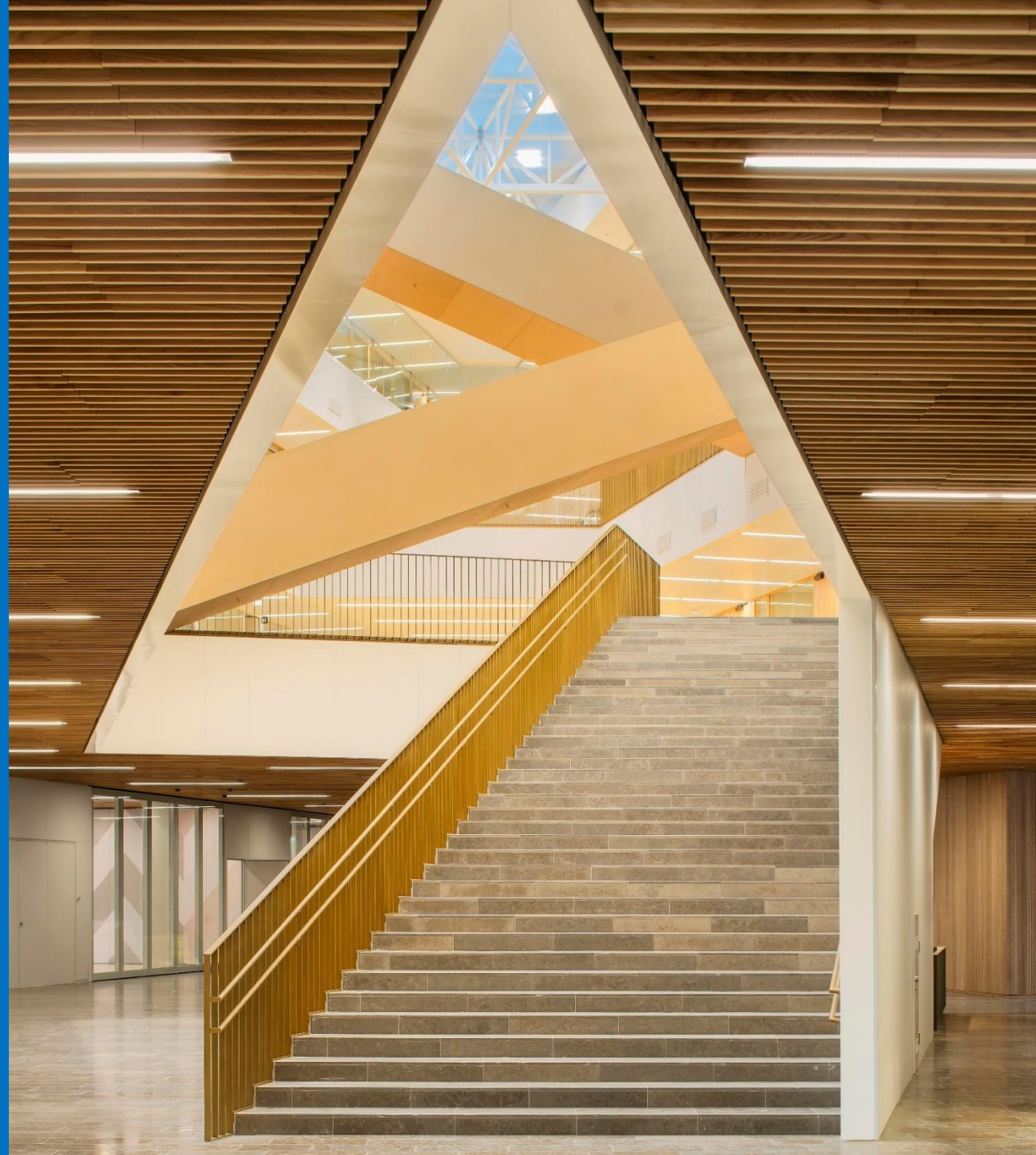


# Decision Making and Relevant Information

## Session 10

David Derichs, PhD



# Decision Making and Relevant Information



# Agenda: Learning Objectives for this session

- 12.1** Use the five-step decision-making process
- 12.2** Distinguish relevant from irrelevant information in decision situations
- 12.3** Explain the concept of opportunity cost and why managers should consider it when making insourcing versus outsourcing decisions
- 12.4** Know how to choose which products to produce when there are capacity constraints
- 12.5** Explain how to manage bottlenecks
- 12.6** Discuss the factors managers must consider when adding or dropping customers or business units
- 12.7** Explain why book value of equipment is irrelevant to managers making equipment-replacement decisions
- 12.8** Explain how conflicts can arise between the decision model a manager uses and the performance-evaluation model top management uses to evaluate managers

# Decision Making and Relevant Information

- 12.1 Use the five-step decision-making process
- 12.2 Distinguish relevant from irrelevant information in decision situations
- 12.3 Explain the concept of opportunity cost and why managers should consider it when making insourcing versus outsourcing decisions
- 12.4 Know how to choose which products to produce when there are capacity constraints
- 12.5 Explain how to manage bottlenecks
- 12.6 Discuss the factors managers must consider when adding or dropping customers or business units
- 12.7 Explain why book value of equipment is irrelevant to managers making equipment-replacement decisions
- 12.8 Explain how conflicts can arise between the decision model a manager uses and the performance-evaluation model top management uses to evaluate managers

# Decision Making and Relevant Information

## 12.1 Use the five-step decision-making process

**12.1 Use the five-step decision-making process**

12.2 Distinguish relevant from irrelevant information in decision situations

12.3 Explain the concept of opportunity cost and why managers should consider it when making insourcing versus outsourcing decisions

12.4 Know how to choose which products to produce when there are capacity constraints

12.5 Explain how to manage bottlenecks

12.6 Discuss the factors managers must consider when adding or dropping customers or business units

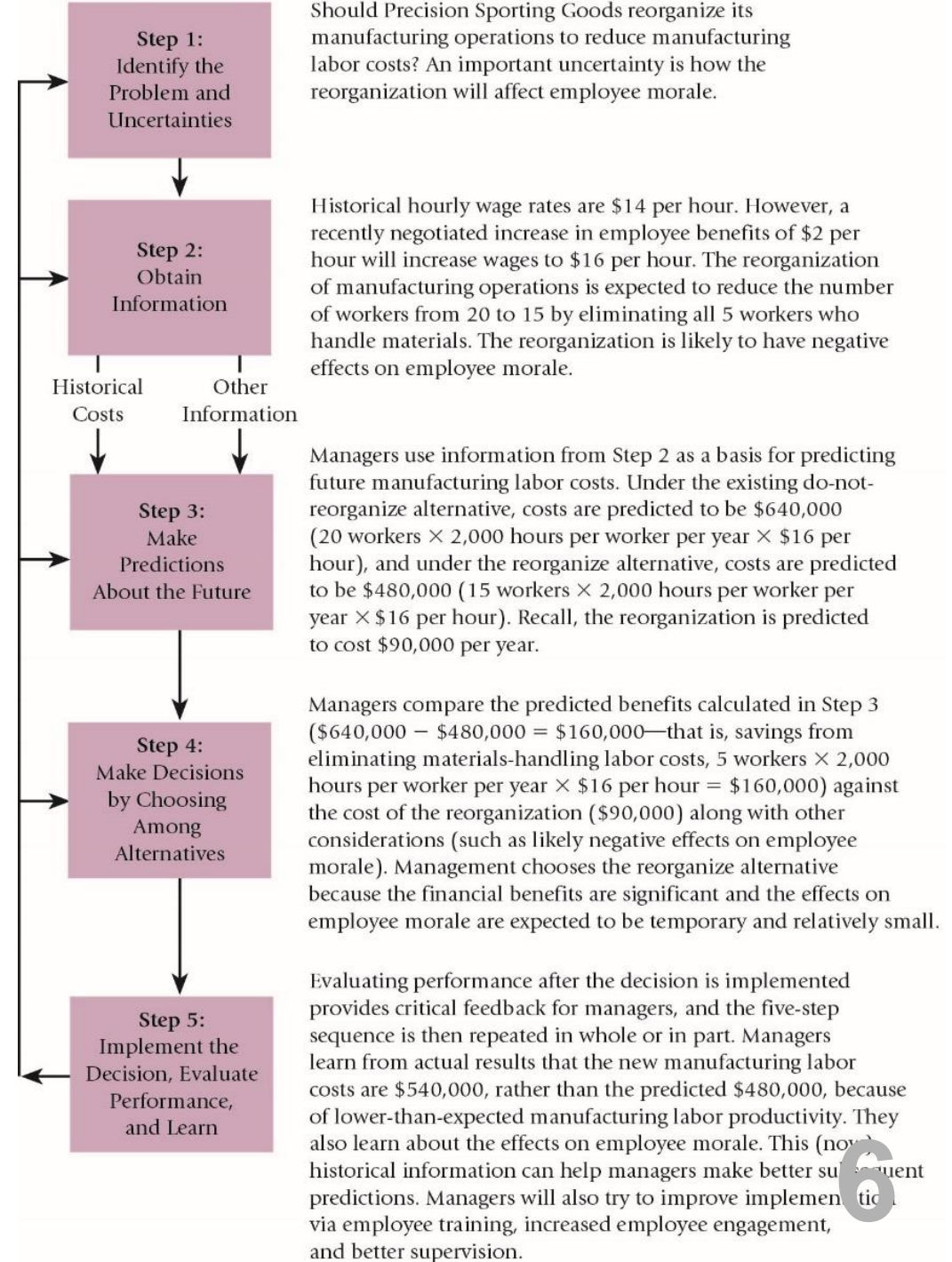
12.7 Explain why book value of equipment is irrelevant to managers making equipment-replacement decisions

12.8 Explain how conflicts can arise between the decision model a manager uses and the performance-evaluation model top management uses to evaluate managers

# Information and the Decision Process

**Managers** usually **follow a decision model** for choosing among different courses of action.

- A **decision model** is a formal method of making a choice that often involves both **quantitative and qualitative analyses**.
- **Management accountants analyze and present relevant data** to guide managers' decisions.
- Managers use the **five-step decision-making process** presented in earlier to make decisions  
→ Check the example on the right!



# Decision Making and Relevant Information

## 12.2 Distinguish relevant from irrelevant information in decision situations

12.1 Use the five-step decision-making process

**12.2 Distinguish relevant from irrelevant information in decision situations**

12.3 Explain the concept of opportunity cost and why managers should consider it when making insourcing versus outsourcing decisions

12.4 Know how to choose which products to produce when there are capacity constraints

12.5 Explain how to manage bottlenecks

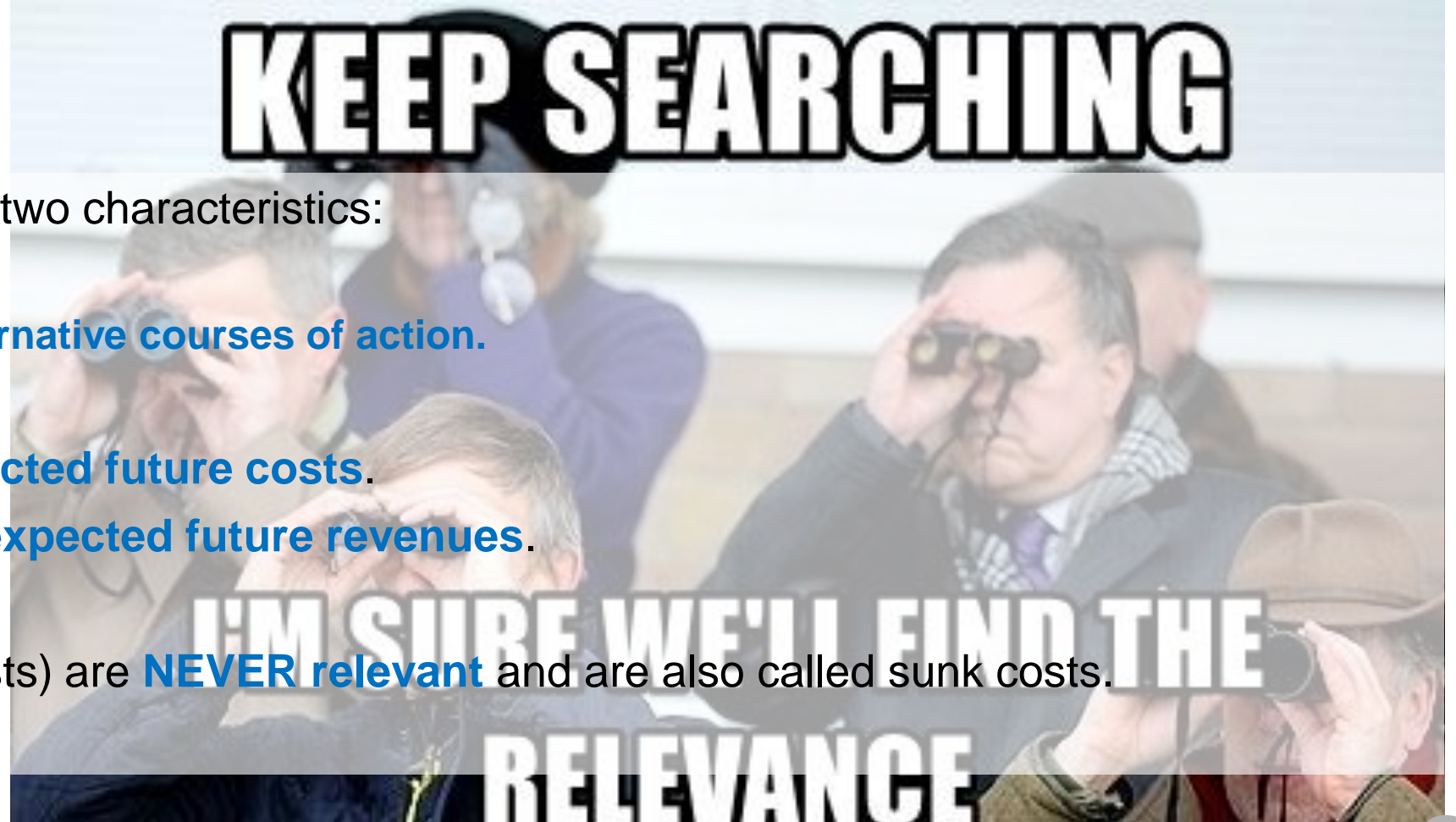
12.6 Discuss the factors managers must consider when adding or dropping customers or business units

12.7 Explain why book value of equipment is irrelevant to managers making equipment-replacement decisions

12.8 Explain how conflicts can arise between the decision model a manager uses and the performance-evaluation model top management uses to evaluate managers

# The Concept of Relevance

- Relevant information has two characteristics:
  - It occurs in the future.
  - It differs among the alternative courses of action.
- Relevant costs are **expected future costs**.
- Relevant revenues are **expected future revenues**.
- **Past costs** (historical costs) are **NEVER relevant** and are also called sunk costs.





# Qualitative and Quantitative Relevant Information

- Although **quantitative nonfinancial factors and qualitative factors are difficult to measure** in financial terms, they are **important for managers to consider**.
- Managers divide the outcomes of decisions into two broad categories: quantitative and qualitative.
  - **Quantitative factors** are outcomes that are measured in numerical terms.
  - **Qualitative factors** are outcomes that are difficult to measure accurately in numerical terms, such as satisfaction.



# Relevant Cost Illustration

	All Revenues and Costs	
	Alternative 1: Do Not Reorganize	Alternative 2: Reorganize
Revenues <sup>a</sup>	\$6,250,000	\$6,250,000
Costs:		
Direct materials <sup>b</sup>	1,250,000	1,250,000
Manufacturing labor	640,000 <sup>c</sup>	480,000 <sup>d</sup>
Manufacturing overhead	750,000	750,000
Marketing	2,000,000	2,000,000
Reorganization costs	—	90,000
Total costs	4,640,000	4,570,000
Operating income	\$1,610,000	\$1,680,000
	\$70,000 Difference	

<sup>a</sup>25,000 units × \$250 per unit = \$6,250,000

<sup>b</sup>25,000 units × \$50 per unit = \$1,250,000

<sup>c</sup>20 workers × 2,000 hours per work

<sup>d</sup>15 workers × 2,000 hours per work

What are  
the  
relevant  
costs?

# Sunk Costs Are Irrelevant in Decision-Making

- **Sunk costs** are costs that have **already occurred and cannot be changed.**
- Sunk costs are excluded because they **cannot be changed by future actions.**



# Terminology

Now, let's look at the types of decisions that need to be made.

- **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

# Exercise Time – E1



# Types of Decisions That Need to Be Made (1 of 3)

1. One-time-only special orders
2. Short-run pricing decisions
3. Insourcing vs. outsourcing (make or buy)
  - a. Outsourcing and idle facilities
  - b. Strategic and qualitative factors
  - c. International outsourcing
  - d. The total alternatives approach
  - e. The opportunity-cost approach
  - f. Carrying costs of inventory



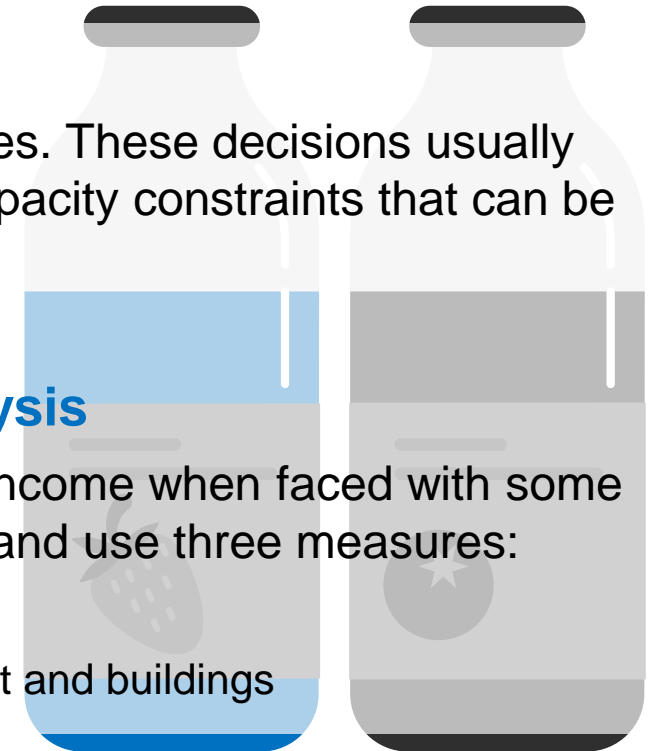
# Types of Decisions That Need to Be Made (2 of 3)

## 4. Product-mix decisions with capacity constraints

- Managers make decisions about which products to sell and in what quantities. These decisions usually have only a short-run focus because they typically arise in the context of capacity constraints that can be relaxed in the long run.

## 5. Bottlenecks, theory of constraints, and throughput-margin analysis

- The theory of constraints (TOC) describes methods to maximize operating income when faced with some bottleneck and some bottleneck operations. To implement TOC, we define and use three measures:
  - Throughput margin
  - Investment equals the sum of materials, R&D costs and capital costs of equipment and buildings
  - Operating costs equal costs of operations (other than direct materials)



# Types of Decisions That Need to Be Made (3 of 3)

## 6. Customer profitability and relevant costs

- Managers must make decisions about adding or dropping a product line or business segment, but if the cost object is a customer, managers must decide about adding or dropping customers.

## 7. Branch/segment: adding or discontinuing

## 8. Equipment replacement (Past costs are irrelevant)

Source: Datar/Rajan (2021)  
Managerial Accounting



© Dr. David Derichs



# Exercise Time – E2 Questions 1



# 1. One-Time-Only Special Orders

- **Decision:** To accept or reject special orders when there is idle production capacity and the special orders have no long-run implications.
- **Decision rule:** Does the special order generate additional operating income?
  - Yes—accept
  - No—reject
- Compares relevant revenues and relevant costs to determine profitability.

# 1. Special Orders Decisions Illustrated

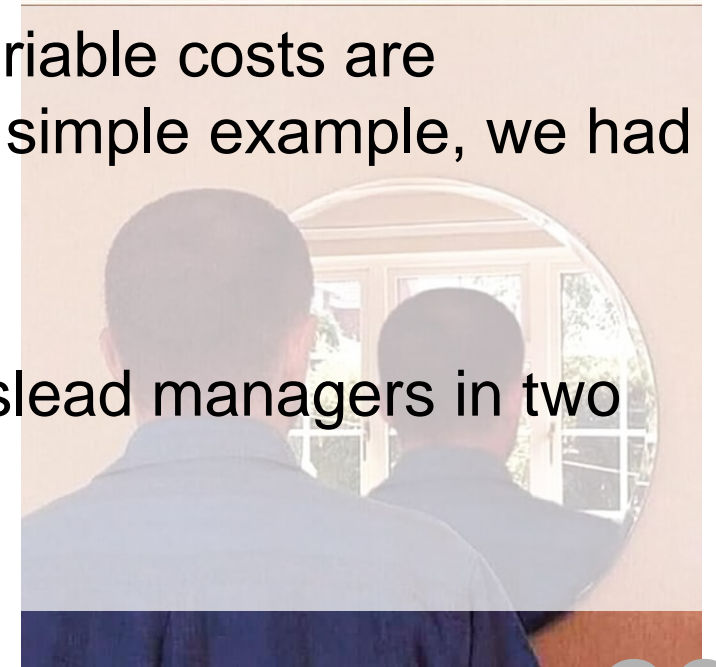
## Comparative Contribution Income Statements

	A	B	C	D	E	F	G	H	
1		Without the Special Order				With the Special Order		Difference: Relevant Amounts	
2		30,000				35,000		for the	
3		Units to Be Sold				Units to Be Sold		5,000	
4		Per Unit		Total		Total		Units Special Order	
5		(1)		(2) = (1) × 30,000		(3)		(4) = (3) – (2)	
6	Revenues	\$20.00		\$600,000		\$655,000		\$55,000 <sup>a</sup>	
7	Variable costs:								
8	Manufacturing	7.50		225,000		262,500		37,500 <sup>b</sup>	
9	Marketing	5.00		150,000		150,000		0 <sup>c</sup>	
10	Total variable costs	12.50		375,000		412,500		37,500	
11	Contribution margin	7.50		225,000		242,500		17,500	
12	Fixed costs:								
13	Manufacturing	4.50		135,000		135,000		0 <sup>d</sup>	
14	Marketing	2.00		60,000		60,000		0 <sup>d</sup>	
15	Total fixed costs	6.50		195,000		195,000		0	
16	Operating income	\$ 1.00		\$ 30,000		\$ 47,500		\$17,500	
17									
18	<sup>a</sup> 5,000 units × \$11.00 per unit = \$55,000.								
19	<sup>b</sup> 5,000 units × \$7.50 per unit = \$37,500.								
20	<sup>c</sup> No variable marketing costs would be incurred for the 5,000-unit one-time-only special order.								
21	<sup>d</sup> Fixed manufacturing costs and fixed marketing costs would be unaffected by the special order.								

# Managers should avoid two potential problems in relevant–cost analysis:

Me trying to face  
my problems 🤪

1. **Avoid incorrect general assumptions** such as “All variable costs are relevant, and all fixed costs are irrelevant.” Even in our simple example, we had irrelevant, variable marketing costs.
2. **Be aware that unit-fixed-cost data** can potentially mislead managers in two ways.



# Beware: Unit-Fixed-Cost Data

Me trying to face  
my problems 😬

**Unit-fixed-cost data can potentially mislead managers** in two ways:

- Fixed unit costs might **include irrelevant costs**, costs that will not change whether or not the one-time only order is accepted or not.
- **If using the same unit fixed costs at different output levels**, managers may reach **erroneous conclusions**. Total fixed costs should be used.

**What should be the minimum price for a short-run sale decision, why?**

**A?**

## 2. Short-Run Pricing Decisions

- A **special order decision** is, in many respects, a **short-run pricing decision**.
- Sometimes, the decision is simply about setting an acceptable price.
- Remember the decision rule?
- **Any price above incremental costs will improve operating income**; however, consideration must be given to **capacity constraints, current market conditions, customer demand, competition**, etc.

# Decision Making and Relevant Information

12.3 Explain the concept of opportunity cost and why managers should consider it when making insourcing versus outsourcing decisions

12.1 Use the five-step decision-making process

12.2 Distinguish relevant from irrelevant information in decision situations

**12.3 Explain the concept of opportunity cost and why managers should consider it when making insourcing versus outsourcing decisions**

12.4 Know how to choose which products to produce when there are capacity constraints

12.5 Explain how to manage bottlenecks

12.6 Discuss the factors managers must consider when adding or dropping customers or business units

12.7 Explain why book value of equipment is irrelevant to managers making equipment-replacement decisions

12.8 Explain how conflicts can arise between the decision model a manager uses and the performance-evaluation model top management uses to evaluate managers



# 3. Insourcing Versus Outsourcing and Make-or-Buy Decisions (1 of 4)

- Outsourcing is purchasing goods and services from outside vendors.
- Insourcing means you'll produce the good (or provide the service) within the organization.
- Decisions about whether to insource or outsource are called **make-or-buy decisions**.
- **Opportunity costs** are the contribution to operating income forgone by not using a limited resource in its next-best alternative use.

# 3.a/b. Insourcing Versus Outsourcing and Make-or-Buy Decisions (2 of 4)

## Outsourcing and Idle Facilities

- To make a good decision, managers must consider the **difference in relevant costs between the alternatives**, including the **cost of idle capacity** and related fixed costs.

## Strategic and Qualitative Factors

- **Outsourcing decisions** invariably have a **long-run horizon** in which the financial **costs and benefits of outsourcing become more uncertain**.
- Almost always, **strategic and qualitative factors become important** determinants of the outsourcing decision.
- Weighing all these factors requires considerable **managerial judgment and care**.

# 3.c/d. Insourcing Versus Outsourcing and Make-or-Buy Decisions (3 of 4)

## International Outsourcing

- International outsourcing requires managers to evaluate **manufacturing and transportation costs, exchange-rate risks**, and **other strategic and qualitative factors**, such as quality, reliability, and efficiency of the supply chain.

## The Total Alternatives Approach

- This approach simply means that managers should consider **future costs and revenues for all products**.
- If, for example, one decision will create idle capacity but that idle capacity can be used for manufacture of another product, that should be considered in the overall decision.

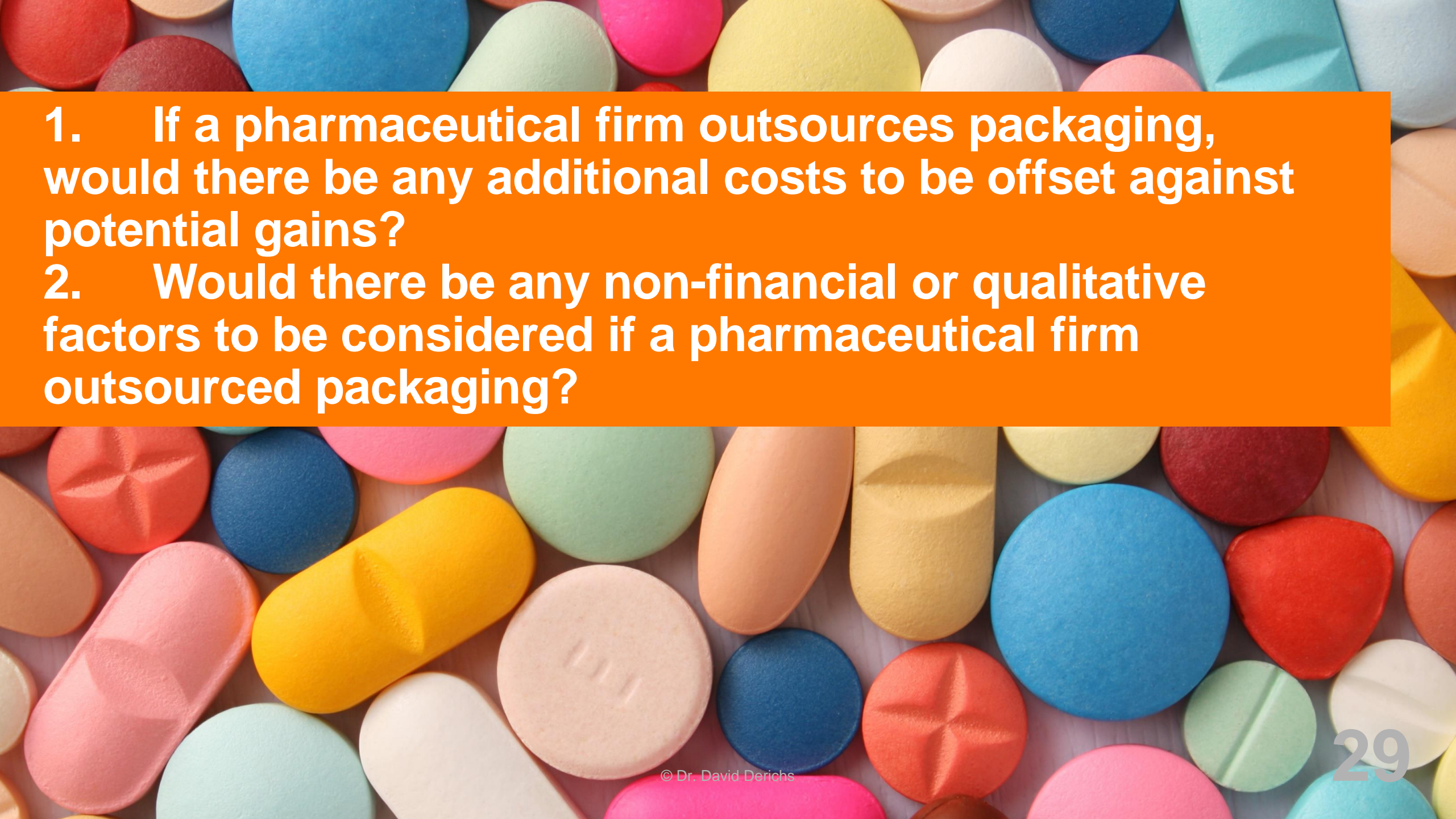
# 3.e/f. Insourcing Versus Outsourcing and Make-or-Buy Decisions (4 of 4)

## The Opportunity-Cost Approach

- Opportunity cost is the **contribution to operating income that is forgone by not using a limited resource in its next-best alternative use.**
- Deciding to use a resource one way means a manager must forgo the opportunity to use the resource in any other way. **Managers must consider that cost in their decision-making.**

## Carrying Costs of Inventory

- Recall that under the opportunity-cost approach, the relevant cost of any alternative is (1) the incremental cost of the alternative plus (2) the opportunity cost of the profit forgone from choosing that alternative. **The opportunity cost of holding inventory is the income forgone by tying up money in inventory and not investing it elsewhere.**

- 
1. If a pharmaceutical firm outsources packaging, would there be any additional costs to be offset against potential gains?
  2. Would there be any non-financial or qualitative factors to be considered if a pharmaceutical firm outsourced packaging?

# Decision Making and Relevant Information

12.4 Know how to choose which products to produce when there are capacity constraints

12.1 Use the five-step decision-making process

12.2 Distinguish relevant from irrelevant information in decision situations

12.3 Explain the concept of opportunity cost and why managers should consider it when making insourcing versus outsourcing decisions

**12.4 Know how to choose which products to produce when there are capacity constraints**

12.5 Explain how to manage bottlenecks

12.6 Discuss the factors managers must consider when adding or dropping customers or business units

12.7 Explain why book value of equipment is irrelevant to managers making equipment-replacement decisions

12.8 Explain how conflicts can arise between the decision model a manager uses and the performance-evaluation model top management uses to evaluate managers

# 4. Product-Mix Decisions with Capacity Constraints

Product-mix decisions are decisions managers make about which products to sell and in what quantities.

- Decision rule (with a constraint):
  - **Choose the product that produces the highest contribution margin per unit of the constraining resource** (not the highest contribution margin per unit of the product).

# 4. Product-Mix Decisions with Capacity Constraint Example

Item	Product A	Product B
Selling price	€10	€30
Variable cost per unit	€ 6	€15
Contribution margin/unit	€ 4	€15
Contribution margin %	40%	50%
Machine hours required per unit	0.5	3.0
Contribution margin/machine hour	€ 8	€ 5



# Exercise Time – E2 Questions 2



# Decision Making and Relevant Information

## 12.5 Explain how to manage bottlenecks

12.1 Use the five-step decision-making process

12.2 Distinguish relevant from irrelevant information in decision situations

12.3 Explain the concept of opportunity cost and why managers should consider it when making insourcing versus outsourcing decisions

12.4 Know how to choose which products to produce when there are capacity constraints

**12.5 Explain how to manage bottlenecks**

12.6 Discuss the factors managers must consider when adding or dropping customers or business units

12.7 Explain why book value of equipment is irrelevant to managers making equipment-replacement decisions

12.8 Explain how conflicts can arise between the decision model a manager uses and the performance-evaluation model top management uses to evaluate managers

# 5. Bottlenecks, Theory of Constraints, and Throughput-Margin Analysis (1 of 3)

- A **bottleneck** is a phenomenon where the **performance or capacity of an entire system is limited by a single or limited number of components or resources.**
- The term bottleneck is taken from the “assets are water” metaphor. As water is poured out of a bottle, the rate of outflow is limited by the width of the conduit of exit—that is, bottleneck.
- By increasing the width of the bottleneck, one can increase the rate at which the water flows out of the neck at different frequencies.
- Such **limiting components of a system** are sometimes referred to as **bottleneck points.**

# 5. Bottlenecks, Theory of Constraints, and Throughput-Margin Analysis (2 of 3)

The **theory of constraints (TOC)** describes methods to **maximize operating income when faced with some bottleneck and some non-bottleneck operations**. TOC defines these three measures:

- **Throughput margin**
- **Investments**
- **Operating costs**

The objective of TOC is to **increase throughput margin** while **decreasing investments and operating costs**. TOC focuses on managing bottleneck operations.

# 5. Bottlenecks, Theory of Constraints, and Throughput-Margin Analysis (3 of 3)

Managing bottleneck operations has four steps:

1. Recognize that bottleneck operations determine the contribution margin of the entire system.
2. Identify the bottleneck operations.
3. **Keep the bottleneck operation busy and subordinate all non-bottleneck operations to the bottleneck operation.**
4. Take actions to increase the efficiency and capacity of the bottleneck operation.

# Decision Making and Relevant Information

12.6 Discuss the factors managers must consider when adding or dropping customers or business units

12.1 Use the five-step decision-making process

12.2 Distinguish relevant from irrelevant information in decision situations

12.3 Explain the concept of opportunity cost and why managers should consider it when making insourcing versus outsourcing decisions

12.4 Know how to choose which products to produce when there are capacity constraints

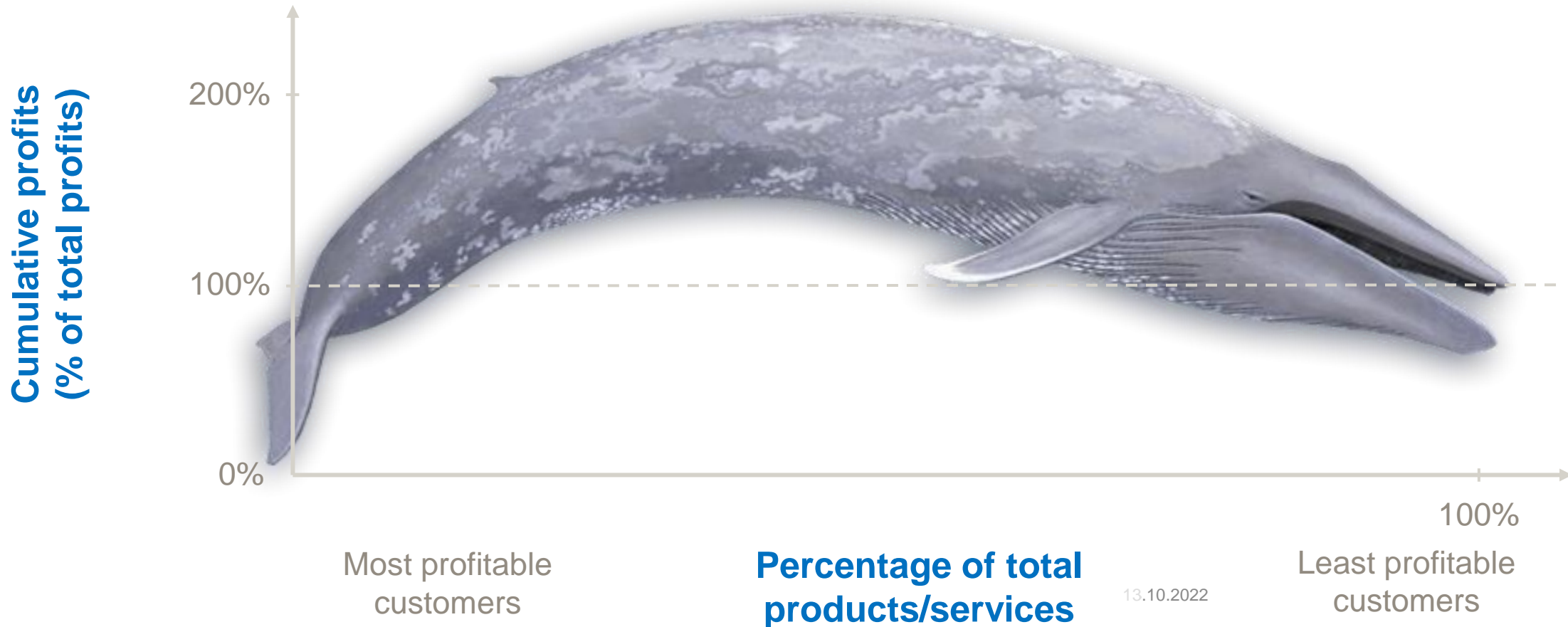
12.5 Explain how to manage bottlenecks

**12.6 Discuss the factors managers must consider when adding or dropping customers or business units**

12.7 Explain why book value of equipment is irrelevant to managers making equipment-replacement decisions

12.8 Explain how conflicts can arise between the decision model a manager uses and the performance-evaluation model top management uses to evaluate managers

# Why are we interested in customer profitability?



# 6. Customer Profitability and Relevant Costs (1 of 2)

- When the cost object is a customer, **managers must decide about adding or dropping the customer.**
- Decision rule: **Does adding or dropping a customer add operating income to the firm?**
  - Yes—add or don't drop
  - No—drop or don't add
- Decision is based on **incremental income of the customer**, not how much revenue a customer generates.



# 6. Customer Profitability and Relevant Costs (2 of 2)

	Customer			Total
	Vogel	Brenner	Wisk	
Revenues	\$500,000	\$300,000	\$400,000	\$1,200,000
Cost of goods sold	370,000	220,000	330,000	920,000
Furniture-handling labor	41,000	18,000	33,000	92,000
Furniture-handling equipment cost written off as depreciation	12,000	4,000	9,000	25,000
Rent	14,000	8,000	14,000	36,000
Marketing support	11,000	9,000	10,000	30,000
Sales order and delivery processing	13,000	7,000	12,000	32,000
General administration	20,000	12,000	16,000	48,000
Allocated corporate-office costs	10,000	6,000	8,000	24,000
Total costs	<u>491,000</u>	<u>284,000</u>	<u>432,000</u>	<u>1,207,000</u>
Operating income	<u>\$ 9,000</u>	<u>\$ 16,000</u>	<u>\$ (32,000)</u>	<u>\$ (7,000)</u>

# 6. Relevant-Revenue and Relevant-Cost Analysis of Dropping a Customer

When a customer doesn't produce positive operating income, managers should attempt to determine why. Some possible reasons might be the following:

- Low-margin products ordered
- High sales order costs
- High delivery-processing and other handling costs
- High marketing costs

Once identified, managers could work with the customer to reduce costs so the customer becomes profitable.

# 6. Relevant-Revenue and Relevant-Cost Analysis of Adding a Customer

- At least one **critical distinction exists between the relevant costs of adding versus dropping a customer.**
- **Depreciation cost is irrelevant in deciding whether to drop a customer because depreciation on equipment that has already been purchased is a past (sunk) cost,**
- **But the cost of purchasing new equipment in the future that will then be written off as depreciation IS relevant in deciding whether to add a customer.**

# 7. Relevant-Revenue and Relevant-Cost Analysis of Closing or Adding Branch Offices or Business Divisions

Sometimes **companies must decide about closing or adding branch offices or business divisions.**

This analysis is **similar to the decision process of adding or closing a customer**, with a notable exception:

- Often, **branches or divisions are allocated a share of corporate-office costs.** If a branch or division is closed, **these costs may be allocated differently** but they may not actually change.

# Simplified example – cost accounting folly (1/4)

Unit	A	B	C	D	SUM
Sales	500	200	60	160	920
Variable costs	-100	-50	-30	-70	-250
Gross Margin	400	150	30	90	670
Unit fix costs	-200	-80	-10	-60	-350
Org- fix costs	-141	-57	-17	-45	-260
<b>Unit profit</b>	<b>59</b>	<b>13</b>	<b>3</b>	<b>-15</b>	<b>60</b>
<b>Org. profit</b>					<b>60</b>

# Simplified example – cost accounting folly (1/4)

Unit	A	B	C	D	SUM
Sales	500	200	60	160	920
Variable costs	-100	-50	-30	-70	-250
Gross Margin	400	150	30	90	670
Unit fix costs	-200	-80	-10	-60	-350
Org- fix costs	-171	-68	-21	-45	-260
<b>Unit profit</b>	<b>29</b>	<b>2</b>	<b>-1</b>	<b>-15</b>	<b>30</b>
<b>Org. profit</b>					<b>30</b>

# Simplified example – cost accounting folly (1/4)

Unit	A	B	C	D	SUM
Sales	500	200	60	160	920
Variable costs	-100	-50	-30	-70	-250
Gross Margin	400	150	30	90	670
Unit fix costs	-200	-80	-10	-60	-350
Org- fix costs	-186	-74	-21	-45	-260
<b>Unit profit</b>	<b>14</b>	<b>-4</b>	<b>3</b>	<b>-15</b>	<b>10</b>
<b>Org. profit</b>					<b>10</b>

# Simplified example – cost accounting folly (1/4)

Unit	A	B	C	D	SUM
Sales	500	200	60	160	920
Variable costs	-100	-50	-30	-70	-250
Gross Margin	400	150	30	90	670
Unit fix costs	-200	-80	-10	-60	-350
Org- fix costs	-260	-74	-21	-45	-260
<b>Unit profit</b>	<b>-60</b>	<b>-4</b>	<b>3</b>	<b>-15</b>	<b>-60</b>
<b>Org. profit</b>					<b>-60</b>



# Decision Making and Relevant Information

12.7 Explain why book value of equipment is irrelevant to managers making equipment-replacement decisions

12.1 Use the five-step decision-making process

12.2 Distinguish relevant from irrelevant information in decision situations

12.3 Explain the concept of opportunity cost and why managers should consider it when making insourcing versus outsourcing decisions

12.4 Know how to choose which products to produce when there are capacity constraints

12.5 Explain how to manage bottlenecks

12.6 Discuss the factors managers must consider when adding or dropping customers or business units

**12.7 Explain why book value of equipment is irrelevant to managers making equipment-replacement decisions**

12.8 Explain how conflicts can arise between the decision model a manager uses and the performance-evaluation model top management uses to evaluate managers

# 8. Irrelevance of Past Costs and Equipment-Replacement Decisions

## Some items of cost are NOT relevant:

- Cost, accumulated depreciation, and book value of existing equipment
- Any potential gain or loss on the transaction, a financial accounting phenomenon only
- Sunk costs (past costs) are unavoidable, cannot be changed no matter what action is taken, and are not relevant.

## Some items of cost MAY BE relevant:

- Current disposal value of old machine and cost of new machine

# Decision Making and Relevant Information

12.8 Explain how conflicts can arise between the decision model a manager uses and the performance-evaluation model top management uses to evaluate managers

12.1 Use the five-step decision-making process

12.2 Distinguish relevant from irrelevant information in decision situations

12.3 Explain the concept of opportunity cost and why managers should consider it when making insourcing versus outsourcing decisions

12.4 Know how to choose which products to produce when there are capacity constraints

12.5 Explain how to manage bottlenecks

12.6 Discuss the factors managers must consider when adding or dropping customers or business units

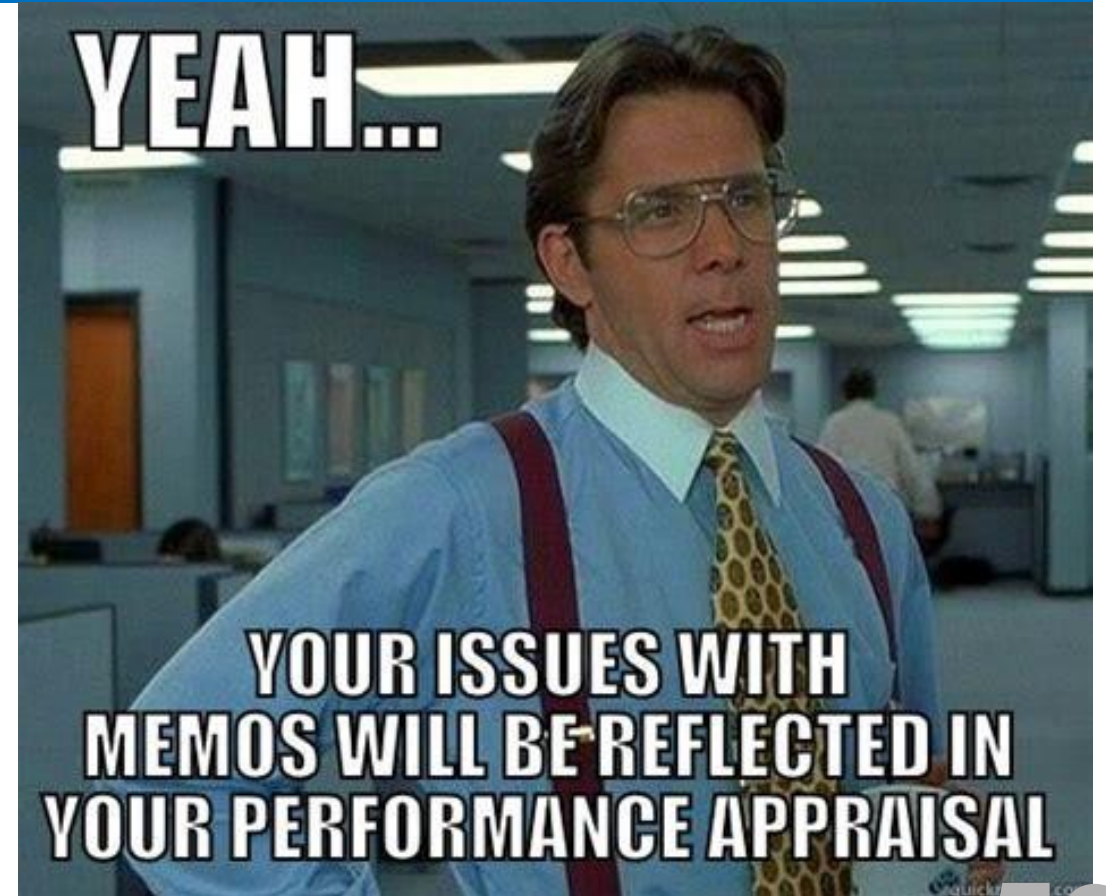
12.7 Explain why book value of equipment is irrelevant to managers making equipment-replacement decisions

**12.8 Explain how conflicts can arise between the decision model a manager uses and the performance-evaluation model top management uses to evaluate managers**

# Decisions and Performance Evaluation

## (1 of 2)

- Despite the quantitative nature of some aspects of decision making, **not all managers will choose the best alternative for the firm.**
- **Managers will consider how the company will judge** his or her **performance** after the decision is implemented.
- Many managers consider it unethical to take actions that make their own performance look good when these actions are not in the best interests of the firm.

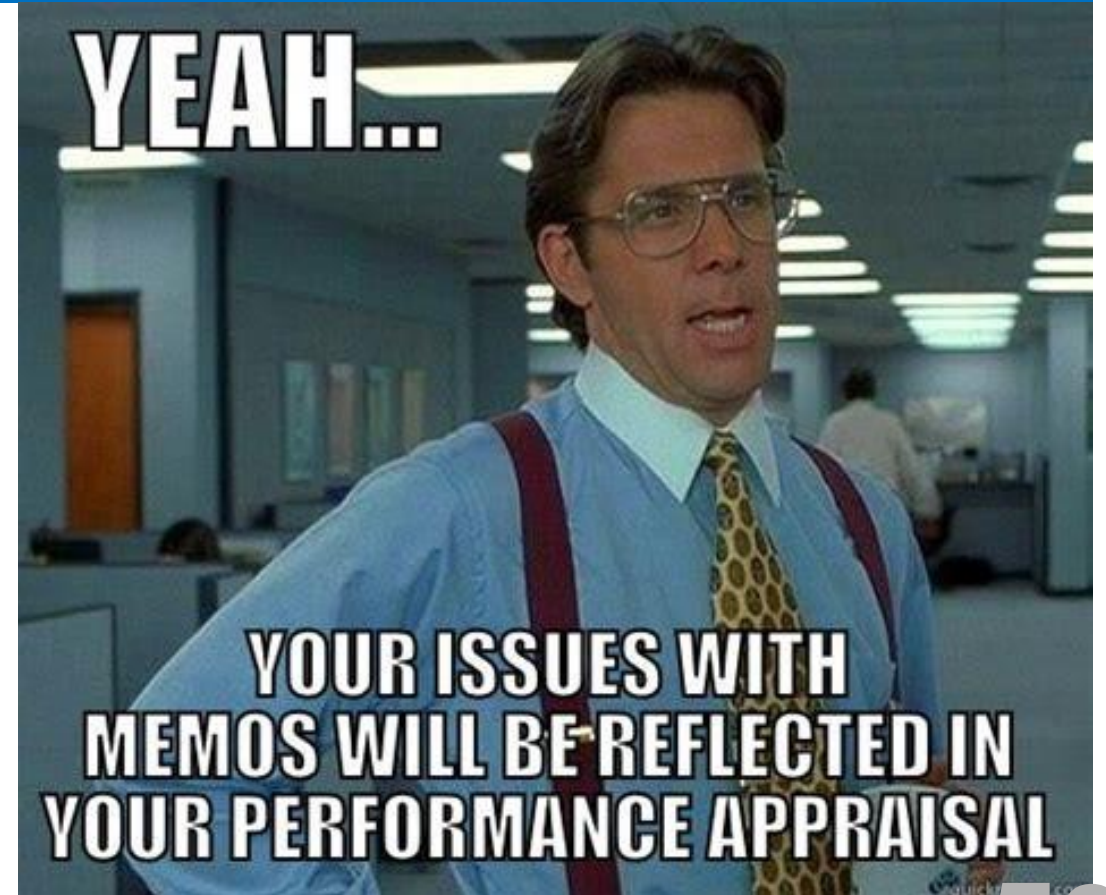


# Decisions and Performance Evaluation

## (2 of 2)

- The decision model analysis (step 4) can dictate one decision, **but in the real world, would the manager want to follow it?**
- **Managers frequently find it difficult to resolve the conflict between the decision model and the performance-evaluation model.**
- In theory, resolving the difficulty seems obvious: Managers should design models that are consistent.

Source: Datar/Rajan (2021)  
Managerial Accounting



# Terms to Learn

Book value	Objective function
Business function costs	One-time-only special order
Constraint	Opportunity cost
Decision model	Outsourcing
Differential cost	Product-mix decisions
Differential revenue	Qualitative factors
Full costs of the product	Quantitative factors
Incremental cost	Relevant costs
Incremental revenue	Relevant revenues
Insourcing	Sunk costs
Linear programming (LP)	Theory of constraints (TOC)
Make-or-buy decisions	Throughput margin