9

Strategi Lokasi dan Layout

PowerPoint presentation to accompany
Heizer and Render
Operations Management, Eleventh Edition
Principles of Operations Management, Ninth Edition

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STRATEGI LOKASI

Location Provides Competitive Advantage for FedEx

- Central hub concept
  - Enables service to more locations with fewer aircraft
  - Enables matching of aircraft flights with package loads
  - Reduces mishandling and delay in transit because there is total control of packages from pickup to delivery

The Strategic Importance of Location

- One of the most important decisions a firm makes
- Increasingly global in nature
- Significant impact on fixed and variable costs
- Decisions made relatively infrequently

The Strategic Importance of Location

- Long-term decisions
- Once committed to a location, many resource and cost issues are difficult to change

The Strategic Importance of Location

The objective of location strategy is to maximize the benefit of location to the firm

Options include

1. Expanding existing facilities
2. Maintain existing and add sites
3. Closing existing and relocating

Location and Costs

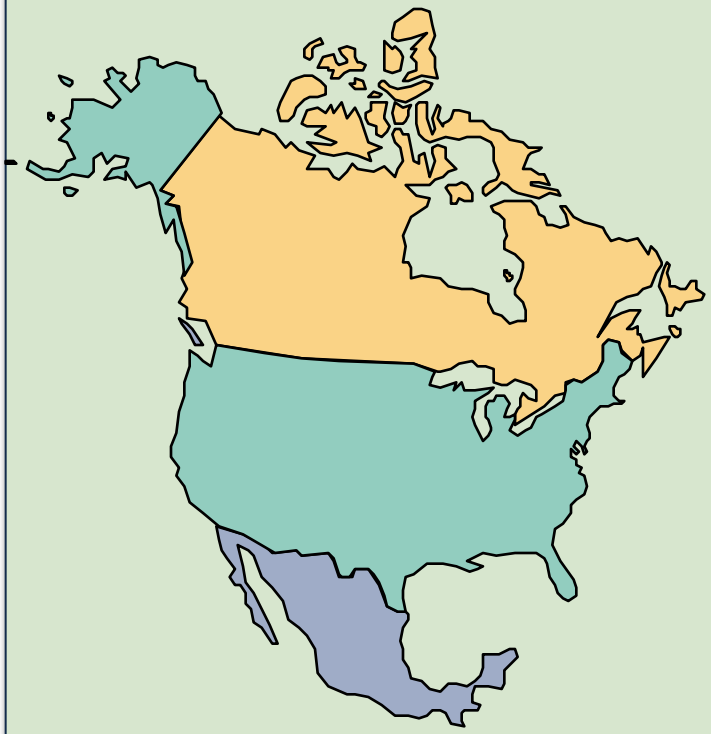
- Location decisions based on low cost require careful consideration
- Once in place, location-related costs are fixed in place and difficult to reduce
- Determining optimal facility location is a good investment

Factors That Affect Location Decisions

1. Globalization adds to complexity
   - Market economics
   - Communication
   - Rapid, reliable transportation
   - Ease of capital flow
   - Differing labor costs
2. Identify key success factors (KSFs)

Location Decisions

Country Decision

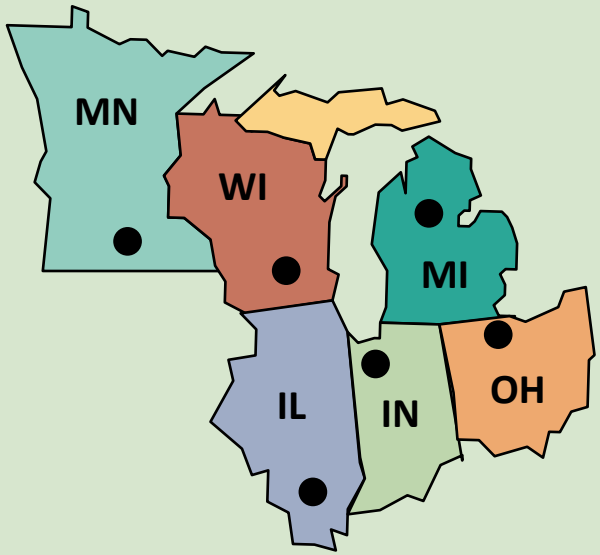


Key Success Factors

1. Political risks, government rules, attitudes, incentives
2. Cultural and economic issues
3. Location of markets
4. Labor talent, attitudes, productivity, costs
5. Availability of supplies, communications, energy
6. Exchange rates and currency risks

Location Decisions

Region/ Community Decision



Key Success Factors

1. Corporate desires
2. Attractiveness of region
3. Labor availability and costs
4. Costs and availability of utilities
5. Environmental regulations
6. Government incentives and fiscal policies
7. Proximity to raw materials and customers
8. Land/construction costs

Location Decisions

Site Decision

Key Success Factors

1. Site size and cost
2. Air, rail, highway, and waterway systems
3. Zoning restrictions
4. Proximity of services/ supplies needed
5. Environmental impact issues

Factors That Affect Location Decisions

- Labor productivity
- Exchange rates and currency risks
  - Can have a significant impact on costs
  - Rates change over time
- Costs
  - Tangible - easily measured costs such as utilities, labor, materials, taxes
  - Intangible - less easy to quantify and include education, public transportation, community, quality-of-life

Factors That Affect Location Decisions

- Political risk, values, and culture
  - National, state, local governments attitudes toward private and intellectual property, zoning, pollution, employment stability may be in flux
  - Worker attitudes towards turnover, unions, absenteeism
  - Globally cultures have different attitudes towards punctuality, legal, and ethical issues

Factors That Affect Location Decisions

- Proximity to markets
  - Very important to services
  - JIT systems or high transportation costs may make it important to manufacturers
- Proximity to suppliers
  - Perishable goods, high transportation costs, bulky products

Factors That Affect Location Decisions

- Proximity to competitors (clustering)
  - Often driven by resources such as natural, information, capital, talent
  - Found in both manufacturing and service industries

Factor-Rating Method

- Popular because a wide variety of factors can be included in the analysis
- Six steps in the method
  1. Develop a list of relevant factors called key success factors
  2. Assign a weight to each factor
  3. Develop a scale for each factor
  4. Score each location for each factor
  5. Multiply score by weights for each factor for each location
  6. Make a recommendation based on the highest point score

Factor-Rating Example

TABLE	Weights, Scores, and Solution				
KSF	**WEIGHT**	***SCORES (OUT OF 100)***		***WEIGHTED SCORES***	
		FRANCE	**DENMARK**	**FRANCE**	**DENMARK**
Labor availability and attitude	.25	70	60	(.25)(70) = 17.5	(.25)(60) = 15.0
People-to-car ratio	.05	50	60	(.05)(50) = 2.5	(.05)(60) = 3.0
Per capita income	.10	85	80	(.10)(85) = 8.5	(.10)(80) = 8.0
Tax structure	.39	75	70	(.39)(75) = 29.3	(.39)(70) = 27.3
Education and health	.21	60	70	(.21)(60) = 12.6	(.21)(70) = 14.7
Totals	1.00			70.4	68.0

Locational Cost-Volume Analysis

- An economic comparison of location alternatives
- Three steps in the method
  - Determine fixed and variable costs for each location
  - Plot the cost for each location
  - Select location with lowest total cost for expected production volume

Locational Cost-Volume Analysis Example

Three locations:

Selling price = $120
Expected volume = 2,000 units

City	Fixed Cost	Variable Cost	Total Cost
Athens	$30,000	$75	$180,000
Brussels	$60,000	$45	$150,000
Lisbon	$110,000	$25	$160,000

Total Cost = Fixed Cost + (Variable Cost x Volume)

Locational Cost-Volume Analysis Example

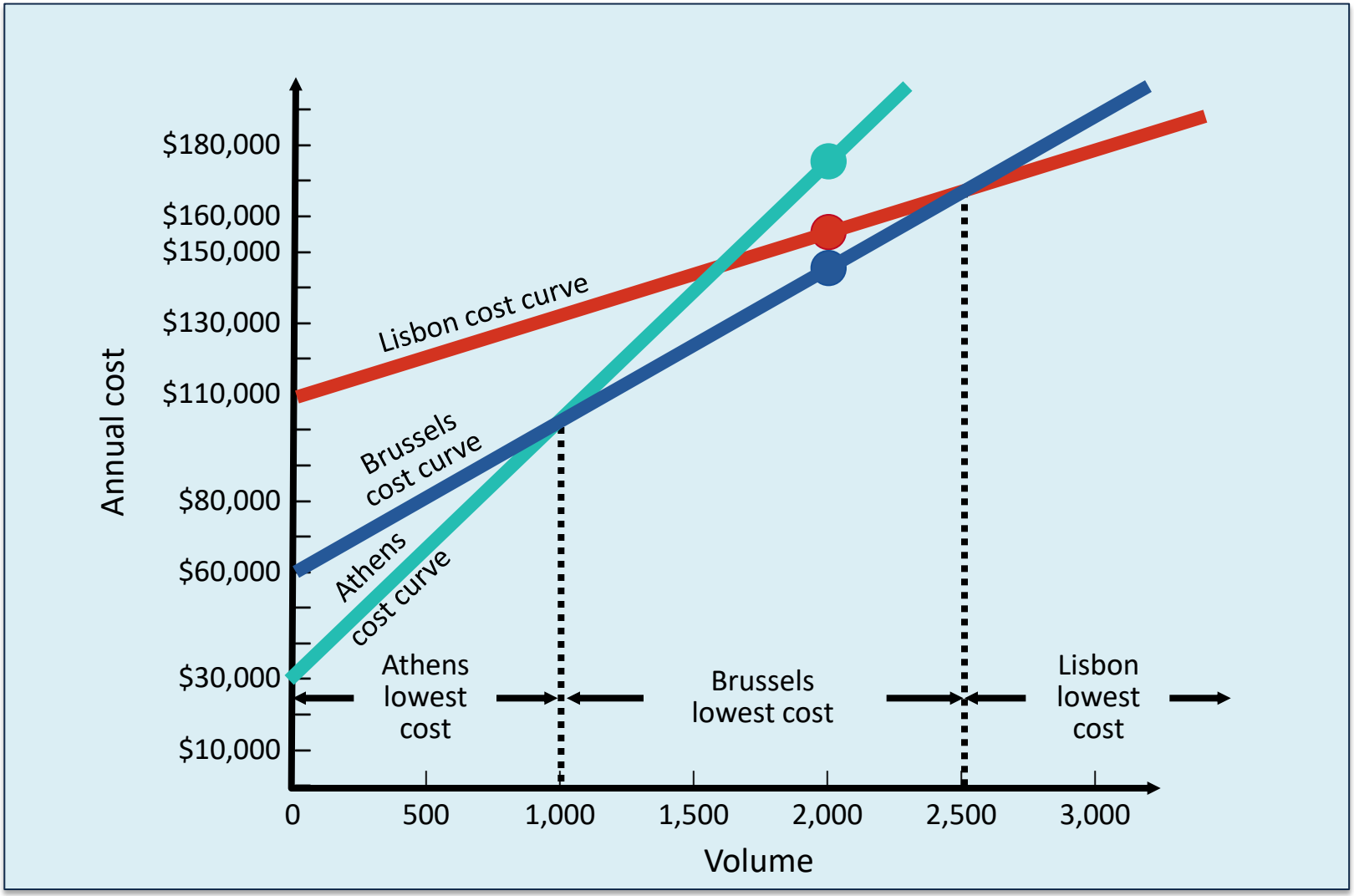
Crossover point – Athens/Brussels

$$
\begin{aligned}
30{,}000 + 75(x) &= 60{,}000 + 45(x) \\
30(x) &= 30{,}000 \\
(x) &= 1{,}000
\end{aligned}
$$

Crossover point – Brussels/Lisbon

$$
\begin{aligned}
60{,}000 + 45(x) &= 110{,}000 + 25(x) \\
20(x) &= 50{,}000 \\
(x) &= 2{,}500
\end{aligned}
$$

Locational Cost-Volume Analysis Example



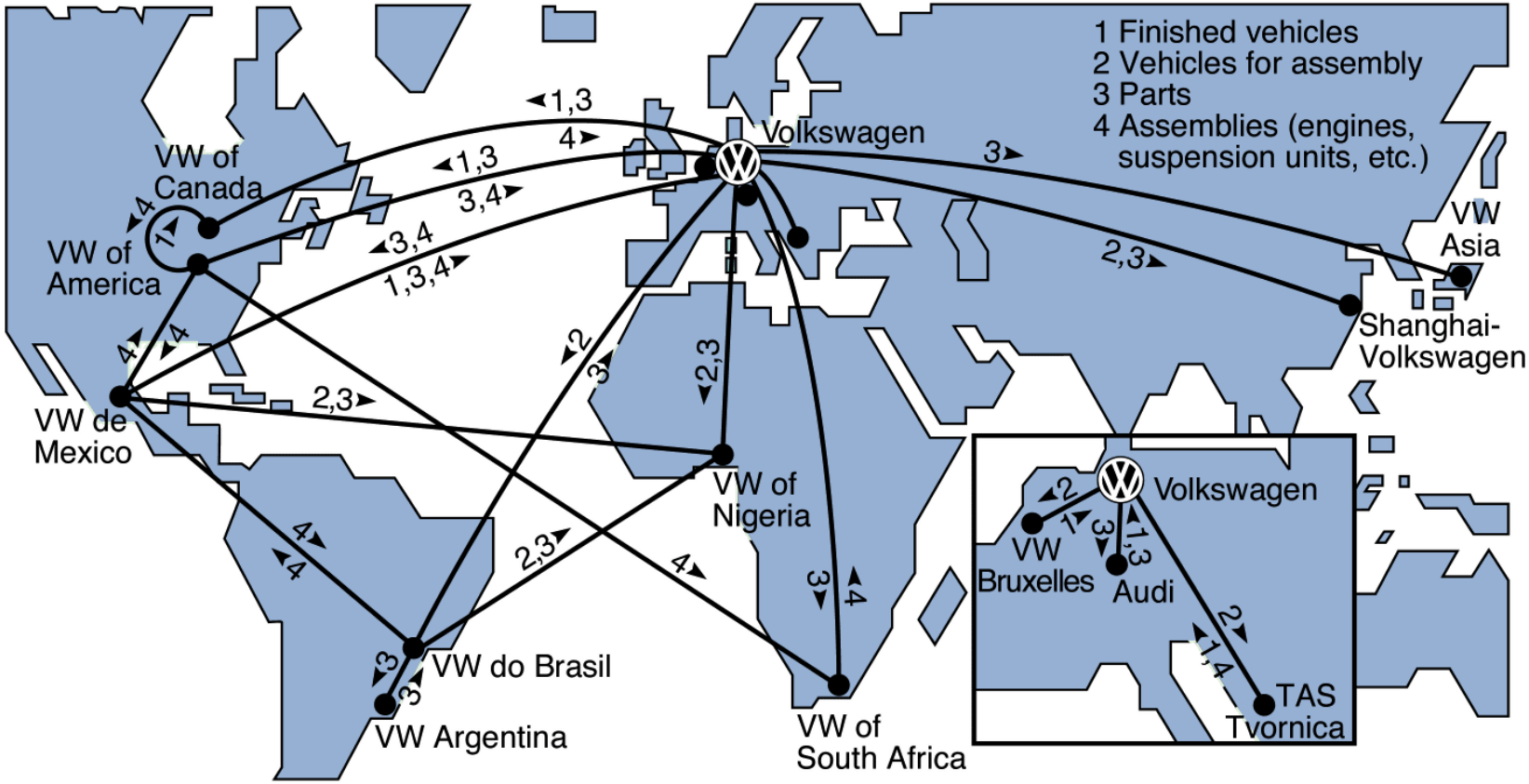
Center-of-Gravity Method

- Finds location of distribution center that minimizes distribution costs
- Considers
  - Location of markets
  - Volume of goods shipped to those markets
  - Shipping cost (or distance)

Transportation Model

- Finds amount to be shipped from several points of supply to several points of demand
- Solution will minimize total production and shipping costs
- A special class of linear programming problems

Worldwide Distribution of Volkswagens and Parts



Service Location Strategy

1. Purchasing power of customer-drawing area
2. Service and image compatibility with demographics of the customer-drawing area
3. Competition in the area
4. Quality of the competition
5. Uniqueness of the firm's and competitors' locations
6. Physical qualities of facilities and neighboring businesses
7. Operating policies of the firm
8. Quality of management

Location Strategies

TABLE	Location Strategies – Service vs. Goods-Producing Organizations

SERVICE/RETAIL/PROFESSIONAL	GOODS-PRODUCING
REVENUE FOCUS	**COST FOCUS**
Volume/revenue Drawing area; purchasing power Competition; advertising/pricing **Physical quality** Parking/access; security/lighting; appearance/ image **Cost determinants** Rent Management caliber Operation policies (hours, wage rates)	**Tangible costs** Transportation cost of raw material Shipment cost of finished goods Energy and utility cost; labor; raw material; taxes, and so on **Intangible and future costs** Attitude toward union Quality of life Education expenditures by state Quality of state and local government

Location Strategies

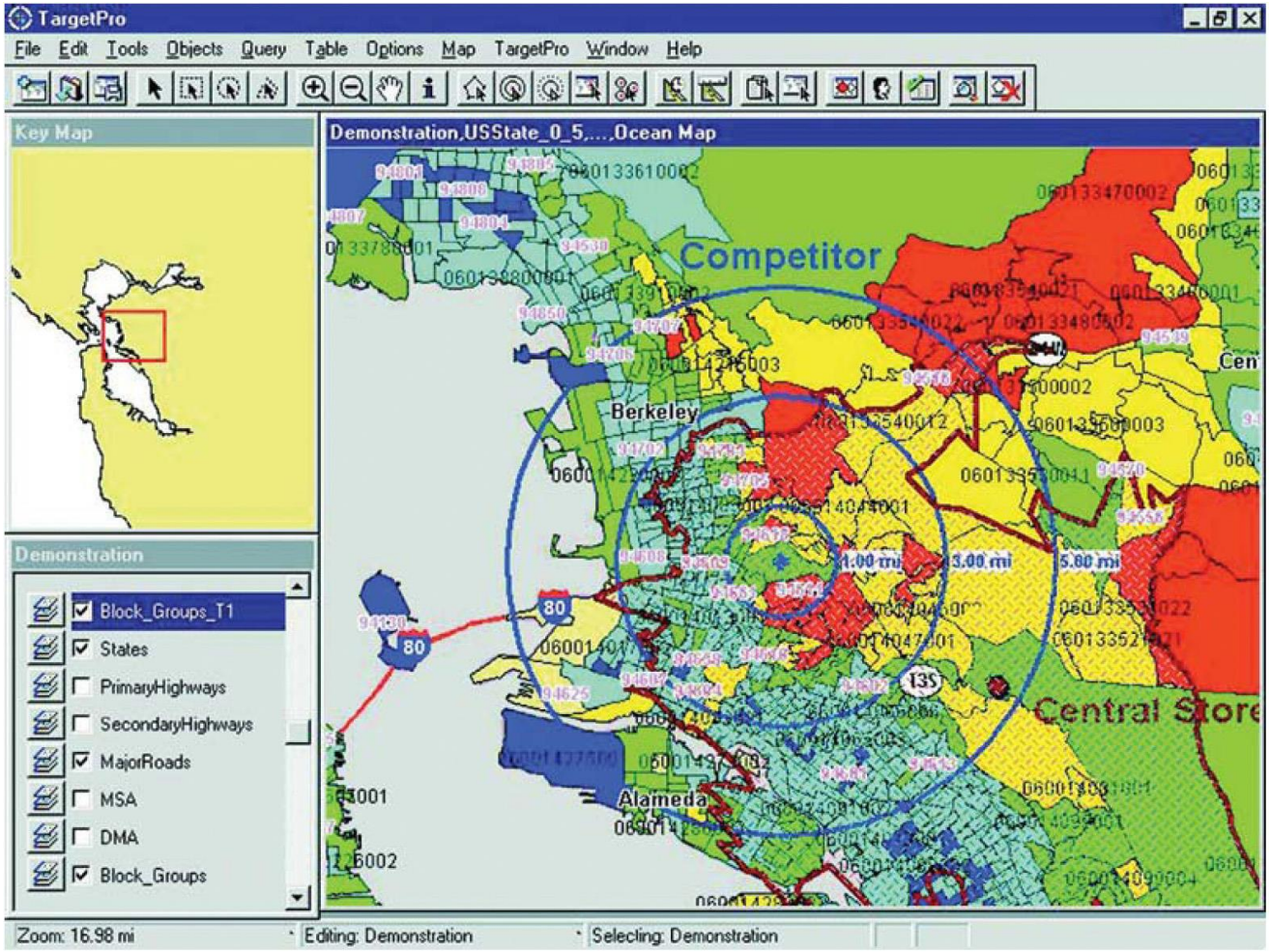
TABLE Location Strategies – Service vs. Goods-Producing Organizations

SERVICE/RETAIL/PROFESSIONAL	GOODS-PRODUCING
TECHNIQUES	**TECHNIQUES**
Regression models to determine importance of various factors Factor-rating method Traffic counts Demographic analysis of drawing area Purchasing power analysis of area Center-of-gravity method Geographic information systems	Transportation method Factor-rating method Locational cost–volume analysis Crossover charts
ASSUMPTIONS	**ASSUMPTIONS**
Location is a major determinant of revenue High customer-contact issues are critical Costs are relatively constant for a given area; therefore, the revenue function is critical	Location is a major determinant of cost Most major costs can be identified explicitly for each site Low customer contact allows focus on the identifiable costs Intangible costs can be evaluated

Geographic Information Systems (GIS)

- Important tool to help in location analysis
- Enables more complex demographic analysis
- Available data bases include
  - Detailed census data
  - Detailed maps
  - Utilities
  - Geographic features
  - Locations of major services

Geographic Information Systems (GIS)



LAYOUT STRATEGIES

Innovations at McDonald's

- Indoor seating (1950s)
- Drive-through window (1970s)
- Adding breakfast to the menu (1980s)
- Adding play areas (late 1980s)
- Redesign of the kitchens (1990s)
- Self-service kiosk (2004)
- Now three separate dining sections

McDonald's New Layout

- Seventh major innovation
- Redesigning all 30,000 outlets around the world
- Three separate dining areas
  - Linger zone with comfortable chairs and Wi-Fi connections
  - Grab and go zone with tall counters
  - Flexible zone for kids and families
- Facility layout is a source of competitive advantage

Strategic Importance of Layout Decisions

The objective of layout strategy is to develop an effective and efficient layout that will meet the firm's competitive requirements

Layout Design Considerations

- Higher utilization of space, equipment, and people
- Improved flow of information, materials, or people
- Improved employee morale and safer working conditions
- Improved customer/client interaction
- Flexibility

Types of Layout

1. Office layout
2. Retail layout
3. Warehouse layout
4. Fixed-position layout
5. Process-oriented layout
6. Work-cell layout
7. Product-oriented layout

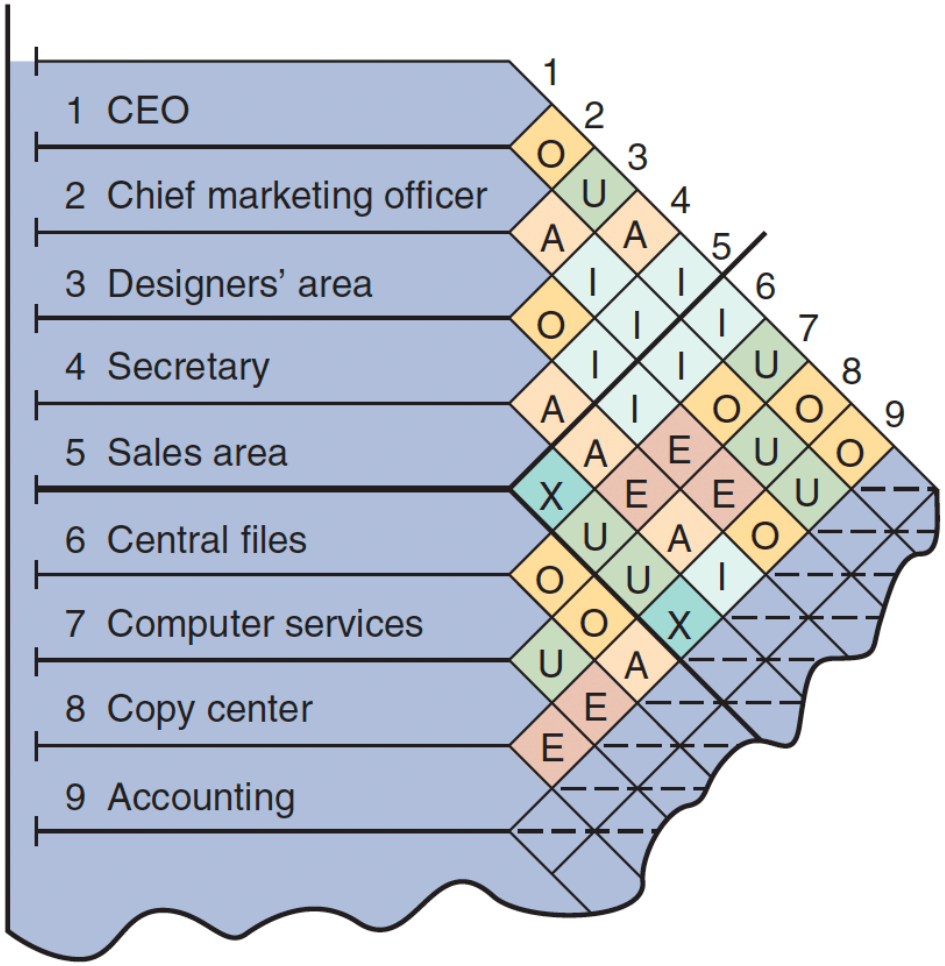
Good Layouts Consider

- Material handling equipment
- Capacity and space requirements
- Environment and aesthetics
- Flows of information
- Cost of moving between various work areas

Office Layout

- Grouping of workers, their equipment, and spaces to provide comfort, safety, and movement of information
- Movement of information is main distinction
- Typically in state of flux due to frequent technological changes

Relationship Chart



Value	CLOSENESS
A	Absolutely necessary
E	Especially important
I	Important
O	Ordinary OK
U	Unimportant
X	Not desirable

Five Helpful Ideas for Supermarket Layout

1. Locate high-draw items around the periphery of the store
2. Use prominent locations for high-impulse and high-margin items
3. Distribute power items to both sides of an aisle and disperse them to increase viewing of other items
4. Use end-aisle locations
5. Convey mission of store through careful positioning of lead-off department

Store Layout

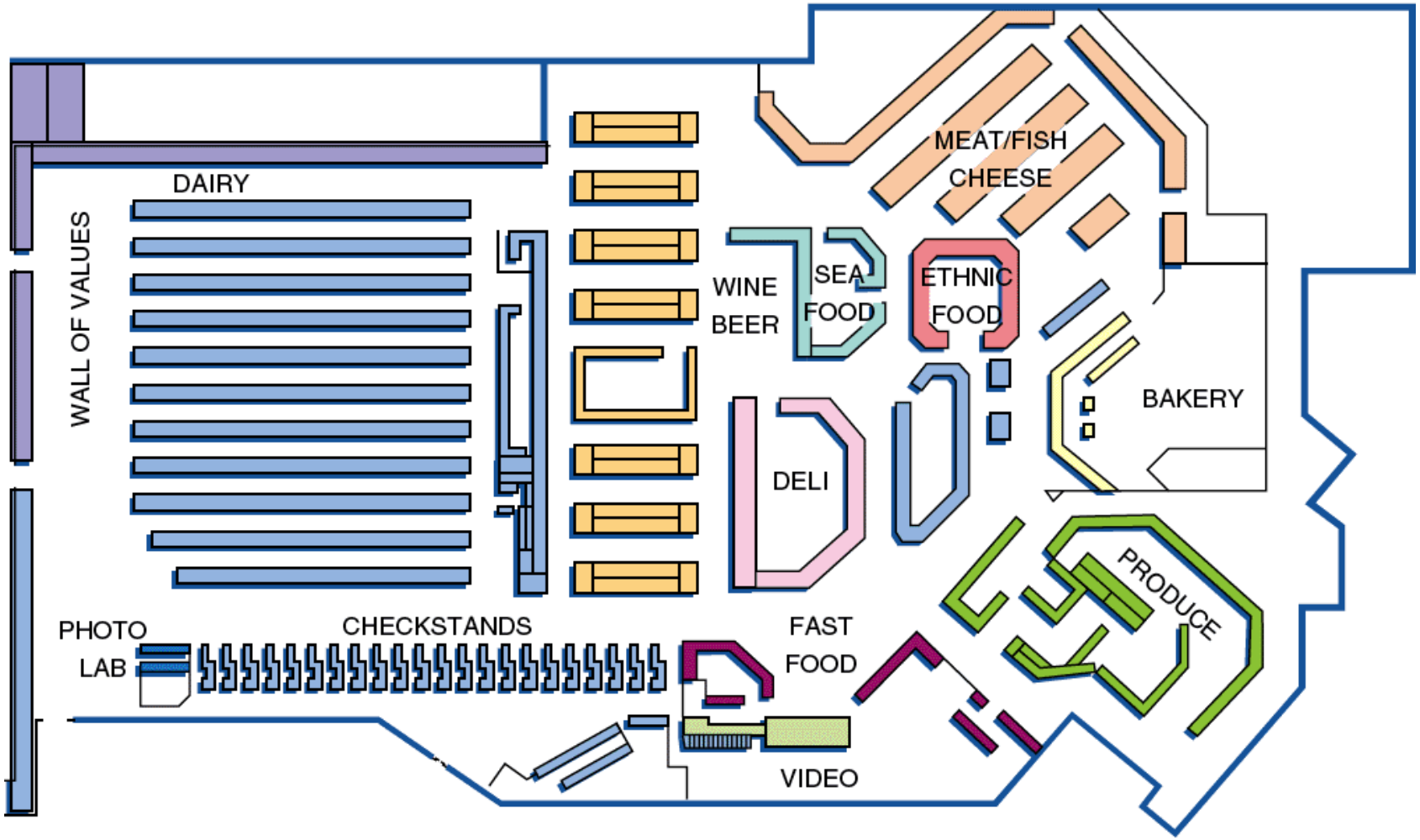
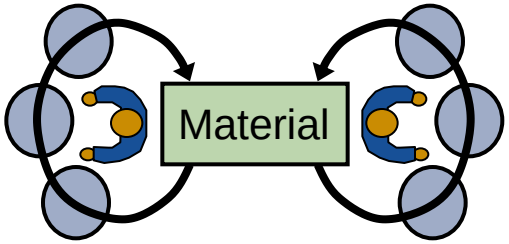


Figure 9.2

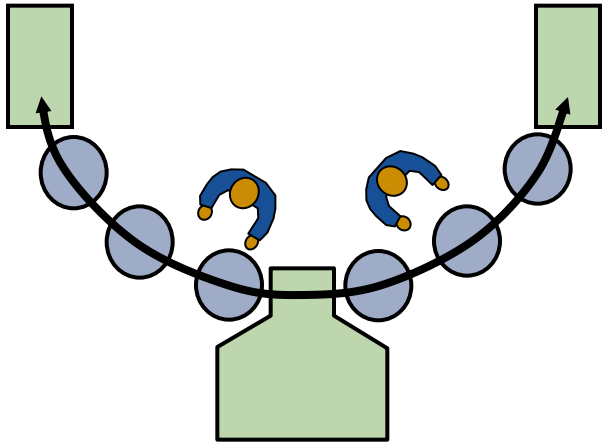
Requirements of Work Cells

- Identification of families of products
- A high level of training, flexibility and empowerment of employees
- Being self-contained, with its own equipment and resources
- Test (poka-yoke) at each station in the cell

Improving Layouts Using Work Cells



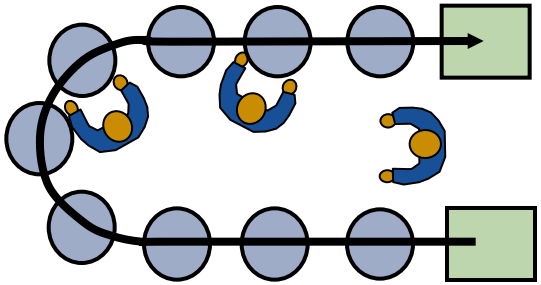
Current layout - workers in small closed areas.



Improved layout - cross-trained workers can assist each other. May be able to add a third worker as additional output is needed.

Improving Layouts Using Work Cells

Current layout - straight lines make it hard to balance tasks because work may not be divided evenly



Improved layout - in U shape, workers have better access. Four cross-trained workers were reduced.

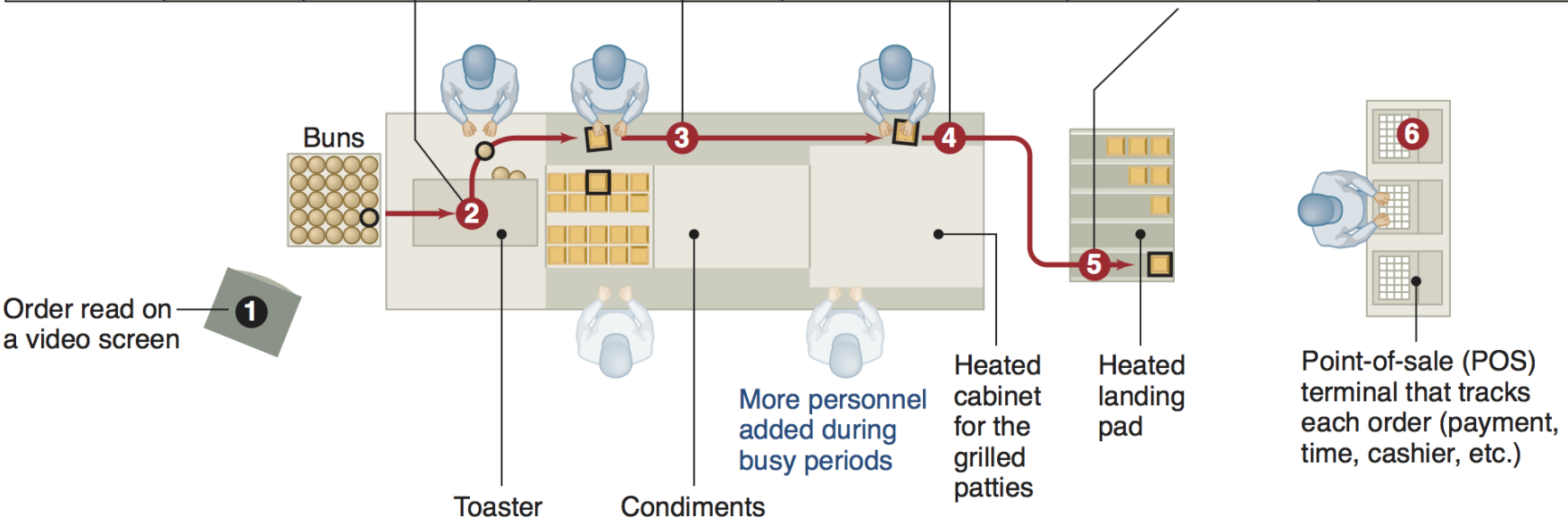
U-shaped line may reduce employee movement and space requirements while enhancing communication, reducing the number of workers, and facilitating inspection

Work Balance Charts

- Used for evaluating operation times in work cells
- Can help identify bottleneck operations
- Flexible, cross-trained employees can help address labor bottlenecks
- Machine bottlenecks may require other approaches

McDonald's Assembly Line

Elapsed time	0:00	0:11	0:31	0:45		1:30
Task time (seconds)		11	20	14	0	45
Task	1. Order	2. Bun toasting	3. Assembly with condiments	4. Wrapping of patty with bun	5. Order picked up immediately to keep it fresh	6. Customer service (order and payment)



Assembly-Line Balancing

- Objective is to minimize the imbalance between machines or personnel while meeting required output
- Starts with the precedence relationships
  - Determine cycle time
  - Calculate theoretical minimum number of workstations
  - Balance the line by assigning specific tasks to workstations


Terima Kasih
ngiyabonga
рахмат
danke
謝謝
teşekkür ederim
Баярлалаа
спасибо
thank you
gracias
dank je
tapadh leat
faafetai lava
vinaka
спасибі
blagodaram
misaotra
matondo
paldies
grazzi
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