



مجموعة جامعة
الجميع الذكية
للتعليم القابضة

MIDOCEAN
UNIVERSITY

Accounting for Managers

Prepared by Dr. Sara Ahmed

MGM 341

Lecture 7



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Chapter 8: Relevant Costs for Short-term Decision

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Chapter
08

Learning Objectives

- Describe and identify information relevant to short-term business decisions
- Decide whether to accept a special order
- Decide whether to discontinue a product, department, or store
- Analyze outsourcing (make-or-buy) decisions
- Factor resource constraints into product mix decisions
- Decide whether to sell a product “as is” or process it further

Identify relevant and
irrelevant costs and benefits
in a decision.

Decision Making – Six Key Concepts – Concepts 1 and 2

Key Concept #1

Every decision involves choosing from among at least two alternatives. Therefore, the first step in decision making is to **define the alternatives** being considered.

Key Concept #2

Once you have defined the alternatives, you need to **identify the criteria** for choosing among them.

- **Relevant costs** and **relevant benefits** should be considered when making decisions.
- **Irrelevant costs** and **irrelevant benefits** should be ignored when making decisions.

Decision Making – Six Key Concepts – Concept

3

Key Concept #3

The key to effective decision making is *differential analysis*—focusing on the future costs and benefits that differ between the alternatives. Everything else is irrelevant and should be ignored.

- A future cost that differs between any two alternatives is known as a **differential cost**.
- Future revenue that differs between any two alternatives is known as **differential revenue**.
- An **incremental cost** is an increase in cost between two alternatives.
- An **avoidable cost** is a cost that can be eliminated by choosing one alternative over another.

Decision Making – Six Key Concepts – Concepts 4 and 5

Key Concept #4

Sunk costs are always irrelevant when choosing among alternatives.

- A **sunk cost** is a cost that has already been incurred and cannot be changed regardless of what a manager decides to do.

Key Concept #5

Future costs and benefits that *do not differ between alternatives* are irrelevant to the decision-making process.

Decision Making – Six Key Concepts – Concept 6

Key Concept #6

Opportunity costs also need to be considered when making decisions.

- An **opportunity cost** is the potential benefit that is given up when one alternative is selected over another.

Identifying Relevant Costs – An Example

Cynthia, a Boston student, is considering visiting her friend in New York. She can drive or take the train. By car, it is 230 miles to her friend's apartment. She is trying to decide which alternative is less expensive and has gathered the following information.

Automobile Costs (based on 10,000 miles driven per year)		
	Annual Cost of Fixed Items	Cost per Mile
1 Annual straight-line depreciation on car	\$ 2,800	\$ 0.280
2 Cost of gasoline		0.100
3 Annual cost of auto insurance and license	1,380	0.138
4 Maintenance and repairs		0.065
5 Parking fees at school	360	0.036
6 Total average cost		\$ 0.619

\$45 per month × 8 months

\$2.70 per gallon ÷ 27 MPG

\$24,000 cost – \$10,000 salvage value ÷ 5 years

Identifying Relevant Costs – Additional Information

Automobile Costs (based on 10,000 miles driven per year)

	Annual Cost of Fixed Items	Cost per Mile
1 Annual straight-line depreciation on car	\$ 2,800	\$ 0.280
2 Cost of gasoline		0.100
3 Annual cost of auto insurance and license	1,380	0.138
4 Maintenance and repairs		0.065
5 Parking fees at school	360	0.036
6 Total average cost		<u>\$ 0.619</u>

Additional Information

7 Reduction in resale value of car per mile of wear	\$ 0.026
8 Round-trip train fare	\$ 104
9 Benefits of relaxing on train trip	????
10 Cost of putting dog in kennel while gone	\$ 40
11 Benefit of having car in New York	????
12 Hassle of parking car in New York	????
13 Per day cost of parking car in New York	\$ 25

Identifying Relevant Costs – Part 1

Which costs and benefits are relevant in Cynthia's decision?

The cost of the car is a sunk cost and is **not relevant** to the current decision.

The annual cost of insurance is **not relevant**. It will remain the same if she drives or takes the train.

However, the cost of gasoline is clearly **relevant** if she decides to drive. If she takes the train, she would avoid the cost of gasoline, so the cost differs between the alternatives.

Identifying Relevant Costs – Part 2

Which costs and benefits are relevant in Cynthia's decision?

The cost of maintenance and repairs is **relevant**. In the long-run these costs depend upon miles driven.

The monthly school parking fee is **not relevant** because it must be paid if Cynthia drives or takes the train.

At this point, we can see that some of the average cost of \$0.619 per mile are relevant and others are not.

Which costs and benefits are relevant in Cynthia's decision?

The decline in resale value due to additional miles is a **relevant** cost.

The round-trip train fare is clearly **relevant**. If she drives the cost can be avoided.

Relaxing on the train is **relevant** even though it is difficult to assign a dollar value to the benefit.

The kennel cost is **not relevant** because Cynthia will incur the cost if she drives or takes the train.

Identifying Relevant Costs – Part 4

Which costs and benefits are relevant in Cynthia's decision?

The cost of parking in New York is **relevant** because it can be avoided if she takes the train.

The benefits of having a car in New York and the problems of finding a parking space are both **relevant** but are difficult to assign a dollar amount.

Identifying Relevant Costs – Part 5

From a financial standpoint, Cynthia would be better off taking the train to visit her friend. Some of the non-financial factors may influence her final decision.

Relevant Financial Cost of Driving

Gasoline (460 @ \$0.100 per mile)	\$ 46.00
Maintenance (460 @ \$0.065 per mile)	29.90
Reduction in resale (460 @ \$0.026 per mile)	11.96
Parking in New York (2 days @ \$25 per day)	50.00
Total	<u>\$ 137.86</u>

Relevant Financial Cost of Taking the Train

Round-trip ticket	<u>\$ 104.00</u>
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Total and Differential Cost Approaches – Total Cost Approach

The management of a company is considering a new labor saving machine that rents for \$3,000 per year. Data about the company's annual sales and costs with and without the new machine are:

	Current Situation	Situation With New Machine	Differential Costs and Benefits
Sales (5,000 units @ \$40 per unit)	\$ 200,000	\$ 200,000	-
Less variable expenses:			
Direct materials (5,000 units @ \$14 per unit)	70,000	70,000	-
Direct labor (5,000 units @ \$8 and \$5 per unit)	40,000	25,000	15,000
Variable overhead (5,000 units @ \$2 per unit)	10,000	10,000	-
Total variable expenses	120,000	105,000	-
Contribution margin	80,000	95,000	15,000
Less fixed expense:			
Other	62,000	62,000	-
Rent on new machine	-	3,000	(3,000)
Total fixed expenses	62,000	65,000	(3,000)
Net operating income	\$ 18,000	\$ 30,000	12,000

Total and Differential Cost Approaches – Differential Cost Approach

As you can see, the only costs that differ between the alternatives are the direct labor costs savings and the increase in fixed rental costs.

	Current Situation	Situation With New Machine	Differential Costs and Benefits
Sales (5,000 units @ \$40 per unit)	\$ 200,000	\$ 200,000	-
Less variable expenses:			
Direct materials			-
Direct labor			15,000
Variable overhead			-
Total variable expenses			-
Contribution margin			15,000
Less fixed expenses:			
Other			-
Rent on new machine			(3,000)
Total fixed expenses			(3,000)
Net operating income			12,000

We can efficiently analyze the decision by looking at the different costs and revenues and arrive at the same solution.

Financial Advantage of Renting the New Machine

Decrease in direct labor costs (5,000 units @ \$3 per unit)	\$ 15,000
Increase in fixed rental expenses	(3,000)
Net annual cost saving of renting the new machine	\$ 12,000

Total and Differential Cost Approaches

Using the differential approach is desirable for two reasons:

- 1. Only rarely will enough information be available to prepare detailed income statements for both alternatives.**
- 2. Mingling irrelevant costs with relevant costs may cause confusion and distract attention away from the information that is really critical.**

Prepare an analysis showing
whether a special order
should be accepted.

Special Orders

A **special order** is a one-time order that is not considered part of the company's normal ongoing business.

When analyzing a special order, only the **incremental costs and benefits** are relevant.

Since the existing fixed manufacturing overhead costs would not be affected by the order, they are not relevant.

Special Orders - Example

- Jet Inc. makes a single product whose normal selling price is \$20 per unit.
- A foreign distributor offers to purchase 3,000 units for \$10 per unit.
- This is a one-time order that would not affect the company's regular business.
- Annual capacity is 10,000 units, but Jet Inc. is currently producing and selling only 5,000 units.

Should Jet accept the offer?

Special Orders – Part 1

Jet Inc.**Contribution Inc. Stmt, before considering special order**

Revenue (5,000 × \$20)		\$ 100,000
Variable costs:		
Direct materials	\$ 20,000	
Direct labor	5,000	
Manufacturing overhead	10,000	
Marketing costs	5,000	
Total variable costs		40,000
Contribution margin		60,000
Fixed costs:		
Manufacturing overhead	\$ 28,000	
Marketing costs	20,000	
Total fixed costs		48,000
Net operating income		\$ 12,000

\$8 variable cost

Special Orders – Part 2

If Jet accepts the special order, the incremental revenue will exceed the incremental costs. In other words, net operating income will increase by \$6,000. This suggests that Jet should accept the order.

Increase in revenue (3,000 × \$10)	\$30,000
Increase in costs (3,000 × \$8 variable cost)	<u>24,000</u>
Financial advantage of accepting the order	<u><u>\$ 6,000</u></u>

Note: This answer assumes that the fixed costs are **unavoidable** and that variable marketing costs must be incurred on the special order.

Concept Check 1

Northern Optical ordinarily sells the X-lens for \$50. The variable production cost is \$10, the fixed production cost is \$18 per unit, and the variable selling cost is \$1. A customer has requested a special order for 10,000 units of the X-lens to be imprinted with the customer's logo. This special order would not involve any selling costs, but Northern Optical would have to purchase an imprinting machine for \$50,000.

Concept Check 1a

What is the rock bottom minimum price below which Northern Optical should not go in its negotiations with the customer? In other words, below what price would Northern Optical actually be losing money on the sale? There is ample idle capacity to fulfill the order and the imprinting machine has no further use after this order.

- a. \$50
- b. \$10
- c. \$15
- d. \$29

Concept Check 1b

What is the rock bottom minimum price below which Northern Optical should not go in its negotiations with the customer? In other words, below what price would Northern Optical actually be losing money on the sale? There is ample idle capacity to fulfill the order and the imprinting machine has no further use after this order.

- a. \$50
- b. \$10
- c. \$15
- d. \$29

Variable production cost	\$100,000
Additional fixed cost	<u>+ 50,000</u>
Total relevant cost	<u>\$150,000</u>
Number of units	10,000
Average cost per unit	= \$15

Prepare an analysis showing whether a product line or other business segment should be added or dropped.

Adding/Dropping Segments – Part 1

One of the most important decisions managers make is whether to add or drop a business segment. Ultimately, a decision to drop an old segment or add a new one is going to hinge primarily on its financial impact.

To analyze this impact, it is necessary to carefully analyze the costs.

Due to the declining popularity of digital watches, Lovell Company's digital watch line has not reported a profit for several years. Lovell is considering discontinuing this product line.

A Contribution Margin Approach

DECISION RULE

Lovell should drop the digital watch segment only if its profit would increase.

Lovell will compare the contribution margin that would be lost if the digital watch line was discontinued to the fixed expenses that would be avoided if the line was discontinued.

Adding/Dropping Segments – Example – Part 1

Segment Income Statement Digital Watches

Sales		\$ 500,000
Less: variable expenses		
Variable manufacturing costs	\$ 120,000	
Variable shipping costs	5,000	
Commissions	75,000	200,000
Contribution margin		\$ 300,000
Less: fixed expenses		
General factory overhead	\$ 60,000	
Salary of line manager	90,000	
Depreciation of equipment	50,000	
Advertising - direct	100,000	
Rent - factory space	70,000	
General admin. expenses	30,000	400,000
Net operating loss		\$ (100,000)

Segment Income Statement Digital Watches

Sales \$ 500,000

An investigation has revealed that the fixed general factory overhead and fixed general administrative expenses will not be affected by dropping the digital watch line. The fixed general factory overhead and general administrative expenses assigned to this product would be reallocated to other product lines.

Advertising - direct	100,000	
Rent - factory space	70,000	
General admin. expenses	30,000	400,000
Net operating loss		<u>\$ (100,000)</u>

Adding/Dropping Segments – Example – Part 3

Segment Income Statement
Digital Watches

Sales		\$ 500,000
Less: Variable expenses		
Direct materials	300,000	
Direct labor	100,000	
Manufacturing overhead	0	
	<u>400,000</u>	<u>200,000</u>
Contribution margin		\$ 300,000
Less: fixed expenses		
General factory overhead	\$ 60,000	
Salary of line manager	20,000	
Depreciation of equipment	10,000	
Advertising - direct	0	
Rent - factory space	70,000	
General admin. expenses	<u>30,000</u>	<u>400,000</u>
Net operating loss		\$ (100,000)

The equipment used to manufacture digital watches has no resale value or alternative use.

Should Lovell retain or drop the digital watch segment?

Contribution Margin Approach Solution

Contribution Margin Solution		
Contribution margin lost if digital watches are dropped		\$ (300,000)
Less fixed costs that can be avoided		
Salary of the line manager	\$ 90,000	
Advertising - direct	100,000	
Rent - factory space	70,000	260,000
Financial disadvantage of dropping the digital watches product line		<u>\$ (40,000)</u>

The Lovell solution can also be obtained by preparing comparative income statements showing results with and without the digital watch segment.

Let's look at this second approach.

Comparative Income Approach – Part 2

Comparative Income Approach Solution

	Keep Digital Watches	Drop Digital Watches	Difference
Sales	\$ 500,000	\$ -	\$ (500,000)
Less variable expenses:			
Manufacturing expenses	120,000	-	120,000
Shipping	5,000	-	5,000
Commissions	75,000	-	75,000
Total variable expenses	200,000	-	200,000
Contribution margin	300,000	-	(300,000)
Less fixed expenses:			
General factory overhead	60,000		
Salary of line Manager	90,000		
Depreciation	50,000		
Advertising - direct	100,000		
Rent - factory space	70,000		
General admin. Expenses	30,000		
Total fixed expenses	400,000		
Net operating loss	\$ (100,000)		

Comparative Income Approach – Part 3

Comparative Income Approach
Solution

	Keep Digital Watches	Drop Digital Watches	Difference
Sales	\$ 500,000	\$ -	\$ (500,000)
Less variable expenses:			
Manufacturing expenses	120,000	-	120,000
Shipping	5,000	-	5,000
Commissions	75,000	-	75,000
Total variable expenses	200,000	-	200,000
Contribution margin	300,000	-	(300,000)
Less fixed expenses:			
General factory overhead	60,000	60,000	-
Salary of line Manager	90,000		
Depreciation			
Advertising - direct			
Rent - factory space			
General admin. Expenses			
Total fixed expenses			
Net operating loss			

On the other hand, the general factory overhead would be the same under both alternatives, so it is irrelevant.

Comparative Income Approach – Part 4

Comparative Income Approach Solution

	Keep Digital Watches	Drop Digital Watches	Difference
Sales	\$ 500,000	\$ -	\$ (500,000)
Less variable expenses:			
Manufacturing expenses			120,000
Shipping			5,000
Commissions			75,000
Total variable expenses	200,000		200,000
Contribution margin	300,000	-	(300,000)
Less fixed expenses:			
General factory overhead	60,000	60,000	-
Salary of line Manager	90,000	-	90,000
Depreciation	50,000		
Advertising - direct	100,000		
Rent - factory space	70,000		
General admin. Expenses	30,000		
Total fixed expenses	400,000		
Net operating loss	\$ (100,000)		

The salary of the product line manager would disappear, so it is relevant to the decision.

Comparative Income Approach – Part 5

Comparative Income Approach
Solution

	Keep Digital Watches	Drop Digital Watches	Difference
Sales	\$ 500,000	\$ -	\$ (500,000)
Less variable expenses:			
Direct materials	300,000	-	(300,000)
Direct labor	50,000	-	(50,000)
Variable overhead	50,000	-	(50,000)
Contribution margin	100,000	-	(100,000)
Less fixed expenses:			
General factory overhead	60,000	60,000	-
Salary of line Manager	90,000	-	90,000
Depreciation	50,000	50,000	-
Advertising - direct	100,000	-	100,000
Rent - factory space	70,000	-	70,000
General admin. Expenses	30,000	-	30,000
Total fixed expenses	400,000	110,000	290,000
Net operating loss	\$ (100,000)	\$ 10,000	\$ 90,000

The depreciation is a sunk cost. Also, remember that the equipment has no resale value or alternative use, so the equipment and the depreciation expense associated with it are irrelevant to the decision.

Comparative Income Approach – Part 6

Comparative Income Approach Solution

	Keep Digital Watches	Drop Digital Watches	Difference
Sales	\$ 500,000	\$ -	\$ (500,000)
Less variable expenses:			
Manufacturing expense	120,000	-	120,000
Shipping	5,000	-	5,000
Commissions	75,000	-	75,000
Total variable expenses	195,000	-	195,000
Contribution margin	305,000	-	305,000
Less fixed expenses:			
General factory overhead	-	-	-
Salary of line Manager	90,000	-	90,000
Depreciation	50,000	50,000	-
Advertising - direct	100,000	-	100,000
Rent - factory space	70,000	-	70,000
General admin. Expenses	30,000	30,000	-
Total fixed expenses	400,000	140,000	260,000
Net operating loss	\$ (100,000)	\$ (140,000)	\$ (40,000)

The complete comparative income statements reveal that Lovell would earn \$40,000 of additional profit by retaining the digital watch line.

Beware of Allocated Fixed Costs – Part 1

Be aware that allocated fixed costs can distort the keep/drop decision.

Lovell's managers may ask:
"Why should we keep the digital watch segment when it's showing a **\$100,000 loss?**"

The answer lies
in the way we
allocate **common**
fixed costs to our
products.

Including **unavoidable common fixed costs** makes the product line **appear to be unprofitable**, when in fact *dropping* the product line would **decrease the company's overall net operating income**.

Prepare a make or buy
analysis.

The Make or Buy Decision

When a company is involved in more than one activity in the entire value chain, it is **vertically integrated**. A decision to carry out one of the activities in the value chain internally, rather than to buy externally from a supplier is called a **make or buy decision**.

Vertical Integration - Advantages

Smoother flow of parts and materials

Better quality control

Realize profits

Vertical Integration - Disadvantages

Companies may fail to take advantage of suppliers who can create **economies of scale advantage** by pooling demand from numerous companies.

While the **economies of scale** factor can be appealing, a company must be careful to retain control over activities that are **essential to maintaining its competitive position**.

The Make or Buy Decision – An Example

Essex Company manufactures part 4A that is used in one of its products. The unit product cost of this part is:

Direct materials	\$ 9
Direct labor	5
Variable overhead	1
Depreciation of special equip.	3
Supervisor's salary	2
General factory overhead	10
Unit product cost	<u>\$ 30</u>

The Make or Buy Decision – Part 1

- The special equipment used to manufacture part 4A has no resale value.
- The total amount of general factory overhead, which is allocated on the basis of direct labor hours, would be unaffected by this decision.
- The \$30 unit product cost is based on 20,000 parts produced each year.
- An outside supplier has offered to provide the 20,000 parts at a cost of \$25 per part.

Should the company stop making Part 4A and but it from an outside supplier?

The Make or Buy Decision – Part 2

	Cost Per Unit	Cost of 20,000 Units	
		Make	Buy
Outside purchase price	<u>\$ 25</u>		<u>\$ 500,000</u>
Direct materials (20,000 units)	\$ 9	180,000	
Direct labor	5	100,000	
Variable overhead	1	20,000	
Depreciation of equip.	3	-	
Supervisor's salary	2	40,000	
General factory overhead	10	-	
Total cost	<u>\$ 30</u>	<u>\$ 340,000</u>	<u>\$ 500,000</u>

The **avoidable costs** associated with making Part 4A include direct materials, direct labor, variable overhead, and the supervisor's salary.

The Make or Buy Decision – Part 3

	Cost Per Unit	Cost of 20,000 Units	
		Make	Buy
Outside purchase price	<u>\$ 25</u>		\$ 500,000
Direct materials (20,000 units)	\$ 9	180,000	
Direct labor	5	100,000	
Variable overhead	1	20,000	
Depreciation of equip.	3	-	
Supervisor's salary	2	40,000	
General factory overhead	<u>10</u>	<u>-</u>	

The cost incurred to buy the equipment is a **sunk cost**; the depreciation simply spreads the sunk cost over the equipment's useful life. The equipment has no resale value. The special equipment and associated depreciation expense are **irrelevant**.

The Make or Buy Decision – Part 4

Allocated general factory overhead: Cost Per Unit \$10

- The allocated general factory overhead represents allocated costs common to all items produced in the factory and would continue unchanged.
- Thus, it is irrelevant to the decision.

The Make or Buy Decision – Part 5

- Financial advantage of making Part 4A is \$160,000 less than the cost of buying the part.
- Should we make or buy Part 4A?
- Given that the total avoidable costs are less than the cost of buying the part, Essex **should continue to make the part.**

Opportunity Cost

Opportunity costs are not actual cash outlays and are not recorded in the formal accounts of an organization.

An **opportunity cost** is the benefit that is foregone as a result of pursuing some course of action.

If the space to make part 4A had an alternative use, the opportunity cost would have been equal to the segment margin that could have been derived from the best alternative use of the space.



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Thank You

