

# Lecture 4

Decision Making and Relevant Information I

# Decision Model

- Decision Model: a formal method for making a choice, often involving *quantitative* and *qualitative* analysis
- Process:
  - (1) Identify the problem and uncertainties
  - (2) Obtain information
  - (3) Make predictions about the future
  - (4) Make decisions by choosing among alternatives
  - (5) Implement the decision, evaluate performance and learn
- Relevant Costs and Relevant Revenue:
  - Occur in the future
  - Differ among the alternative courses of action
  - Avoidable
- Opportunity Cost
  - The profit foregone by selecting one alternative over another

# Decision 1: Retain or Replace Equipment

- Book value of the current (old) asset → sunk cost → irrelevant
- Example:

New machine:	
List price	\$90,000
Annual variable expenses	80,000
Expected life in years	5
Old machine:	
Original cost	\$72,000
Remaining book value	60,000
Disposal value now	15,000
Annual variable expenses	100,000
Remaining life in years	5
Sales are \$200,000 per year Fixed costs, other than depreciation, are \$70,000 per year.	

## (1) Comparative Analysis

For Five Years	Keep Old Machine	Purchase New Machine	Difference
Revenue	\$1,000,000	\$1,000,000	-
Variable Costs	(500,000)	(400,000)	100,000
Other FC	(350,000)	(350,000)	-
Depreciation-new	-	(90,000)	(90,000)
Depreciation-old	(60,000)	(60,000)	-
Disposal of old	-	15,000	15,000
Total net profit	90,000	115,000	25,000

## (2) Relevant Costs Analysis

Savings in VC provided by new machine [( $\$100,000 - \$80,000$ )*5]	\$100,000
Cost of the new machine	(90,000)
Disposal of old machine	15,000
Net effect	25,000

# Decision 2: Make or Buy decisions

- If there is opportunity to use the productive capacity for another purpose  
→ opportunity cost (OC ↑ → Profit ↓)

- Example:

- Essex Ltd. Manufactures Part 4A that is currently in one of its products

Direct Materials	\$9
Direct labor	5
Variable overhead	1
Depreciation of special equip.	3
Supervisor's salary (direct)	2
General factory overhead	10
Total cost per unit	\$30

- The special equipment used to manufacture part 4A has no resale value → no OC → sunk cost

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

- General factory OH: allocated on the basis of DL hours  
→ unavoidable
  - Make: 20,000 parts@\$30
  - Purchase: 20,000 parts@\$25

Decision? - make

# Lecture 5

Decision Making and Relevant Information II

# Decision 4: Accept or reject an order for a special price

- Opportunity to obtain additional business from a specific customer at a price concession
- No capacity constraint → No incremental fixed costs → No opportunity cost
- No capacity constraint:

- Jet Ltd receives a one-time order that is not considered part of its normal ongoing business.
- Jet Ltd makes a single product with a unit variable manufacturing cost of \$7.
- Marketing cost for the product is \$1 per unit.
- Normal selling price is \$20 per unit.
- Annual capacity is 10,000 units, and annual fixed costs total \$48,000.
- Jet Ltd is currently producing and selling only 5,000 units.
- A foreign distributor offers to purchase 3,000 units for \$10 per unit.

Increase in revenue ( $\$10 \times 3,000$ )	\$30,000
Increase in costs ( $3,000 \times \$7$ )	<u>(21,000)</u>
Increase in operating income	\$9,000

→ *accept the offer*

- Capacity constraint:

What if current sales were 5,000 units and the order was still for 3,000 units, but capacity was only 7,000 units?

Increase in revenue ( $\$10 \times 3,000 - 1,000 \times \$20$ )	\$10,000
Increase in costs ( $\$7 \times 3,000 - \$8 \times 1,000$ )	<u>(13,000)</u>
Increase in operating income	$\$(3,000)$

→ *not accept the offer*

# Decision 5: Dropping Product line, Segments or Customers

- Continue? Close? Drop?
- Fixed costs *previously allocated* to discontinued product/division → not avoidable
- *Decision Rule*: drop the digital watch line only if dived cost savings > lost contribution margin

- Due to the declining popularity of digital watches, Lovell Company's digital watch line has not reported a profit for several years.
- If the line is dropped the fixed general factory overhead and general overhead expenses are not avoidable.
- The equipment used to manufacture digital watches has no resale value or alternative use.

Segment Income Statement Lovell Digital Watches		
Sales		\$ 500,000
Less: variable expenses		
Variable mfg. 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 loss		\$ (100,000)

## Contribution Margin Approach

CM lost if digital watches are dropped		\$(300,000)
Less FC that can be avoided:		
Salary of line manager	\$90,000	
Advertising - direct	100,000	
Rent – factory space	<u>70,000</u>	<u>\$260,000</u>
Net disadvantage		\$(40,000)

→ *not to drop*

## Comparative Income Approach

	Keep	Drop
Sales	\$500,000	-
Less: variable expenses	(200,000)	-
CM	\$300,000	-
Less: fixed expenses		
General factory OH	(60,000)	(60,000)
Salary	(90,000)	-
Depreciation	(50,000)	(50,000)
Advertising	(100,000)	-
Rent	(70,000)	-
General admin	(30,000)	(30,000)
Net loss	\$(100,000)	\$(140,000)

What if the equipment had a resale value of \$30,000?

	Keep	Drop
Net loss	\$(100,000)	\$(140,000)
Resale	-	30,000
Operating income	\$(100,000)	\$(110,000)

→ *not to drop*

What if the equipment had a resale value of \$50,000?

	Keep	Drop
Net loss	\$(100,000)	\$(140,000)
Resale	-	50,000
Operating income	\$(100,000)	\$(90,000)

→ *drop*

# Qualitative Issues

Quantitative relevant information	Qualitative relevant information
<ul style="list-style-type: none"><li>• Measured in numerical terms</li></ul>	<ul style="list-style-type: none"><li>• Cannot be measured in numerical terms</li></ul>
<ul style="list-style-type: none"><li>• Probable effect of decisions on:<ul style="list-style-type: none"><li>○ Financial info (costs, revenues)</li><li>○ Non-financial (time, quality)</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Probable effect of decisions on:<ul style="list-style-type: none"><li>○ Employee moral</li><li>○ Customer satisfaction</li></ul></li></ul>

Examples of **qualitative issues**:

- **Decision to accept or reject one-time special order**
  - Possibility of future long-term sales at a higher price
  - Negative effect on customer relationships
- **Decision to make or buy**
  - Considered for outsourcing decision: quality, delivery time, reliability of the supplier, dependability vs. keep control, focus on areas of core competencies
- **Decision to close down a division**
  - The division's product line plays relative to other product lines
  - Morale of employees of the remaining divisions

# Decision Model vs. Performance Evaluation Model

Example: replace machine decision

$$ROI = \frac{Profit}{Investment}$$

- Would the manager replace if she was evaluated on the basis of ROI
- If nothing change → the only thing change is t+1 → accumulated depreciation↑ → Investment ↓ → ROI ↑ → managers will do nothing to get higher bonus



# Lecture 6

Pricing Decisions and Cost Management

# Influences on Pricing Decisions

- **Customers** → how much they are willing to pay
  - Characteristics of the product; quality
- **Competitors** → price charged for alternative products?
  - Perfect: price taker ; Imperfect: price maker
- **Costs** → costs of producing and delivering the product?
  - Relevant costs: variable, fixed, full costs
- **Other important considerations**: political, legal and ethical issues
  - *Price discrimination*: charge some customers a higher price the same product or service
  - Peak load pricing: charge a higher price for the same product when demand approaches physical capacity limits
  - Legal restriction on pricing: ACCC
  - Predatory pricing: a company deliberately prices below its costs in an effort to drive out competitors
  - Resale price maintenance: minimum price at which g&s are to be resold by a buyer to the retail or wholesale market
  - Price-fixing contracts: arrangements that result in the fixing, control or maintenance of prices of g&s
- **Product Life-cycle**
- Long run? Short run?
- Market based? Cost based?

# Short run

## Short run

- < 1 year
- E.g. special order; adjusting product mix or output volume; changing prices in respond to weak demand
- Relevant costs: all direct and indirect costs throughout the value chain that will change in total
- *Opportunistic* (any excess capacity?)
- Costs often irrelevant (e.g. unavoidable FC)

## Short-Run Decision

The **San Carlos Ltd** is an electronics business with 8 product lines. Income data for one of the products (XT-107) for June 2011 are as follow:

Revenues (200,000 x \$100)	\$20,000,000
Variable costs:	
DM (\$35/u)	\$7,000,000
DL (\$10/u)	2,000,000
VOH (\$6/u)	1,200,000
Sales Com'n (15% Rev)	3,000,000
Other V costs (\$5/u)	<u>1,000,000</u>
Total V Costs	<u>14,200,000</u>
Contribution Margin	5,800,000
Fixed Costs	<u>5,000,000</u>
Operating Income	<u>\$ 800,000</u>

**Abrams Ltd**, has a problem with its preferred supplier of XT-107. This supplier has had a 3 week labour strike. Abrams approaches Sarah Holtz (Sales Rep at San Carlos) about providing 3,000 units of XT-107 at a price of \$75/u. Holtz informs Jim McMahon (XT-107 product manager), that she would accept a flat commission of \$8,000 rather than the usual 15% of revenues if this order were accepted. San Carlos has the capacity to produce 300,000 units of XT-107 each month, but demand has not exceeded 200,000 units in any month in the past year.

1. If the 3,000 unit order is accepted, how much will operating income increase or decrease? (Assume same cost structures)

Sales (3,000*\$75)		\$225,000
Variable costs:		
DM (\$35*3,000)	\$105,000	
DL (\$10*3,000)	30,000	
VOH (\$6/3,000)	18,000	
Sales commission	8,000	
Other V costs (\$5*3,000)	<u>15,000</u>	
Total variable costs		<u>176,000</u>
Contribution Margin		\$49,000

→ accept the order

2. McMahon ponders whether to accept the 3,000 unit special order. He is afraid of the precedent that might be set by cutting the price. He says, "The price is below our full cost of \$96/unit. I think we should quote a full price, or Abrams will expect favoured treatment again and again if we continue to do business with it."  
Do you agree with McMahon?

Yes, if it affects our current customers.

But if it doesn't affect, we should not have full price.

# Lecture 7

Decentralization

Management Control Systems and Transfer Pricing

**Lecture Exercise (Horngren 21-20)**

British Columbia (BC) Lumber has a raw lumber division and a finished lumber division.

The variable costs are as follow:

Raw Lumber Division: \$100 per 100 metres of raw lumber

Finished Lumber Division: \$125 per 100 metres of finished lumber

Assume that there are no metres lost in processing raw lumber into its finished form. Raw lumber can be sold at \$200 per 100 metres. Finished lumber can be sold at \$275 per 100 metres. The plant is currently **operating at capacity**.

**(1) Should BC Lumber process raw lumber into its finished form?**

If process to FL:

Incremental revenues (\$275-\$200)	\$75
Incremental costs	<u>(125)</u>
Incremental loss (per 100 metres)	\$(50)

→ Columbia Lumber will maximize its total contribution margin by selling lumber in its raw form

**(2) Assume that internal transfers are made at 110% of variable cost. Will each division maximize its division operating income contribution by adopting the action that is in the best interest of BC Lumber as a whole? Explain.**

Transfer costs = 110%\*\$100=\$110

	<u>Sell as RD</u>	<u>Sell as FL</u>
<u>Raw Lumber Division</u>		
Revenues	\$200	\$110
Variable costs	<u>(100)</u>	<u>(100)</u>
Operating income	\$100 ✓ (congruence)	\$10
<u>Finished Lumber Division</u>		
Revenues	\$0	\$275
Transferred-in-costs	-	(110)
Variable costs	<u>0</u>	<u>(125)</u>
Operating income	\$0	\$40 ✓ (not congruence)

**(3) Assume that internal transfers are made at market prices. Will each division maximize its division operating income contribution by adopting the action that is in the best interest of BC Lumber as a whole? Explain.**

Transfer costs = market price = \$200

	<u>Sell as RD</u>	<u>Sell as FL</u>
<u>Raw Lumber Division</u>		
Revenues	\$200	\$200
Variable costs	<u>(100)</u>	<u>(100)</u>
Operating income	\$100 ✓ (congruence)	\$100
<u>Finished Lumber Division</u>		
Revenues	\$0	\$275
Transferred-in-costs	-	(200)
Variable costs	<u>0</u>	<u>(125)</u>
Operating income	\$0 ✓ (congruence)	\$(50)

→ transfer at market price will result in division actions that are also in the interest of the company as a whole

# Minimum vs. Maximum transfer prices

- Minimum transfer price → decided by selling division
    - no worse off if the good/service is sold to an internal division
  - Maximum transfer price → decided by buying division
    - No worse off if an input is purchased from an internal division
- Minimum TP = incremental cost/unit + opportunity cost/unit*
- Minimum TP = VC + (total CM on lost sales/units transferred)*
- Incremental cost: additional cost of producing and transferring the product or service
  - Opportunity cost: the maximum contribution margin forgone by the seller if the production or service is transferred internally
- When producing division has *no excess capacity* and *perfect competition prevails*:
    - general transfer-pricing guideline & market price yield the *same* TP
  - *General transfer-pricing guideline* → promote goal-congruent decision making