modifications:

a. Propose enhanced interest rates for accounts with substantial balances to bolster the bank's appeal and ability to preserve these accounts.
b. Implement fees for specific services. The ABC analysis details the expense associated with each service. The bank must decide on its pricing strategy: at cost, below cost, or above cost. If the bank opts for pricing above cost, it might deploy advertising and other strategies to prompt customers to use those services more. Naturally, in setting its prices, the bank would have to weigh how its competitors are pricing their offerings.