

Differential Analysis: The Key to Decision Making

128. Costs associated with two alternatives, code-named Q and R, being considered by Corniel Corporation are listed below:

	Alternative Q	Alternative R	
Supplies costs	\$63,000	\$58,000	Δ 5,000
Power costs	\$39,000	\$39,000	0 Irrelevant
Inspection costs	\$19,000	\$29,000	(10,000)
Assembly costs	\$32,000	\$21,000	11,000

From Alternative R perspective.

Required:

- a. Which costs are relevant and which are not relevant in the choice between these two alternatives?
- b. What is the differential cost between the two alternatives?

- a. Supplies costs..... Relevant, since costs differ between alternatives
 Power costs Not relevant since the costs do not differ between alternatives
 Inspection costs..... Relevant, since costs differ between alternatives
 Assembly costs Relevant, since costs differ between alternatives

b.	Alternative Q	Alternative R	Differential	<i>Δ from Alt. Q perspective</i>
Supplies costs.....	\$ 63,000	\$ 58,000	\$ (5,000)	
Power costs	39,000	39,000	0	
Inspection costs.....	19,000	29,000	10,000	
Assembly costs	<u>32,000</u>	<u>21,000</u>	<u>(11,000)</u>	
Total.....	<u>\$153,000</u>	<u>\$147,000</u>	<u>\$ (6,000)</u>	

Learning Objective: 07-01 Identify relevant and irrelevant costs and benefits in a decision.
 Level: 1 Easy

132. Mr. Earl Pearl, accountant for Margie Knall Co., Inc., has prepared the following product-line income data:

	Total	Product			
		A	B	C	
Sales	\$100,000	\$50,000	\$20,000	\$ 30,000	
Variable expenses	60,000	30,000	10,000	20,000	
Contribution margin	40,000	20,000	10,000	10,000	lost
Fixed expenses:					
Rent	5,000	2,500	1,000	1,500	avoidable
Depreciation	6,000	3,000	1,200	1,800	irrelevant
Utilities	4,000	2,000	500	1,500	700 avoidable
Supervisors' salaries	5,000	1,500	500	3,000	avoidable
Maintenance	3,000	1,500	600	900	1000 avoidable
Administrative expenses	10,000	3,000	2,000	5,000	3000 avoidable
Total fixed expenses	33,000	13,500	5,800	13,700	
Net operating income	\$ 7,000	\$ 6,500	\$ 4,200	\$ (3,700)	

The following additional information is available:

- * The factory rent of \$1,500 assigned to Product C is avoidable if the product were dropped.
- * The company's total depreciation would not be affected by dropping C.
- * Eliminating Product C will reduce the monthly utility bill from \$1,500 to \$800.
- * All supervisors' salaries are avoidable.
- * If Product C is discontinued, the maintenance department will be able to reduce monthly expenses from \$3,000 to \$2,000.
- * Elimination of Product C will make it possible to cut two persons from the administrative staff; their combined salaries total \$3,000.

Required:

Prepare an analysis showing whether Product C should be eliminated.

If Product C is dropped	}	lost CM (10,000)	}	9,200 avoidable
		rent 1500		
		utilities 700		
		Sup Salary 3,000		
		maint 1,000		
		admin exp 3000		
		(800) disadvantage to dropping C.		
		∴ Retain Product C.		

Lost contribution margin.....		\$ (10,000)
Less fixed expenses avoided:		
Rent	\$1,500	
Utilities.....	700	
Supervisor's salary	3,000	
Maintenance.....	1,000	
Administrative expense	<u>3,000</u>	<u>9,200</u>
Disadvantage in dropping Product C.....		<u>\$ (800)</u>

Since there is a net \$800 disadvantage to dropping Product C, it should not be dropped.

Learning Objective: 07-02 Prepare an analysis showing whether a product line or other business segment should be added or dropped.

Level: 2 Medium

POHR = \$14 per DLH

134. Bady Inc. makes a range of products. The company's predetermined overhead rate is \$14 per direct labor-hour, which was calculated using the following budgeted data:

Variable manufacturing overhead	\$100,000	$\div 25,000 \text{ DLH} = \4 per DLH	(VPOHR)
Fixed manufacturing overhead	\$250,000		
Direct labor-hours	25,000		

$\left[\frac{250,000}{25,000} = \$10 \text{ per DLH for FMOH} \right]$

Component M3 is used in one of the company's products. The unit cost of the component according to the company's cost accounting system is determined as follows:

Direct materials	\$ 28.00	
Direct labor	56.00	
Manufacturing overhead applied	39.20	$\div 14 \text{ per DLH} = 2.80 \text{ DLH}$
Unit product cost	<u>\$123.20</u>	$\times 4.00$ \$11.20 VMOH

An outside supplier has offered to supply component M3 for \$108 each. The outside supplier is known for quality and reliability. Assume that direct labor is a variable cost, variable manufacturing overhead is really driven by direct labor-hours, and total fixed manufacturing overhead would not be affected by this decision. Bady chronically has idle capacity.

FMOH is irrelevant

Required:

Is the offer from the outside supplier financially attractive? Why?

DM	28
DL	56
VMOH	11.20
	<hr/>
	95.20
offer	<hr/>
	108

(12.80) disadvantage of taking outside offer

∴ Continue to make Component M3 internally.

Direct materials, direct labor, and variable manufacturing overhead are relevant in this decision. Fixed manufacturing overhead is not relevant since it would not be affected by the decision. The variable portion of the manufacturing overhead rate is computed as follows:

$$\begin{aligned} \text{Variable portion of the predetermined overhead rate} &= \text{Variable manufacturing overhead} \div \\ \text{Direct labor-hours} &= \$100,000 \div 25,000 \text{ direct labor-hours} = \$4.00 \text{ per direct labor-hour} \end{aligned}$$

The direct-labor hours per unit for the special order can be determined as follows:

Manufacturing overhead applied	\$39.20
÷ Predetermined overhead rate	\$14.00
= Direct labor-hours	2.80

Consequently, the variable manufacturing overhead for the special order would be:

Variable portion of the predetermined overhead rate	\$4.00
× Direct labor-hours	2.80
= Variable manufacturing overhead	\$11.20

Putting this all together:

Direct materials	\$28.00
Direct labor	56.00
Variable manufacturing overhead	<u>11.20</u>
Total variable cost	<u>\$95.20</u>

Because the outside supplier has offered to sell the component for \$108.00 each, but it only costs the company \$95.20 to make the component internally, this is not a financially attractive offer.

Learning Objective: 07-03 Prepare a make or buy analysis.

Level: 3 Hard

Source: CIMA, adapted

$$POHR = \$16 \text{ per DLH}$$

143. Humes Corporation makes a range of products. The company's predetermined overhead rate is \$16 per direct labor-hour, which was calculated using the following budgeted data:

Variable manufacturing overhead.....	\$75,000	$\div 25,000 \text{ DLHs} = \3 per DLH	(VPOHR)
Fixed manufacturing overhead.....	\$325,000		
Direct labor-hours	25,000		

Management is considering a special order for 700 units of product J45K at \$64 each. The normal selling price of product J45K is \$75 and the unit product cost is determined as follows:

Direct materials	\$37.00	
Direct labor	18.00	
Manufacturing overhead applied	<u>16.00</u>	$\div \$16 \text{ per DLH} = 1.0 \text{ DLH}$
Unit product cost.....	<u>\$71.00</u>	$\times \$3 \text{ per DLH}$
		$\$3 \text{ per DLH (VMOH)}$

If the special order were accepted, normal sales of this and other products would not be affected. The company has ample excess capacity to produce the additional units. Assume that direct labor is a variable cost, variable manufacturing overhead is really driven by direct labor-hours, and total fixed manufacturing overhead would not be affected by the special order.

irrelevant

Required:

If the special order were accepted, what would be the impact on the company's overall profit?

Special Order Price		\$ 64.00
VC - DM	\$ 37	
DL	\$ 18	
VMOH	<u>3</u>	
		<u>58.00</u>
CM		6.00
	$6.00 \times 700 \text{ units ordered} =$	\$4200 profit increase

Direct materials, direct labor, and variable manufacturing overhead are relevant in this decision. Fixed manufacturing overhead is not relevant since it would not be affected by the decision. The variable portion of the manufacturing overhead rate is computed as follows:

Variable manufacturing overhead.....	\$75,000
+ Direct labor-hours.....	25,000
= Variable portion of the predetermined overhead rate	\$3.00

The direct-labor hours per unit for the special order can be determined as follows:

Manufacturing overhead applied	\$16.00
+ Predetermined overhead rate.....	\$16.00
= Direct labor-hours.....	1.00

Consequently, the variable manufacturing overhead for the special order would be:

Variable portion of the predetermined overhead rate.....	\$3.00
× Direct labor-hours.....	1.00
= Variable manufacturing overhead	\$3.00

Putting this all together:

Special order price.....	<u>\$64.00</u>
Variable costs:	
Direct materials.....	37.00
Direct labor.....	18.00
Variable manufacturing overhead	<u>3.00</u>
Total variable cost.....	<u>58.00</u>
Contribution margin.....	<u>\$ 6.00</u>
× Units ordered.....	700
= Total increase in profit from the special order.....	\$4,200

Learning Objective: 07-04 Prepare an analysis showing whether a special order should be accepted.

Level: 3 Hard

Source: CIMA, adapted

147. Redner, Inc. produces three products. Data concerning the selling prices and unit costs of the three products appear below:

	Product		
	J	K	L
Selling price.....	\$80	\$60	\$90
Variable costs	<u>\$50</u>	<u>\$40</u>	<u>\$55</u>
Fixed costs	\$25	\$8	\$22
Grinding machine time (minutes).....	10	5	7
(GM)			
	CM		
	30	20	35
	CMGM \$3	\$4	\$5

Fixed costs are applied to the products on the basis of direct labor hours.

Demand for the three products exceeds the company's productive capacity. The grinding machine is the constraint, with only 2,400 minutes of grinding machine time available this week.

Required:

- Given the grinding machine constraint, which product should be emphasized? Support your answer with appropriate calculations.
- Assuming that there is still unfilled demand for the product that the company should emphasize in part (a) above, up to how much should the company be willing to pay for an additional hour of grinding machine time?

$$1 \text{ hr} = 60 \text{ min}$$

$$\times \$5 \text{ CM per GM minute}$$

$$\$300 \text{ per GM hour.}$$

a. The product to emphasize can be determined by computing the contribution margin per unit of the scarce resource, which in this case is grinding machine time.

	Product		
	J	K	L
Selling price.....	\$80	\$60	\$90
Variable costs	<u>50</u>	<u>40</u>	<u>55</u>
Contribution margin.....	<u>\$30</u>	<u>\$20</u>	<u>\$35</u>
Grinding machine time (minutes)	10	5	7
Contribution margin per minute.....	\$3.00	\$4.00	\$5.00

Product L should be emphasized because it has the greatest contribution margin per unit of the scarce resource.

b. If additional grinding machine time would be used to produce more of Product L, the time would be worth 60 minutes per hour × \$5 contribution margin per minute = \$300 per hour.

Learning Objective: 07-05 Determine the most profitable use of a constrained resource.

Learning Objective: 07-06 Determine the value of obtaining more of the constrained resource.

Level: 3 Hard

154. Laukea Company makes two products from a common input. Joint processing costs up to the split-off point total \$49,600 a year. The company allocates these costs to the joint products on the basis of their total sales values at the split-off point. Each product may be sold at the split-off point or processed further. Data concerning these products appear below:

	Product X	Product Y	Total
Allocated joint processing costs.....	\$19,200	\$30,400	\$49,600
Sales value at split-off point.....	\$24,000	\$38,000	\$62,000
Costs of further processing.....	\$23,700	\$18,000	\$41,700
Sales value after further processing.....	\$46,800	\$57,300	\$104,100

Required:

- What is the net monetary advantage (disadvantage) of processing Product X beyond the split-off point?
- What is the net monetary advantage (disadvantage) of processing Product Y beyond the split-off point?
- What is the minimum amount the company should accept for Product X if it is to be sold at the split-off point?
- What is the minimum amount the company should accept for Product Y if it is to be sold at the split-off point?

(X) a.

$$\begin{array}{r}
 24,000 \\
 (23,700) + 46,800 = 23,100 \quad \text{Benefit} \\
 \hline
 - 24,000 \\
 \hline
 \text{Disadvantage } \underline{\underline{900}}
 \end{array}$$

(Y) b.

$$\begin{array}{r}
 38,000 \\
 (18,000) + 57,300 = 39,300 \\
 \hline
 - 38,000 \\
 \hline
 \text{Advantage } \underline{\underline{1,300}}
 \end{array}$$

c. Product X minimum = $24,000 + (900) = \underline{\underline{\$23,100}}$

d. Product Y minimum = $38,000 + 1300 = \underline{\underline{\$39,300}}$

a. & b.

	Product X	Product Y
Sales value after further processing	\$46,800	\$57,300
Costs of further processing	<u>23,700</u>	<u>18,000</u>
Benefit of further processing	23,100	39,300
Less: Sales value at split-off point	<u>24,000</u>	<u>38,000</u>
Net advantage (disadvantage)	<u><u>\$ (900)</u></u>	<u><u>\$ 1,300</u></u>

c. & d.

	Product X	Product Y
Minimum selling price at split-off	\$23,100	\$39,300

Learning Objective: 07-07 Prepare an analysis showing whether joint products should be sold at the split-off point or processed further.

Level: 3 Hard