

Chapter 11

Relevant Costs – Decision Making

Category of Decision Making Problems:

1. Special Order Decisions
2. Make or Buy Decision
3. Keep/Drop Decisions
4. Constrained Resource
5. Sell or Process Further Decisions

Relevant Costs

Identifying relevant costs and relevant benefits when deciding between two alternatives is a key to successfully understanding this topic:

Eliminate Irrelevant Costs:

Sunk Costs - are NOT relevant because they have already been incurred and cannot be changed by the decision

Costs & benefits that will not change in the future between the alternatives are also considered irrelevant in the decision making process

Relevant Costs & Benefits

Incremental Costs – all costs & benefits that remain should differ between the two alternatives and are considered relevant. These costs will be used in deciding between the alternatives.

Special Order Decision

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

- Often the proposal is for a **lower/discounted selling price**
- Must decide whether it should sell units below its regular selling price
- The decision is based on the premise that it is better to make **some profit than none at all**
- Whenever multiple special orders are considered treat it to be a mutually exclusive decision and choose the alternative that increases income the most
- Qualitative factors should be considered when making this decision

Fall into two categories:

1. Within Capacity
2. Without Capacity

Special Order Decisions - Example (Within Capacity)

Touchstone Manufacturing Inc. owns and operates a manufacturing facility where they produce components to be used in common household electronics. The factory has a capacity of **50,000 units** per year and is currently operating at **42,000 units**. Each unit is sold for \$5.

Management has been approached by an overseas customer who would like to purchase 8,000 units in bulk for \$4.50/unit. The costs to produce one unit of the part are detailed below:

Direct Materials	\$0.50
Direct Labor	\$0.20
Variable Manufacturing Overhead	\$0.12
Fixed Manufacturing Overhead	\$0.75
Variable Selling Expenses	\$0.28
Fixed Selling Expenses	\$0.25

The customer requires a modification to the current design. This would increase materials cost by \$0.05 and require the acquisition of specialized equipment at a cost of \$2,000.

Required:

Should management accept or reject this proposal? What will be the impact on operating income?

Special Order Decisions - Example (Without Capacity)

Touchstone Manufacturing Inc. owns and operates a manufacturing facility where they produce components to be used in common household electronics. The factory has a capacity of **50,000 units** per year and is currently operating at **45,000 units**. Each unit is sold for \$5.

Management has been approached by an overseas customer who would like to purchase 8,000 units in bulk for \$4.50/unit. The costs to produce one unit of the part are detailed below:

Direct Materials	\$0.50
Direct Labor	\$0.20
Variable Manufacturing Overhead	\$0.12
Fixed Manufacturing Overhead	\$0.75
Variable Selling Expenses	\$0.28
Fixed Selling Expenses	\$0.25

The customer requires a modification to the current design. This would increase materials cost by \$0.05 and require the acquisition of specialized equipment at a cost of \$2,000.

Required:

Should management accept or reject this proposal? What will be the impact on operating income?

Special Order Decisions - Example

Touchstone Company is currently operating at full production capacity producing 20,000 units of product. Manufacturing costs per unit for the product are as follows:

Direct materials	10
Direct labor	7
*Manufacturing overhead	12
Total manufacturing cost per unit	\$27

** The per-unit manufacturing overhead cost is based on a \$5 variable cost per unit and \$140,000 fixed costs.*

In addition to the above, the company incurred nonmanufacturing costs (all variable) of \$10 per unit, and the sales price is \$48 per unit. ABC Inc. has asked the company to produce 5,000 units of a modification of the product. This modification would require the same manufacturing processes. However, because of the nature of the proposed sale, the estimated nonmanufacturing costs per unit are only \$3 (not \$10). The company would sell the modified product to ABC Inc. for \$36 per unit.

Required:

1. What is the impact on short-term operating profit of accepting the special sales order?
2. Suppose the company had been working at less than full capacity to produce 16,000 units of the product, what is the minimum price per unit that the company should accept for the modified product under these conditions?

Special Order Decisions

Qualitative Considerations - Special Order Decisions

- Is the order likely to lead to further regular business with this customer?
- Is the order in the strategic best interest of the firm, for example, will it support or undermine desired image in the market?
- Are there alternative uses of the capacity which will produce a greater contribution?
- The effect of the special order on sales at regular prices.
- Other reasonable answers

Make or Buy Decision

Make or Buy Decision

A decision as to whether an item should be produced internally or purchased from an outside supplier.

- We will compute the effect on income to determine which alternative is best by determining which alternative is the cheapest.
- Note that in this decision the sales are usually **not relevant** since whether the firm makes the product or buys it, it will sell it for the same price.

Make or Buy Decision - Example

Touchstone Company manufactures 20,000 units of Part AXR-14 each year. At this level of activity, the cost per unit follows:

Direct materials	\$ 4.80
Direct labor	\$ 7.00
Variable manufacturing overhead	\$ 3.20
Fixed manufacturing overhead	\$ 10.00
Total cost per part AXR-14	\$ 25.00

An outside supplier has offered to sell 20,000 units of Part AXR-14 each for \$23.50 per part. Touchstone Company has determined that \$6 of the fixed manufacturing overhead being applied to Part AXR-14 would continue even if the part was purchased from the outside supplier.

Required:

- Prepare computations showing how much profits will increase or decrease if the outside supplier's offer is accepted.
- Assume if Touchstone Company accepts this offer, the facilities now being used to manufacture Part AXR-14 could be rented to another company at an annual rental of \$150,000. Should the offer from the outside supplier be accepted or reject?

Make or Buy Decision – Example

Touchstone Company is trying to decide whether it should rent new equipment and continue to make its products internally or whether it should discontinue production and purchase them from an outside supplier. The alternatives follow:

Option 1: Rent new equipment for \$147,000 per year.

Option 2: Purchase from an outside supplier for \$18.80 each.

Touchstone Company's costs per unit of producing the products internally (with the old equipment) are given below. These costs are based on a current activity level of 30,000 units per year:

Direct materials	\$5.60
Direct labor	\$9.00
Variable OH	\$1.60
Fixed OH (2.45 Supervisor, 1.80 Depreciation, 4 General OH)	\$8.25
Total cost per part	\$24.45

The new equipment would reduce DL costs and VOH costs by 25%. Supervision cost (\$73,500 per year) and direct materials cost per unit would not be affected by the new equipment. The new equipment's capacity would be 50,000 units per year.

The total general company overhead would be unaffected by this decision.

Required:

The company is unsure what to do and would like an analysis showing the total costs for each of the two alternatives given above.

Which course of action would you recommend to the president? Assume that the following units:

- 30,000units
- 42,000units
- 50,000units

Make or Buy Decision

Qualitative Considerations - Make or Buy Decisions

- The ability of the outside supplier to meet required delivery schedules.
- The quality of the units purchased from the outside supplier.
- Alternative uses of the capacity that is used to make the units.
- The ability of the outside supplier to supply units if volume increases in future years.
- The problem of alternative sources of supply if the outside supplier proves undependable.

Keep/Drop Decision

- The company must decide whether product, division or department should be kept or whether it should be dropped
 - usually because managements opinion is product, division or department is underperforming
- Evaluate this decision by investigating the effects of dropping on net income
- If the net effect on income is an increase then we drop the product or division or department, else we keep it
- When we drop a product or division two obvious effects include:
 - The loss of contribution margin that is generated by the product
 - Reductions in direct fixed costs that are avoidable
- Note that sometimes by dropping a product the sales of another product are affected they either become more or less profitable

Keep/Drop Decision - Example

Excellent Electronics Inc., has two departments, Electronic Repair and Electronic Sales. The company's most recent monthly contribution-format income statement follows:

	<u>Total</u>	<u>Electronic Repair</u>	<u>Electronics Sales</u>
Sales	1,000,000.00	850,000.00	150,000.00
Variable expenses	320,000.00	275,000.00	45,000.00
Contribution margin	680,000.00	575,000.00	105,000.00
Fixed expenses	300,000.00	160,000.00	140,000.00
Operating income (loss)	380,000.00	415,000.00	(35,000.00)

Management has determined that \$45,000 of the fixed expenses being charged to the Electronic Sales Department are sunk costs or allocated costs that will continue even if the Department is dropped. In addition, the elimination of the Electronic Sales Department would result in a 5% decrease in the sales of the Service & Repair Department.

Required:

If the Sales Department is dropped, what will be the effect on the operating income of the company as a whole? Should the Sales department be dropped?

Keep/Drop Decision - Example

Touchstone Company, is a retailer of consumer electronic products. Management is currently examining a particular product line of 2 products, AX-14 & AX-15. The analysis found that the sales for AX-15 are decreasing and the purchase costs are increasing. Consideration is being given to drop AX-15. Touchstone Company allocates fixed costs to products on the basis of sales revenue. If AX-15 is dropped, sales of AX-14 are expected to increase by 15% next year, but the firm's cost structure will remain the same.

	<u>AX-14</u>	<u>AX-15</u>
Sales	175,000.00	235,000.00
<i><u>Variable Costs:</u></i>		
Cost of Goods Sold	45,000.00	110,000.00
Selling & Admin	13,000.00	35,000.00
Contribution Margin	117,000.00	90,000.00
<i><u>Fixed costs:</u></i>		
Fixed corporate costs	60,000.00	80,000.00
Fixed selling and administrative	12,000.00	25,000.00
Total fixed expenses	72,000.00	105,000.00
Operating Income	\$ 45,000.00	\$ (15,000.00)

Required

1. Find the expected change in annual operating income by dropping AX-15 and selling only AX 14.
2. By what percentage would sales from AX-14 have to increase in order to make up the financial loss from dropping AX-15?
3. What is the required percentage increase in sales (rounded to 2 decimal places) from AX-14 to compensate for lost margin from AX-15, if total fixed costs can be reduced by \$25,000?

Keep/Drop Decision

Qualitative Considerations - Keep or Drop Decisions

- What will be the effect on the firm's image if product, division or department is dropped?
- If Drop, will this result in an unfavorable reaction from key customers and of customers of other product lines?
- Can the production capacity released by product, division or department be used for new products or in some other value-generating activity?

Constrained Resource Decisions

- Scenario where there exists a limitation under which a company must operate
 - Such as limited **Machine Hours** available or limited **Raw Materials** available
 - Restricts the company's ability to satisfy demand for its products or services.

- The company must decide which product to produce when there exists a constraint on a resource

- The company will choose to produce the product that generates the highest contribution margin per unit of scarce resource

Constrained Resource Decisions

Touchstone Company produces three products: AX-14, AX-15 & AX-16. Data (per unit) concerning the three products follow:

Product	AX-14	AX-15	AX-16
<i>Selling Price</i>	\$90	\$120	\$150
<i>Variable costs:</i>			
<i>Direct materials</i>	\$28	\$64	\$80
<i>Direct labor & VOH</i>	\$37	\$26	\$16
<u>Total variable cost</u>	<u>\$65</u>	<u>\$90</u>	<u>\$96</u>
<u>Contribution margin</u>	<u>\$25</u>	<u>\$30</u>	<u>\$54</u>

All three products utilize a common raw material. Due to a global shortage, the raw material is in limited supply. The material costs \$8 per kilogram, with a maximum of 25,000 kilograms available each month.

Required:

Which orders would you advise the company to accept first, those for AX-14, AX-15 or AX-16?
Which orders second? Third?

Constrained Resource Decisions

The following are the selling price, variable costs, and contribution margin for one unit of each of Company's three products:

	A	B	C
Selling price	<u>\$60</u>	<u>\$90</u>	<u>\$80</u>
Variable costs:			
Direct materials	27	14	40
Direct labor	12	32	16
Variable MOH	3	8	4
Total variable cost	42	54	60
Contribution margin.	\$18	\$36	\$20

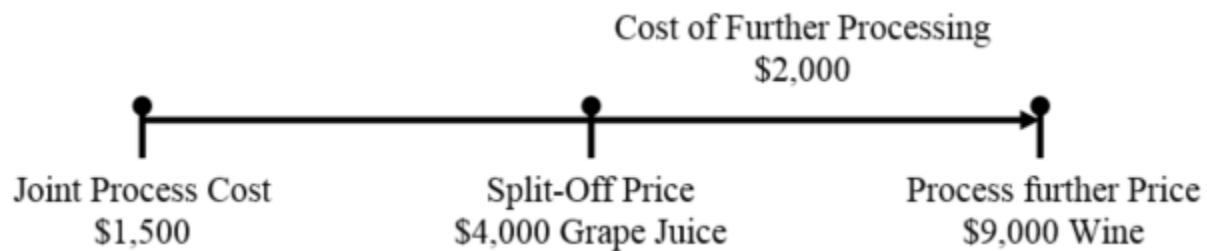
Due to a strike in the plant of one of its competitors, demand for the company's products far exceeds its capacity to produce. Management is trying to determine which product(s) to concentrate on next week in filling its backlog of orders. The direct labor rate is \$8 per hour, and only 3,000 hours of labor time are available each week.

Required:

1. Which orders would you recommend that the company work on next week—the orders for product A, product B, or product C?
2. By paying overtime wages, more than 3,000 hours of direct labor time can be made available next week. Up to how much should the company be willing to pay per hour in overtime wages as long as there is unfilled demand for the three products?

Sell or Process Further Decisions

- A decision as to whether a joint product should be sold at the split-off point or processed further and sold at a later time in a different form.
- Company must decide if joint products should be sold after the common manufacturing phase at the split off point or whether they should be processed further and sold after split off
- For example: Grapes can be crushed and sold as grape juice or they can be aged (processed further) and be sold as wine; The company will choose the alternative that generates the higher revenue



- The basic rule: worthwhile to process further provided that the incremental revenue generated from this decision exceeds the incremental processing costs.

Sell or Process Further Decisions - Example

Touchstone Ltd. produces several products through refining crude oil. Joint processing costs total \$60,000 per tonne. The diesel produced from a tonne of crude oil can either be sold at the split-off point, or processed further at a cost of \$23,000 and then sold for \$110,000. The sales value of crude oil at the split-off point is \$75,000.

Required:

Should the crude oil be processed further or sold at the split-off point?

Sell or Process Further Decisions - Example

Touchstone Co. manufactures products 1, 2, and 3 from a joint process. Joint costs are allocated on the basis of relative sales value of the products at the split-off point. Additional information for the company follows:

	<u>1</u>	<u>2</u>	<u>3</u>
Units produced	15,000	12,000	6,000
Joint costs	\$ 250,000	\$ 89,000	\$ 66,000
Sales value before additional processing	\$ 350,000	\$ 145,000	\$ 78,000
Additional costs for further processing	\$ 45,000	\$ 55,000	\$ 20,000
Sales value if processed further	\$ 410,000	\$ 200,000	\$ 90,000

Required:

What is the impact on short-term operating income of processing each of the three products (1, 2, and 3) beyond the split-off point?

Sell or Process Further Decisions - Example

Touchstone Co. is a processor of meat products. The company is analyzing several options available with respect to a quantity of T-bone steaks, and it is trying to decide whether to sell the T-bone steaks as is or to process them further into filet mignon and New York-cut steaks.

Management believes that a kilogram of T-bone steak would yield the following profit:

Wholesale selling price (per kilogram) \$16.00
Less joint costs incurred up to the split-off point: 12.00
Profit per kilogram \$ 4.00

Additional details:

One 480-gram T-bone steak will yield one 181-gram filet mignon and one 241-gram New York cut; the remaining grams are waste. The cost of processing the T-bone steaks into these cuts is \$1.40 per kilogram. The filet mignon can be sold retail for \$26 per kilogram, and the New York-cut can be sold wholesale for \$22 per kilogram.

Required:

1. Determine the profit for each 480-gram T-bone steak processed further into filet mignon and New York-cut steaks.
2. Would you recommend that the T-bone steaks be sold as is or processed further? Why?