

CHAPTER 3

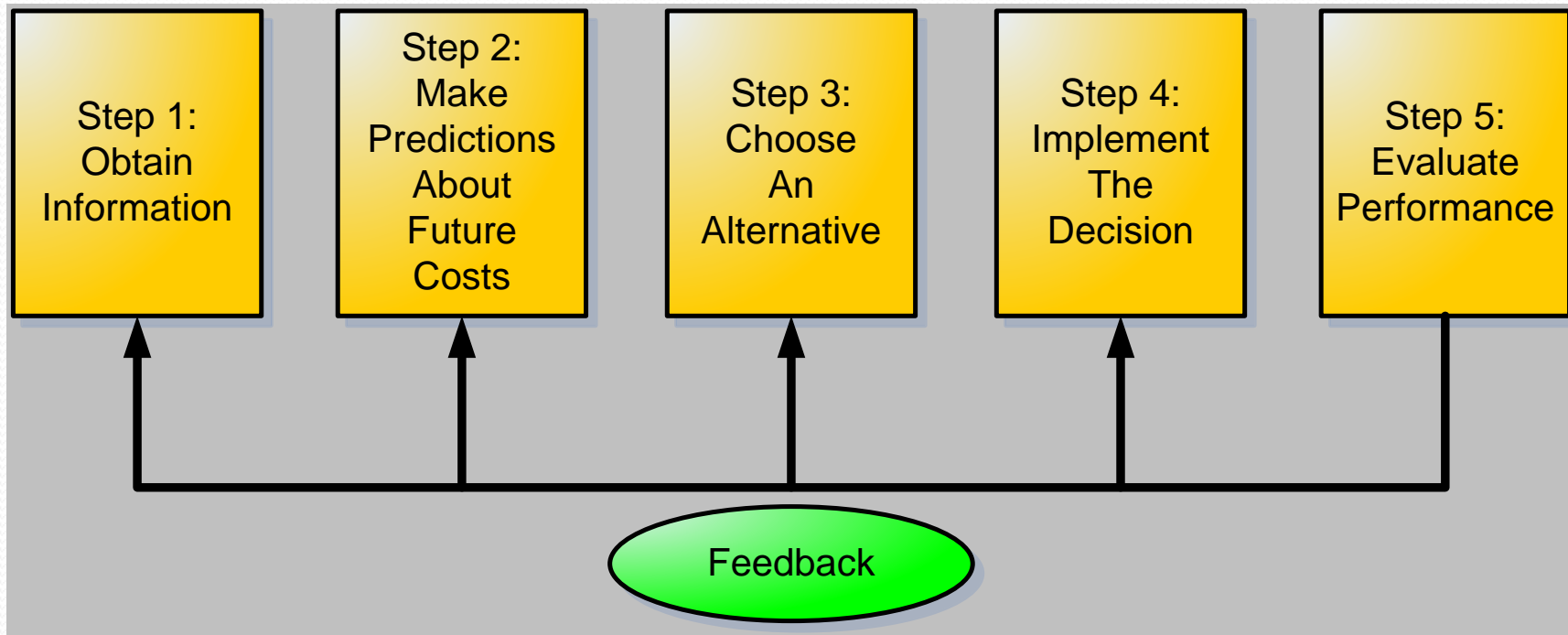
Decision Making and Relevant Information

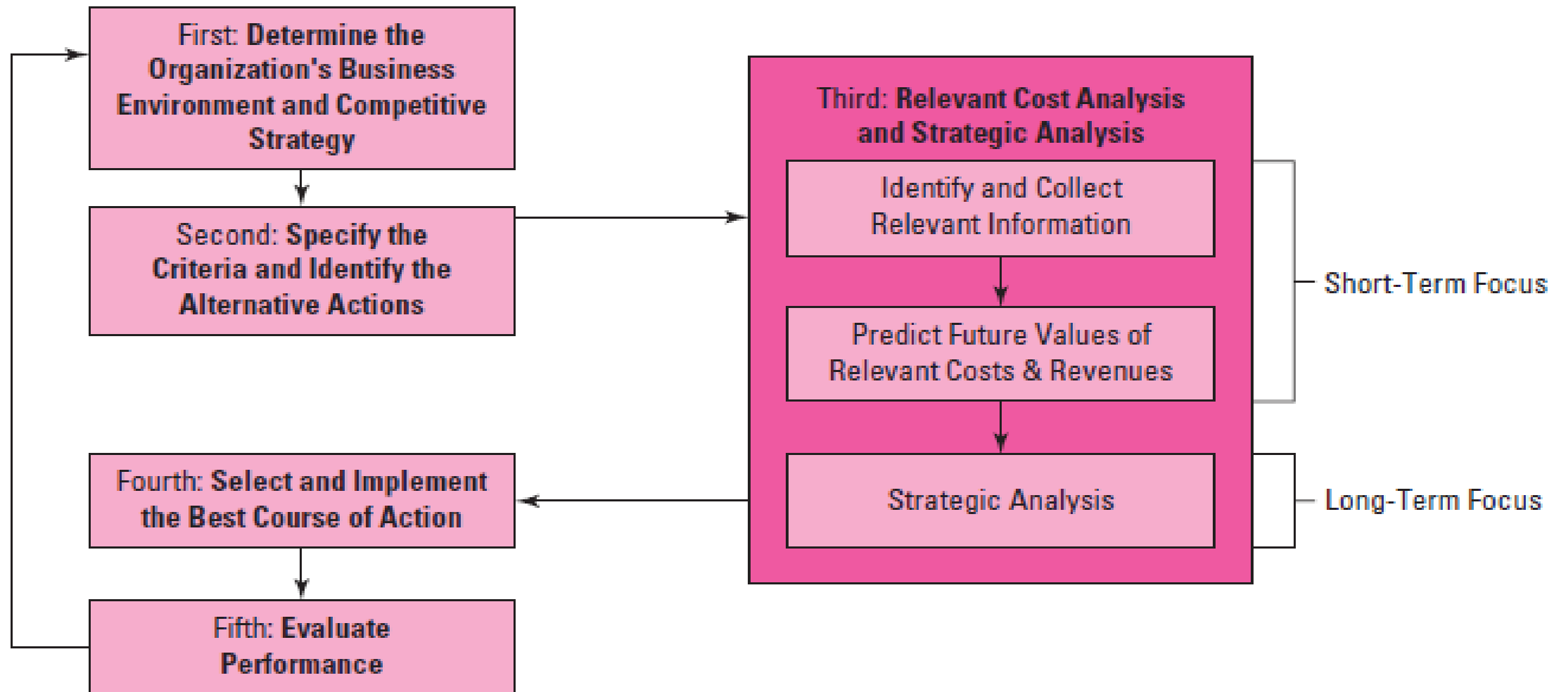
Decision Maker

- Decision makers should consider both short-term and long-term effects in making the best decision.
- the art and science of decision making has many elements, including:
 1. **Leadership**
 2. **vision**
 3. **execution, and other characteristics,**
- cost management provides two important resources to **improve decisions**:
 1. **relevant cost analysis ; has a short-term focus;**
 2. **strategic analysis; has a long-term focus.**
- Relevant cost analysis and strategic analysis are important parts of the manager's decision process.
- A decision model is a formal method of making a choice, often involving both quantitative and qualitative analyses.

Five-Step: Decision-Making Process

Managers often use some variation of the Five-Step Decision-Making Process





1. The first step; and the most important, is to consider the organization's business environment and competitive strategy.
2. Second step; the manager's specify the criteria by which the decision is to be made and to identify the alternative actions.
3. Third step; a manager performs an analysis in which the relevant information is developed and analyzed, using relevant cost analysis and strategic analysis. This step involves three sequential activities;
 - a. identifies and collects relevant information about the decision,
 - b. makes predictions about the relevant information, and
 - c. considers the strategic issues involved in the decision.
4. Fourth; based on the relevant cost analysis and strategic analysis, the manager selects the best alternative and implements it.
5. The fifth and final step, the manager evaluates the performance of the implemented decision as a basis for feedback to a possible reconsideration of this decision as it relates to future

Relevance

1. Relevant Information has two characteristics:
 - a. Occur in the future: every decision deals with selecting a course of action based on its expected future results.
 - b. Differ among the alternative courses of action: costs and revenues that do not differ will not matter and, hence, will have no bearing on the decision being made.
- **Relevant Costs**; for a decision are costs that should make a difference in choosing among the options available for that decision. A relevant cost can be either;
 1. variable; variable costs are relevant for decision making because they differ for each option and have not been committed
 2. Fixed; often are irrelevant, they do not differ for the options, but If differ for each option .
- **Sunk cost**; a cost that has been incurred in the past or is committed for the future is not relevant.
- Relevant Revenues: expected future revenues

Relevant Cost Analysis: A Two-Step Process;

- 1. Eliminate costs and benefits that do not differ between alternatives.**
- 2. Use the remaining costs and benefits that do differ between alternatives in making the decision. The costs that remain are the differential, or avoidable, costs.**
- 3. Irrelevance:** Historical costs are past costs that are irrelevant to decision making Also called Sunk Costs

Avoidable Cost& Unavoidable Cost;

An avoidable cost can be eliminated (in whole or in part) by choosing one alternative over another. Avoidable costs are relevant costs. Unavoidable costs are irrelevant costs.

Two broad categories of costs are never relevant in any decision and include:

1. Sunk costs which have already been incurred and cannot be avoided regardless of what a manager decides to do.
2. Future costs that do not differ between the alternatives.

Key Features of Relevant Information

1. Past (historical) costs may be helpful as a basis for making *predictions*. However, past costs themselves are always irrelevant when making *decisions*.
2. Different alternatives can be compared by examining differences in expected total future revenues and expected total future costs.
3. Not all expected future revenues and expected future costs are relevant. Expected future revenues and expected future costs that do not differ among alternatives are irrelevant and, hence, can be eliminated from the analysis. The key question is always, “What difference will an action make?”
4. Appropriate weight must be given to qualitative factors and quantitative nonfinancial factors.

Types of Information

1. Quantitative factors: are outcomes that are measured in numerical terms. Some quantitative factors are financial; they can be expressed in monetary terms. Examples include the cost of direct materials, direct manufacturing labor, and marketing
 2. Qualitative factors are outcomes that are difficult to measure accurately in numerical terms. Employee morale is an example.
- Are just as important as quantitative factors even though they are difficult to measure

Terminology

- Incremental Cost: the additional total cost incurred for an activity
- Differential Cost: the difference in total cost between two alternatives
- Incremental Revenue: the additional total revenue from an activity
- Differential Revenue: the difference in total revenue between two alternatives

Total and Differential Cost Approaches

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

Data for Machine Replacement Example

Old machine

Level of output	2,000 hours/year
Current net book value	\$2,100
Useful life (if repaired)	1 year
Operating cost (labor)	\$10 per hour
Repair cost	\$3,500

New machine

Level of output	2,000 hours/year
Purchase price	\$7,000
Useful life	1 year
Operating cost (labor)	\$9.50 per hour

	Relevant Costs		Difference
	Repair	Replace	Replace Minus Repair
Variable costs			
Labor (2,000 × \$10, \$9.50)	\$20,000	\$19,000	\$(1,000)
Fixed costs (relevant costs)			
Old machine repair cost	3,500		(3,500)
New machine		7,000	7,000
Total costs	\$23,500	\$26,000	\$ 2,500
Repair cost lower by: \$2,500			

Potential Problems with Relevant-Cost Analysis

1. **Avoid incorrect general assumptions about information, especially:**
 - a. **“All variable costs are relevant and all fixed costs are irrelevant”**
 - b. **There are notable exceptions for both costs**
2. **Problems with using unit-cost data:**
 - a. **Including irrelevant costs in error**
 - b. **Using the same unit-cost with different output levels**
 - c. **Fixed costs per unit change with different levels of output**
3. **Focus on Total Revenues and Total Costs, not their per-unit equivalents**
4. **Continually evaluate data to ensure that they meet the requirements of relevant information.**

Qualitative Factors

1. Non quantitative factors may be extremely important in an evaluation process, yet do not show up directly in calculations:
 - a. Quality Requirements
 - b. Reputation of Outsourcer
 - c. Employee Morale
 - d. Logistical Considerations – distance from plant, etc.

One-Time-Only Special Orders

Accepting or rejecting special orders when there is **idle production capacity** and the special orders have no long-run implications

1. Decision Rule: does the special order generate additional operating income?
 1. Yes – accept
 2. No – reject
2. Compares relevant revenues and relevant costs to determine profitability

Example 1:

Surf Gear plant has a production capacity, of 48,000 towels each month. Current monthly production is 30,000 towels. Retail department stores account for all existing sales. Expected results for the coming month(August)

	Total	Per Unit
Units sold	<u>30,000</u>	
Revenues	<u>\$600,000</u>	<u>\$20.00</u>
Cost of goods sold (manufacturing costs)		
Variable manufacturing costs	225,000	7.50 ^b
Fixed manufacturing costs	135,000	4.50 ^c
Total cost of goods sold	<u>360,000</u>	<u>12.00</u>
Marketing costs		
Variable marketing costs	150,000	5.00
Fixed marketing costs	60,000	2.00
Total marketing costs	<u>210,000</u>	<u>7.00</u>
Full costs of the product	<u>570,000</u>	<u>19.00</u>
Operating income	<u>\$ 30,000</u>	<u>\$ 1.00</u>

Azelia, a luxury hotel chain, has offered to buy 5,000 towels from Surf Gear in August at \$11 per towel. No subsequent sales to Azelia are anticipated. If Surf Gear accepts the special order, it will use existing idle capacity to produce the 5,000 towels, and fixed manufacturing costs will not change. No marketing costs will be necessary for the 5,000-unit one-time-only special order. Accepting this special order is not expected to affect the selling price or the quantity of towels sold to regular customers. Should Surf Gear accept Azelia's offer?

Insourcing vs. Outsourcing

1. Insourcing – producing goods or services within an organization
2. Outsourcing – purchasing goods or services from outside vendors
3. Also called the “Make or Buy” decision
4. Decision Rule: Select the option that will provide the firm with the lowest cost, and therefore the highest profit.

The top ten Reasons motivations for companies to pursue outsourcing.

1. Reduce and control operating costs.
2. Improve company focus.
3. Gain access to world-class capabilities.
4. Free internal resources for other purposes.
5. Obtain resources not available internally.
6. Accelerate reengineering benefits.
7. Eliminate a function difficult to manage/out of control.
8. Make capital funds available.
9. Share risks.
10. Obtain cash infusion.

Outsource Decision Considerations

Relevant Quantitative Factors:

Incremental production costs for each unit

Unit cost of purchasing from outside supplier (price less any discounts available plus shipping, etc.)

Number of available suppliers

Production capacity available to manufacture components

Opportunity costs of using facilities for production rather than for other purposes

Amount of space available for storage

Costs associated with carrying inventory

Increase in throughput generated by buying components

Relevant Qualitative Factors:

Reliability of supply sources

Ability to control quality of inputs purchased from outside

Nature of the work to be subcontracted (such as the importance of the part to the whole)

Impact on customers and markets

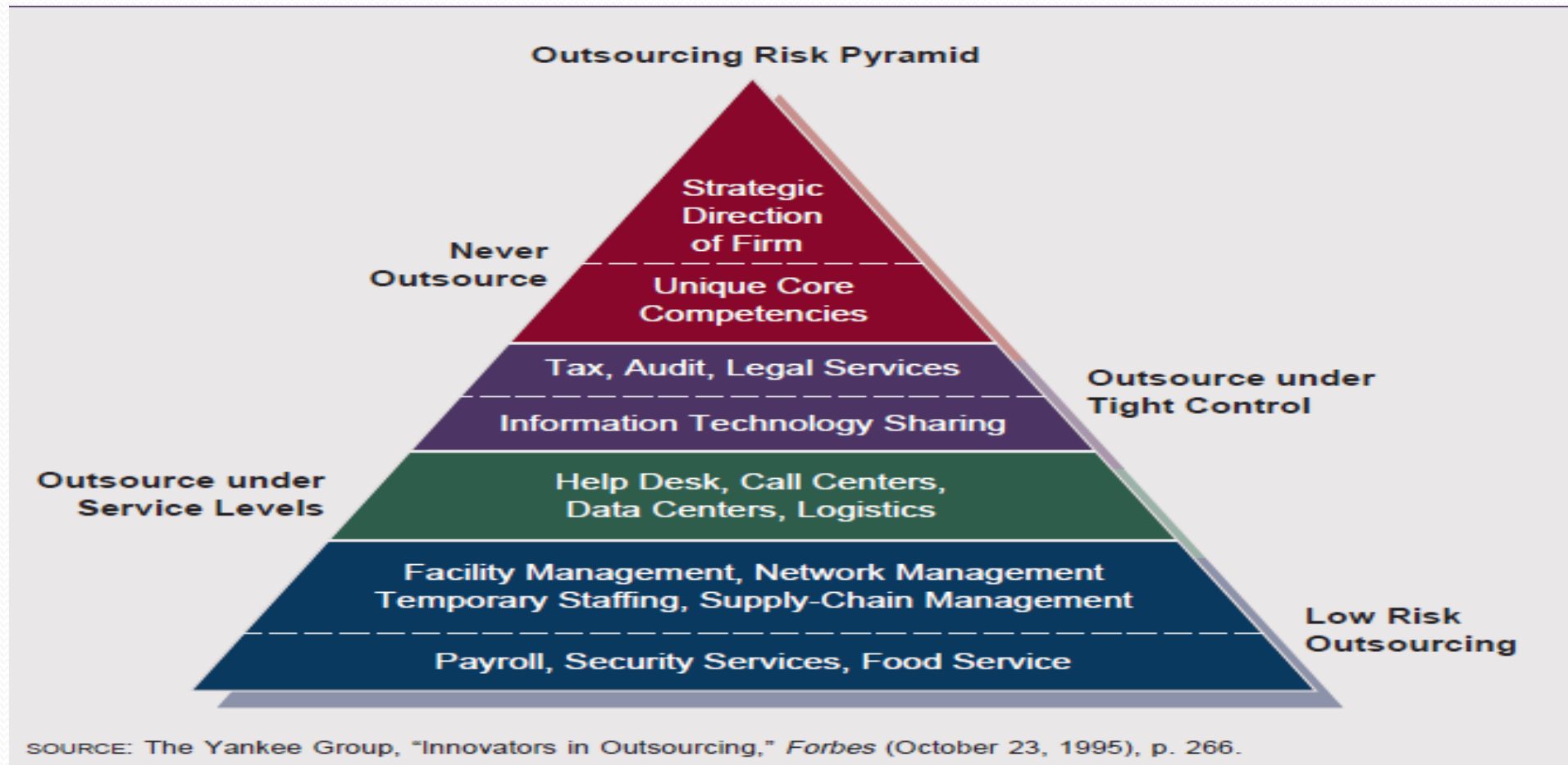
Future bargaining position with supplier(s)

Perceptions regarding possible future price changes

Perceptions about current product prices (are the prices appropriate or, in some cases with international suppliers, is product dumping involved?)

Factors to consider include whether

1. a function is considered critical to the organization's long-term viability (such as product research and development).
2. The organization is pursuing a core competency relative to this function.
3. Issues such as product/service quality, time of delivery, flexibility of use, reliability of supply cannot be resolved to the company's satisfaction.



Example;

The costs of in-house production of a computer processing service that averages 10,000 transactions per month are calculated as £25,000 per month. This comprises **£0.50** per transaction for stationery and **£2** per transaction for labor. In addition, there is a **£10,000** charge from head office as the share of the depreciation charge for equipment. An independent computer bureau has tendered a fixed price of **£20,000** per month.

Based on this information, stationery and labor costs are variable costs that are both avoidable if processing is outsourced. The depreciation charge is likely to be a fixed cost to the business irrespective of the outsourcing decision. It is therefore unavoidable. The fixed outsourcing cost will only be incurred if outsourcing takes place. The relevant costs for each alternative can be compared as shown in Table 1 below;

The £10,000 share of depreciation costs is not relevant as it is unavoidable. The relevant costs for this decision are therefore those shown in table 2 Based on relevant costs, there would be a £5,000 per month saving by outsourcing the computer processing service.

	Cost to make	Cost to buy
Stationery 10,000 @ £0.50	5,000	
Labour 10,000 @ £2	20,000	
Share of depreciation costs	10,000	10,000
Outsourcing cost		20,000
Total relevant cost	£35,000	£30,000

	Relevant cost to make	Relevant cost to buy
Stationery 10,000 @ £0.50	5,000	
Labour 10,000 @ £2	20,000	
Outsourcing cost		20,000
Total relevant cost	£25,000	£20,000

Opportunity Costs

1. Opportunity Cost is the contribution to operating income that is forgone by not using a limited resource in its next-best alternative use
“How much profit did the firm ‘lose out on’ by not selecting this alternative?”
2. Special type of Opportunity Cost: Holding Cost for Inventory. Funds tied up in inventory are not available for investment elsewhere

Adding Or Dropping A Product Line;

The decision whether to drop an old product line or add a new one must take into account both qualitative and quantitative factors. However, any final decision should be based primarily on the impact the decision will have on contribution margin or net income.

The ABC grocery store has three major product lines: produce, meats, and canned food. The store is considering dropping the meat line because the income statement shows that it is operating at a loss. Note the income statement for these product lines below:

	<u>Produce</u>	<u>Meats</u>	<u>Canned Food</u>	<u>Total</u>
Sales	\$10,000	\$15,000	\$25,000	\$50,000
Less: Variable costs	<u>6,000</u>	<u>8,000</u>	<u>12,000</u>	<u>26,000</u>
CM	<u>\$ 4,000</u>	<u>\$ 7,000</u>	<u>\$13,000</u>	<u>\$24,000</u>
Less: Fixed costs				
Direct	\$ 2,000	\$ 6,500	\$ 4,000	\$12,500
Allocated	<u>1,000</u>	<u>1,500</u>	<u>2,500</u>	<u>5,000</u>
Total	<u>\$ 3,000</u>	<u>\$ 8,000</u>	<u>\$ 6,500</u>	<u>\$17,500</u>
Net income	<u><u>\$ 1,000</u></u>	<u><u>\$ (1,000)</u></u>	<u><u>\$ 6,500</u></u>	<u><u>\$ 6,500</u></u>

The total project approach showing the effects on the company as a whole with and without the meat line is shown below:

	<u>Keep Meats</u>	<u>Drop Meats</u>	<u>Difference</u>
Sales	\$50,000	\$35,000	\$(15,000)
Less: Variable costs	<u>26,000</u>	<u>18,000</u>	<u>(8,000)</u>
CM	<u>\$24,000</u>	<u>\$17,000</u>	<u>\$ (7,000)</u>
Less: Fixed costs			
Direct	\$12,500	\$ 6,000	\$ (6,500)
Allocated	<u>5,000</u>	<u>5,000</u>	<u>—</u>
Total	<u>\$17,500</u>	<u>\$11,000</u>	<u>\$ (6,500)</u>
Net income	<u>\$ 6,500</u>	<u>\$ 6,000</u>	<u>\$ (500)</u>

Alternatively, the incremental approach would show the following:

	<u>If Meats Dropped</u>	
Sales revenue lost		\$15,000
Gains:		
Variable cost avoided	\$8,000	
Direct fixed costs avoided	<u>6,500</u>	<u>14,500</u>
Increase (decrease) in net income		<u>\$ (500)</u>

Problem:

Johnson Metal Products produces three products: wire, tubing, and sheet metal. The company is currently contemplating the elimination of the tubing product line because it is showing a pretax loss. An annual income statement follows:

JOHNSON METAL PRODUCTS
Income Statement by Product Line
For the Year Ended July 31, 2001
(in thousands)

	Wire	Tubing	Sheet Metal	Total
Sales	\$ 2,200	\$ 1,600	\$ 1,800	\$ 5,600
Cost of sales	(1,400)	(1,000)	(1,080)	(3,480)
Gross margin	\$ 800	\$ 600	\$ 720	\$ 2,120
Avoidable fixed and variable costs	\$ 630	\$ 725	\$ 520	\$ 1,875
Allocated fixed costs	90	80	105	275
Total fixed costs	\$ 720	\$ 805	\$ 625	\$ 2,150
Operating profit	\$ 80	\$ (205)	\$ 95	\$ (30)

1. Should corporate management drop the tubing product line? Support your answer with appropriate schedules.
2. How would the pretax profit of the company be affected by the decision?

Product-Mix Decisions

Where demand exceeds the capacity of the business to produce goods or deliver services as a result of scarce resources (whether that is space, equipment, materials or staff), the scarce resource is the **limiting factor**.

A business will want to maximize its profitability by selecting the optimum product/service mix. The **product/service mix** is the mix of products or services sold by the business, each of which may have different selling prices and costs. It is therefore necessary, where demand exceeds capacity, to rank the products/services with the highest contributions, per unit of the limiting factor (i.e. the scarce resource).

1. The decisions made by a company about which products to sell and in what quantities
2. Decision Rule (with a constraint): choose the product that produces the highest contribution margin per unit of the constraining resource

Example;

Beaufort Accessories makes three parts (F, G and H) for a motor vehicle, each with different selling prices and variable costs and requiring a different number of machining hours.

These are shown below However, Beaufort has an overall capacity limitation of 10,000 machine hours.

	Part F	Part G	Part H
Selling price per unit	£150	£200	£225
Variable material cost per unit	£50	£80	£40
Variable labour cost per unit	£50	£60	£125
Contribution per unit	£50	£60	£60
Machine hours per unit	2	4	5
Estimated sales demand (units)	2,000	2,000	2,000
Required machine hours based on estimated demand	4,000	8,000	10,000

Beaufort accessories – product ranking based on contribution

	Part F	Part G	Part H
Contribution per unit	£50	£60	£60
Machine hours per unit	2	4	5
Contribution per machine hour	£25	£15	£12
Ranking (preference)	1	2	3

The first step is to identify the ranking of the products by calculating the contribution per unit of the limiting factor (machine hours in this case) for each product. Although both Part G and Part H have higher contributions per unit, the contribution per machine hour (the unit of limited capacity) is higher for Part F.

Profitability will be maximized by using the limited capacity to produce as many Part Fs as can be sold, followed by Part Gs. Based on this ranking, the available production capacity can be allocated as follows:

Problem:

Because the employees of one of its plants are out on strike, Allentown Electronics has found itself operating at peak capacity. The firm makes two electronic products, beepers and cell phones. Presently, the company can sell as many of each product as it can make, but it takes twice as long in production labor time to make a cell phone as it does to make a beeper. The firm's production capacity is only 120,000 labor hours per month. Data on each product follow:

	Beepers	Cell Phones
Sales	\$30	\$56
Variable costs	<u>(24)</u>	<u>(46)</u>
Contribution margin	<u>\$ 6</u>	<u>\$10</u>
Labor hours required	2	4

Fixed costs are \$140,000 per month.

- How many of each product should the company make? Explain your answer.
- What qualitative factors would you consider in making this product mix decision?

Behavioral Implications

- Despite the quantitative nature of some aspects of decision making, not all managers will choose the best alternative for the firm
- Managers could engage in self-serving behavior such as delaying needed equipment maintenance in order to meet their personal profitability quotas for bonus consideration



THANKS