Chapter 7

Decision-Making and Relevant Data

Learning Objectives:

- Explain the importance of relevant information in decision making.
- Identify relevant and non-relevant information in various decision making situations.
- Evaluate decisions involving relevant and non-relevant information. In particular, you should be able to make decisions in the following situations:
    1. Special order (special selling price decision).
    2. Make or buy (outsourcing).
    3. Optimal product mix.
    4. Replacing an old asset.
    5. Keeping or closing a product line or an organizational unit (Performance Evaluation).

THE BASIC CONCEPTS FOR DECISION-MAKING

Relevant Data in Decision Making

- In deciding among alternative choices for a given situation, managers must ***include*** in the decision-making process all ***relevant*** (related) information to the specific decision at hand and ***exclude*** **non-relevant** information.
- There are two ***types of information*** that can be considered in the decision-making process: **quantitative** and **qualitative** information.
    - ***Quantitative*** information includes factors that can be measured in terms of financial measurements (i.e., costs and revenues).
    - ***Qualitative*** information are difficult to quantify or measured in terms of financial measurement. Examples include things like the effect of a decision on employees morale, loss of control by giving work to outsourcing providers, and effects on a community or the environment. When faced with making a decision that includes qualitative factors such as these, managers must employ skill, experience, judgment, and ethical standards. In this chapter, we will only deal with the quantitative (i.e., financial) aspects of decisions.

Definition of Relevant Data

The term relevant data **(Costs & Revenues)** can be defined as the (i) ***expected future*** (ii) ***cash flows*** (inflows and outflows) that will (iii) ***differ*** among the alternative courses of action being considered, and will be (iv) ***directly affected*** by the decision at hand.

Sunk Costs:

Sunk costs are historical costs that have been incurred in the **past** ***and will not change*** regardless of which decision the company chooses. Hence, sunk costs are irrelevant for decisions and should be ignored in decision making process, because they cannot be changed.

Differential (Incremental) cost:

- When making decisions, managers often compare the costs and revenues of different alternatives. There are two approaches to analyze the data: (i) consider all the data or (ii) consider *only* differential (incremental) data.
- **Differential costs** (also known as **incremental cost**) are the differences in costs of two alternatives.
- The differential cost can be either **fixed costs** or **variable costs**.
- Similarly the difference in revenue of two alternatives is known as differential revenue.
- The terms "differential cost" and "differential revenue" used in managerial accounting are similar to the terms "***marginal cost***" and "***marginal revenue***" used in economics.

Avoidable Costs:

An avoidable cost is a cost that can be eliminated (in whole or in part) as a result of choosing one alternative over another. Any cost that is ***avoidable*** is by definition relevant.

Committed (Unavoidable) costs:

Committed or ***unavoidable*** costs are ***future cash flows*** which ***will be incurred*** regardless of any decision to be taken. Thus, although they area cash flows and they are going to happen in the future, they cannot be avoided. Therefore, they should be excluded from the decision making process.

As a practical matter, sunk costs and committed costs are ***equivalent*** with respect to their ***decision-relevance***; neither is relevant with respect to any decision, because neither can be changed.

Accounting (bookkeeping) costs:

These are items which are not cash flows. The most common non-cash flow costs are depreciation and common costs which are allocated to various parts of the organization. For example, if a company pays $40,000 rent for a building that house four divisions (A, B, C, and D). The head office allocates the rent among the four divisions equally, as each division occupies one floor of the building. If the company is considering closing division A as it is not operating profitably. The amount of rent allocated to division A is irrelevant to the decision of whether to close division A or not.

Opportunity costs:

An opportunity cost is defined as the income or benefit foregone on the ***second best*** alternative. Opportunity cost is an economic concept that represents potential gain or income that could have been earned from the next best use of a resource (alternative course of action).

For example, assume that before you joint the MBA program, you had a job that pays you $40,000 per year. For a better future, you decided to get an MBA degree, which costs you $50,000 per year. Assume that you are a full time students and it will take two years to complete your MBA degree. How much is the opportunity costs and what is total cost of getting your MBA degree?

Almost every alternative has an opportunity cost. Opportunity costs are relevant to decision-making and should be considered in the decision making process whenever is possible. The difficulty with opportunity costs is that they do not represent actual revenues or costs, and therefore, they are not recorded by the accounting system.

1. SPECIAL ORDER

- Sometimes, when a company has spare (idle) production capacity, it may be willing to fulfill SPECIAL ORDERS for non-regular customers. Normally, the prices quoted are lower than those regular customers.
- Special orders are one-time orders that do not affect a company's normal sales. The profit from a special order equals the incremental revenue less the incremental costs.

A special order should be accepted if the ***incremental revenue*** from the order exceeds its ***incremental co***sts.

Where:
Incremental Revenue = Special Order units x Special Order price
Incremental Costs = Variable costs + extra fixed overheads + opportunity cost**

**Note that the Opportunity Cost will arise if accepting the special order will cause the company to exceed the maximum capacity.

Note the following:

a. It is assumed that sales to regular customers will not be affected by the special order.
b. If the units of the special order can be produced within existing plant capacity (i.e., using the idle capacity of production), generally only variable costs will be affected.
c. If the units of the special order can not be fulfilled using the idle capacity, then, they company should consider either (1) giving up some of its regular sales or (2) incurs additional fixed costs to increase the existing capacity to satisfy the special order.
d. "Minimum" selling price = "incremental" costs associated with the special order. These costs usually include variable costs.

Example 1: **(Special Order)**

Company A has capacity to produce 100,000 units of product X. The cost estimate per unit based on current capacity of 80% is as follows:

	$ per unit
Direct material	$5.00
Direct labor	$3.00
Variable production overhead	$2.00
Fixed production overhead	$4.00
Shipping cost	$1.00
Sales Commission	$2.00
Fixed production overhead	$3.00
Total	$20.00
Selling price/unit	25.00

A non- regular customer has approached the company to purchase 20,000 units at $16 each.

Required:

Should Company A accept this special order?

Example 2: (Special Order)

Following is the budgeted income statement For XYZ Company.

Sales (15,000 Units @ $60)		$ 900,000
Less: Cost Of Goods Sold:		
Direct Materials	$ 150,000	
Direct Labour	300,000	
Variable Overhead	60,000	
Fixed Overhead	225,000	
Cost Of Goods Sold		735,000
Gross Profit		165,000
Less: **Operating Expenses**:		
Sales Commission (2% Of Sales)	18,000	
Delivery Expense (Var.)	90,000	
Sales Salaries (Fixed)	30,000	
Administrative (Fixed)	12,000	
Total Operating Expenses		150,000
Operating Income		$ 15,000

Additional Information:

- Maximum plant capacity = 18,000 units (it can be increased to 30,000 units for an additional costs of $ 28,000)
- XYZ Co. received a special order from ABC company to purchase 2,000 units @ $ 45 per unit (FOB factory, i.e., the buyer will pay the delivery costs). The special order will not affect the demand from the regular customers.

Required:

1. Should the manager of XYZ Co. accept or reject the special order? How much is the change in XYZ net income if it accepted the order?
2. What is the Minimum price acceptable if ABC Company wants 6,000 units instead of 2000 units?

Example 3: (Special Order)

Cornell Corporation manufactures faucets. Several weeks ago, the firm received a special-order inquiry from Yale, Inc. Yale desires to market a faucet similar to Cornell's model no. 55 and has offered to purchase 3,000 units. The following data are available:

- Cost data for Cornell's model no. 55 faucet: direct materials, $45; direct labor, $30 (2 hours at $15 per hour); and manufacturing overhead, $70 (2 hours at $35 per hour).
- The normal selling price of model no. 55 is $180; however, Yale has offered Cornell only $115 because of the large quantity it is willing to purchase.
- Yale requires a modification of the design that will allow a $4 reduction in direct-material cost.
- Cornell's production supervisor notes that the company will incur $8,700 in additional set-up costs and will have to purchase a $3,300 special device to manufacture these units. The device will be discarded once the special order is completed.
- Total manufacturing overhead costs are applied to production at the rate of $35 per labor hour. This figure is based, in part, on budgeted yearly fixed overhead of $624,000 and planned production activity of 24,000 labor hours.
- Cornell will allocate $5,000 of existing fixed administrative costs to the order as "…part of the cost of doing business."

Required:

A. One of Cornell's staff accountants wants to reject the special order because "financially, it's a loser." Do you agree with this conclusion if Cornell currently has excess capacity? Show calculations to support your answer.
B. If Cornell currently has no excess capacity, should the order be rejected from a financial perspective? Briefly explain.
C. Assume that Cornell currently has no excess capacity. Would outsourcing be an option that Cornell could consider if management truly wanted to do business with Yale? Briefly discuss, citing several key considerations for Cornell in your answer.

2. THE MAKE OR BUY DECISION (OUTSOURCING)

A make or buy decision is concerned with whether certain goods or services should be made internally or purchased from an external supplier. The decision to buy goods or services externally is also known as "outsourcing." Outsourcing is more commonly associated with decisions by organizations to shift their focus toward accomplishing core activities internally and allowing outside organizations to accomplish peripheral activities. In recent years, many companies have chosen to outsource support service activities such as information systems technology, human resources, accounting, and payroll activities.

The make-or-buy decision is often part of a company's long-run strategy. Some organizations integrate vertically, meaning that they perform all activities from the beginning to the end of their value chain. Other organizations rely on outsiders for some inputs and specialize only on certain portions of the total process.

Advantages of making an item internally

1. Producing a part internally reduces dependence on suppliers and may ensure a smoother flow of parts and material for production.
2. Quality control may be easier when parts are produced internally.
3. Profits can be realized on the parts and materials.

Advantages of buying an item from an external supplier

1. A specialized supplier may be able to respond more quickly and at less cost to changing future needs.
2. Changing technology may make producing one's own parts riskier than purchasing from the outside.

In a make-or-buy decision, the relevant costs are

1. the variable manufacturing costs that will be saved,
2. The purchase price of the part from outside,
3. Avoidable fixed costs of the released facilities, and
4. Opportunity costs from using the released facilities in different activities (e.g., renting these facilities to another company or using them to increase production of another component) . This opportunity cost should be treated either as an additional **cost** of making the component or as a potential **revenues** for the Buy decision

Decision Model

COMPARE THE RELEVANT COST OF MAKE with Relevant Cost of BUY

RELEVANT COSTS OF MAKING
= Variable Cost of Manufacturing (DM, DL and VFOH)
+ Any increase in specific fixed costs
+ Any Opportunity cost involved from utilizing the released facilities.

RELEVANT COSTS OF BUYING
= Purchase price
+ Any direct costs relating to purchasing
- Any avoidable Fixed Costs resulting from not making

Decision to Make:

COMPARE THE RELEVANT COST OF MAKE with Relevant Cost of BUY

If Relevant costs of Making < Relevant Cost of Buying then Make; otherwise you should outsource

Example 4: (M/B)

Company A has to decide whether to manufacture internally or to buy or contract from outsiders.
Company A is able to contract with another company to supply them ready make at $5 each.
The details of Company A internal production costs are as follows:

Direct material/unit	$2.00
Direct labor/unit	$3.00
Variable production overhead	$0.50
Fixed production overhead	$0.50
Total production per unit cost	$6.00

The company also need to pay for transport charges of $5,000 for the delivery of 3,000 units of the product.

Required:
Should Company A make or buy the product?

Example 5: (M/B)

Mason Company Produced A Product that requires several components. Component "Z" is currently produced by Mason with the following costs for **10,000 Units:**

Direct Materials	*48/Unit*
Direct Labour	*30/Unit*
Variable Overhead	*15/Unit*
Supervisor Salaries	*8/Unit*
Building Depreciation	*5/Unit*
Head Office Costs	*4/Unit*
Total Costs To Manuf.	*110/Unit*

A Supplier has offered to sell Mason component "Z" for $ 105

If Mason accepted the offer, the supervisor will be laid off and the released facilities will be rented to another company for $70,000 per period.

Required:

How much is the gain or loss if Mason accepted the supplier's offer?

Example 6: **(M/B)**

St. Joseph Hospital has been hit with a number of complaints about its food service from patients, employees, and cafeteria customers. These complaints, coupled with a very tight local labor market, have prompted the organization to contact Nationwide Institutional Food Service (NIFS) about the possibility of an outsourcing arrangement.

The hospital's business office has provided the following information for food service for the year just ended: food costs, $890,000; labor, $85,000; variable overhead, $35,000; allocated fixed hospital overhead, $60,000; and cafeteria food sales, $80,000.

Conversations with NIFS personnel revealed the following information:

- NIFS will charge St. Joseph Hospital $14 per day for each patient served. Note: This figure has been "marked up" by NIFS to reflect the firm's cost of operating the hospital cafeteria.
- St. Joseph's 250-bed facility operates throughout the year and typically has an average occupancy rate of 70%.
- Labor is the primary driver for variable overhead. If an outsourcing agreement is reached, hospital labor costs will drop by 90%. NIFS plans to use St. Joseph facilities for meal preparation.
- Cafeteria food sales are expected to increase by 15% because NIFS will offer an improved menu selection.

Required:
Should St. Joseph outsource its food-service operation to NIFS?

Solutions to the Examples

Example 2: (Special Order)

1. Should the manager of XYZ Co. accept or reject the special order

Note the following:

- *Fixed costs are irrelevant –because the company has idle capacity of 3000 units that will remain unused regardless of the special.*
- *Delivery costs are irrelevant (although they are variable) - terms are FOB factory. They are paid by the buyer.*
- *Incremental Costs associated with the special order are:*
- *Direct Materials ($10 per unit), Direct Labor ($20 per unit) and Variable overhead ($4 per unit) are relevant.*
- *Sales Commissions are relevant - but change to $.90 per unit ($45)(.02)*

Special Order = (2,000)(45 - (10+2+4+.90)) = $20,200 gain

Therefore XYZ should accept. The net income will increase by $20,200.

2. What is the Minimum price acceptable if they want 6,000 units?

Note that the company has Insufficient "idle capacity" available. The company has two options:

a. Expand Capacity:

Minimum Selling Price = 10+20+4+(.02)(Selling Price) + 28,000/6,000 = $39.46

b. Decrease sales to regular customers:
Income forgone from regular customer = (3,000)(60 - (10+20+4+1.20+6)) = 56,400
Minimum Selling Price = 10+20+4+ (.02)(Selling Price) + 56,400/6,000 = $44.29

Solution: Best alternative is to expand capacity

Example 3: **(Special Order)**

A. No, the conclusion is incorrect because the order generates a net contribution of $66,000 for the firm. Note: The fixed administrative cost is irrelevant to the decision.

Selling price		$115
Direct materials ($45 - $4)	$41	
Direct labor	30	
Variable manufacturing overhead (2 hours x $9*)	18	89
Unit contribution margin		$ 26
Total contribution margin (3,000 units x $26)		$78,000
Less: Additional set-up costs	$8,700	
Special device	3,300	12,000
Net contribution to profit		$66,000

* Fixed manufacturing overhead: $624,000 ÷ 24,000 labor hours = $26 per hour
Variable manufacturing overhead: $35 - $26 = $9

B. Yes, the order should be rejected. An environment of no excess capacity implies a very strong marketplace. Cornell would be giving up sales at $180 per faucet, to be replaced with sales of $115 per unit. Company profitability would suffer.

C. Yes, outsourcing is an option. Cornell could have another manufacturer produce the faucets for Yale or perhaps even for another customer. Price, product quality, and supplier reliability would be important considerations in this decision.

Example 4: (M/B)

Relevant cost of Making

=Direct material + Direct Labor + Variable Production OH

=($2 + $3 + 0.50) x 3,000 units

=$16,500

Relevant cost of Buying:

= Purchase cost + Transport cost

= ($5 x 3,000) + $5,000

=$20,000

Therefore, it is better for Company A to manufacture internally

Example 5: (M/B)

	Make	**Buy**
If Purchase: Cost = (105)(10,000) =		$1,050,000
If Make: Cost = DM, DL + VFOH = (10,000)(93) =	$930,000	
Avoidable Costs:		
Supervisor salary (10,000)(8) =		(80,000)
Opportunity Costs:		
Use of Idle Facilities: Rent Revenues =		(70,000)
Net Costs	$ 930,000	$ 900,000

Therefore, accept the offer.

Example 6: (M/B)

The hospital would be better off to outsource its food-service operation, benefiting by $115,750 ($930,000 - $814,250). Note: The allocated overhead is not a relevant decision factor.

	St. Joseph	NIFS
Food cost	$890,000	$ --
Labor ($85,000; $85,000 x 10%)	85,000	8,500
Variable overhead ($35,000; $35,000 x 10%)	35,000	3,500
Cafeteria food sales ($80,000; $80,000 x 115%)	(80,000)	(92,000)
NIFS charges (250 beds x 70% x 365 days x $14)	--	894,250
Net cost	$930,000	$814,250

Practice Question

Use the following to answer questions 1-3:

Dockwiller Inc. manufactures industrial components. One of its products, which is used in the construction of industrial air conditioners, is known as D53. Data concerning this product are given below:

	Per Unit Data
Selling price	$150
Direct materials	$26
Direct labor	$3
Variable manufacturing overhead	$1
Fixed manufacturing overhead	$17
Variable selling expense	$2
Fixed selling and administrative expense	$18

The above per unit data are based on annual production of 8,000 units of the component. Direct labor can be considered to be a variable cost.

1. The company has received a special, one-time-only order for 500 units of component D53. There would be no variable selling expense on this special order and the total fixed manufacturing overhead and fixed selling and administrative expenses of the company would not be affected by the order. Assuming that Dockwiller has excess capacity and can fill the order without cutting back on the production of any product, what is the minimum price per unit on the special order below which the company should not go?
   A) $67
   B) $30
   C) $150
   D) $47

2. The company has received a special, one-time-only order for 300 units of component D53. There would be no variable selling expense on this special order and the total fixed manufacturing overhead and fixed selling and administrative expenses of the company would not be affected by the order. However, assume that Dockwiller has no excess capacity and this special order would require 30 minutes of the constraining resource, which could be used instead to produce products with a total contribution margin of $1,800. What is the minimum price per unit on the special order below which the company should not go?
   A) $73
   B) $36
   C) $53
   D) $6

3. Refer to the original data in the problem. What is the current contribution margin per unit for component D53 based on its selling price of $150 and its annual production of 8,000 units?
   A) $83
   B) $118
   C) $32
   D) $120

4. Jordan Company budgeted sales of 400,000 calculators at $40 per unit last year. Variable manufacturing costs were budgeted at $16 per unit, and fixed manufacturing costs at $10 per unit. A special order for 40,000 calculators at $23 each was received by Jordan in March. Jordan has sufficient plant capacity to manufacture the additional quantity without incurring any additional fixed manufacturing costs; however, the production would have to be done on an overtime basis at an estimated additional cost of $3 per calculator. No selling expenses would be incurred on the special order. What would be the effect on NI if the special order were accepted?
   A) $120,000 decrease
   B) $160,000 increase
   C) $240,000 decrease
   D) $280,000 increase

5. The Talbot Company makes wheels that it uses in the production of bicycles. Talbot's costs to produce 100,000 wheels annually are:

Direct materials	$30,000
Direct labor	$50,000
Variable overhead	$20,000
Fixed overhead	$70,000

An outside supplier has offered to sell Talbot similar wheels for $1.25 per wheel. If the wheels are purchased from the outside supplier, $15,000 of annual fixed overhead could be avoided and the facilities now being used could be rented to another company for $45,000 per year.
If Talbot chooses to buy the wheel from the outside supplier, then the change in annual net operating income due to accepting the offer is a:
   A) $35,000 increase
   B) $10,000 decrease
   C) $45,000 increase
   D) $70,000 increase

6. Melbourne Company has traditionally made a subcomponent of its major product. Annual production of 30,000 subcomponents results in the following costs:

Direct materials	$250,000
Direct labor	$200,000
Variable overhead	$190,000
Fixed overhead	$120,000

Melbourne has received an offer from an outside supplier who is willing to provide the 30,000 units of the subcomponent each year at a price of $28 per unit. Melbourne knows that the facilities now being used to manufacture the subcomponent could be rented to another company for $80,000 per year if the subcomponent were purchased from the outside supplier. Otherwise, there would be no effect of this decision on the total fixed overhead of the company. If Melbourne decides to purchase the subcomponent from the outside supplier, what would be the impact on the company's net operating income for the year?
   A) $120,000 higher
   B) $20,000 higher
   C) $120,000 lower
   D) $20,000 lower

1	2	3	4	5	6