Chapter 8

Location Strategies

Outline

- **Global Company Profile:**
  FedEx
- The Strategic Importance of Location
- Factors That Affect Location Decisions
- Methods of Evaluating Location Alternatives
- Service Location Strategy
- Geographic Information Systems

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

Learning Objectives

When you complete this chapter you should be able to:

8.1	***Identify*** and explain seven major factors that effect location decisions
8.2	***Compute*** labor productivity
8.3	***Apply*** the factor-rating method
8.4	***Complete*** a locational break-even analysis graphically and mathematically
8.5	***Use*** the center-of-gravity method
8.6	***Understand*** the differences between service- and industrial-sector location analysis

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 – when demand outgrown capacity – relocate

FedEx – Asian hub in Guangzhou – linking Paris + Memphis hubs

MNCs – Global Operations – mfg, distribution locations

Logistics - near airports can be deciding factor , fast, low-cost transportation of goods and people

The Strategic Importance of Location

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

Factories – if low costs strategy need to meet this long term basis -

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 require careful consideration
- Once in place, location-related costs are fixed in place and difficult to reduce
- Effort spent determining optimal facility location is a good investment

Factors That Affect Location Decisions

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

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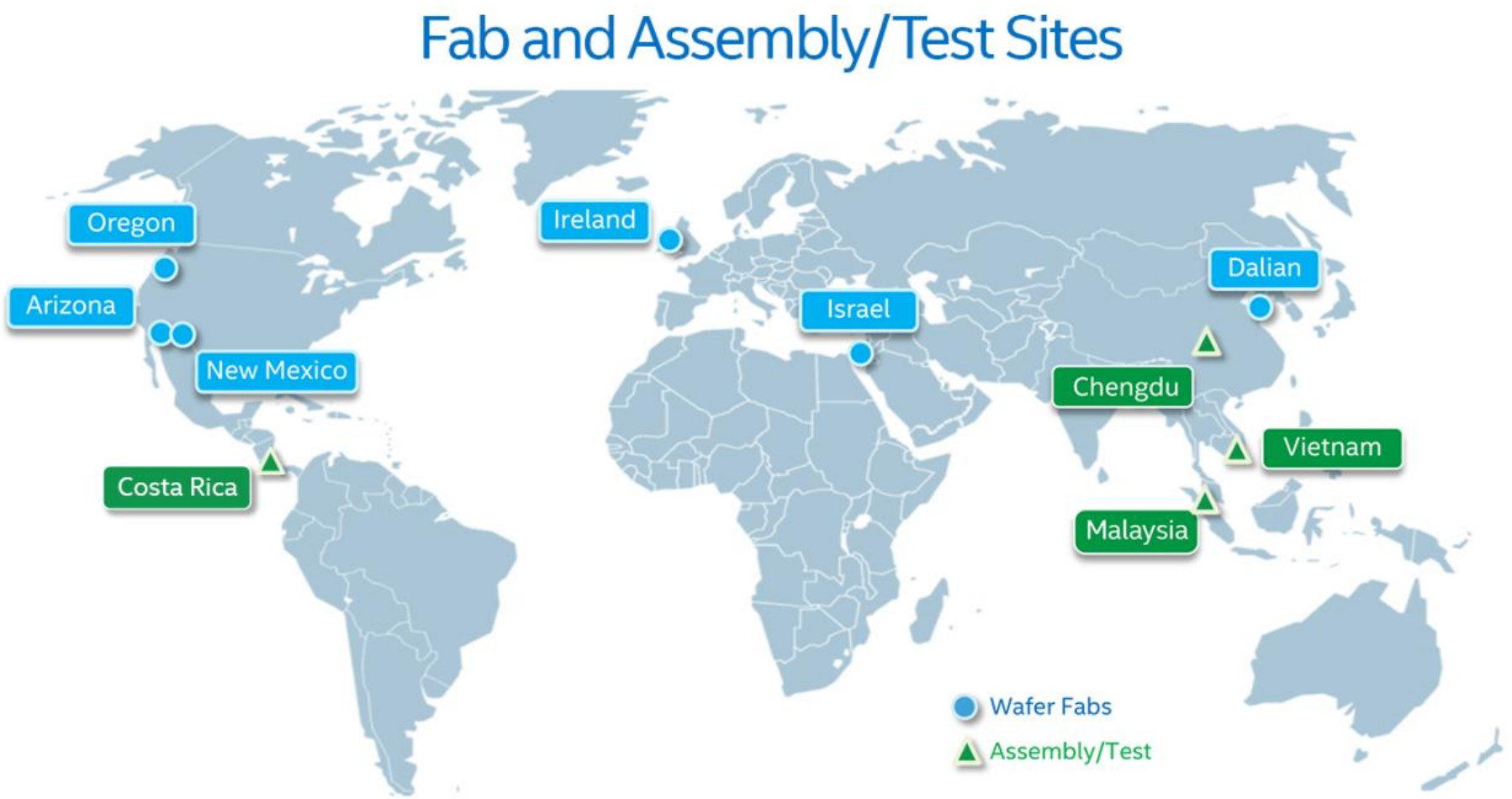
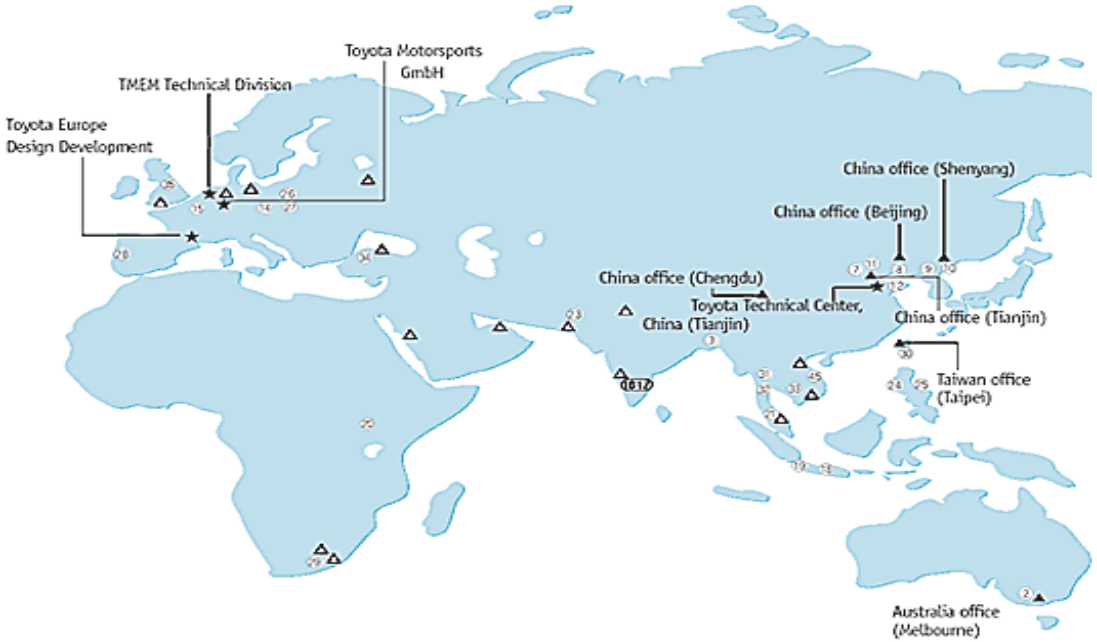
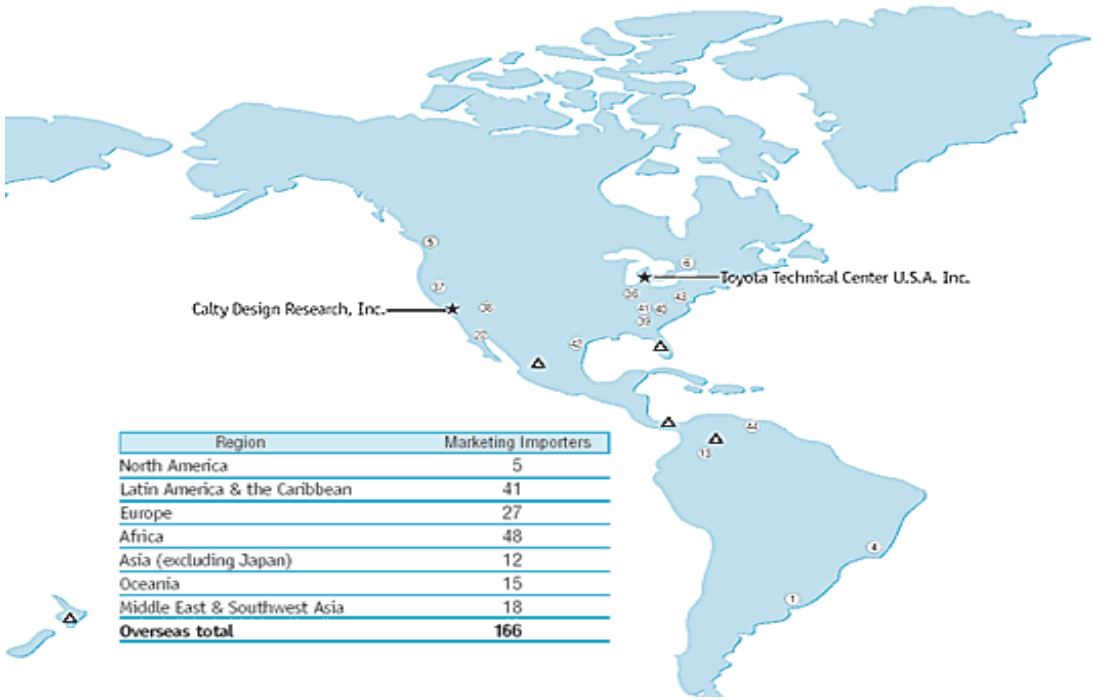

Fab and Assembly/Test Sites
Oregon
Arizona
New Mexico
Ireland
Israel
Dalian
Chengdu
Vietnam
Malaysia
Costa Rica
Wafer Fabs
Assembly/Test





Region	Marketing Importers
North America	5
Latin America & the Caribbean	41
Europe	27
Africa	48
Asia (excluding Japan)	12
Oceania	15
Middle East & Southwest Asia	18
Overseas total	**166**

TOYOTA

Location Decisions – 3 stages

1. Country Decision

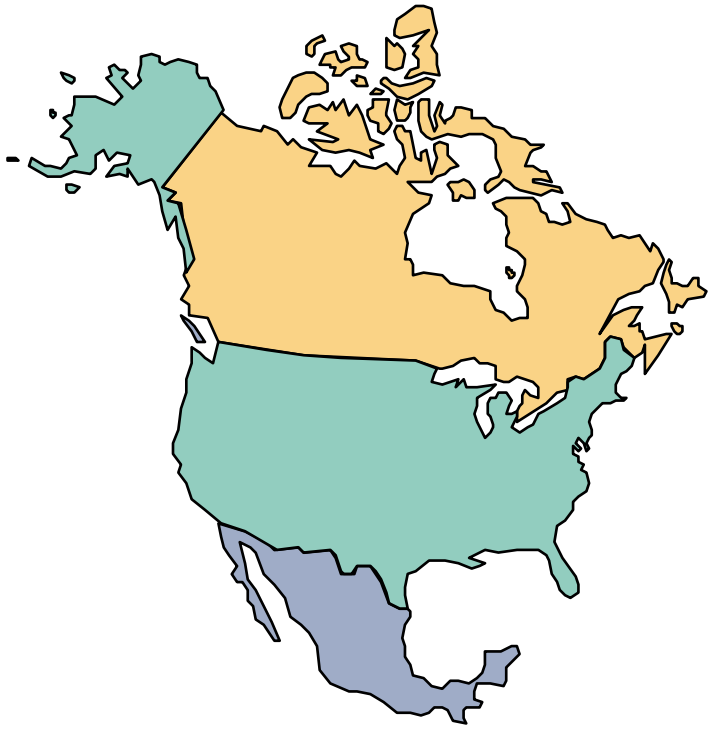


Figure 8.1

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

2. Region/ Community Decision

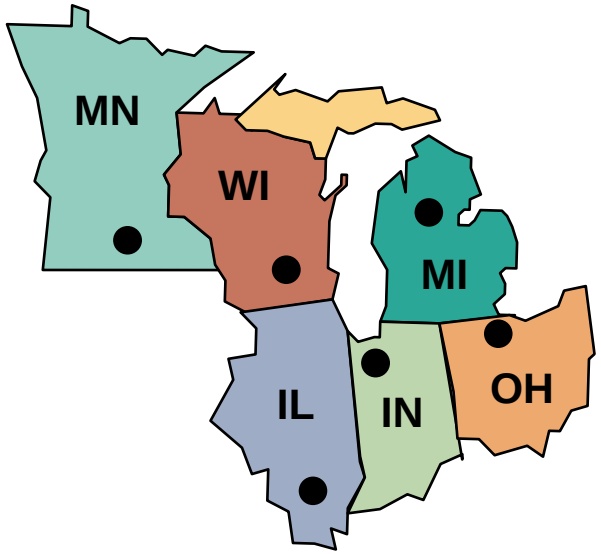


Figure 8.1

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

3. Site Decision

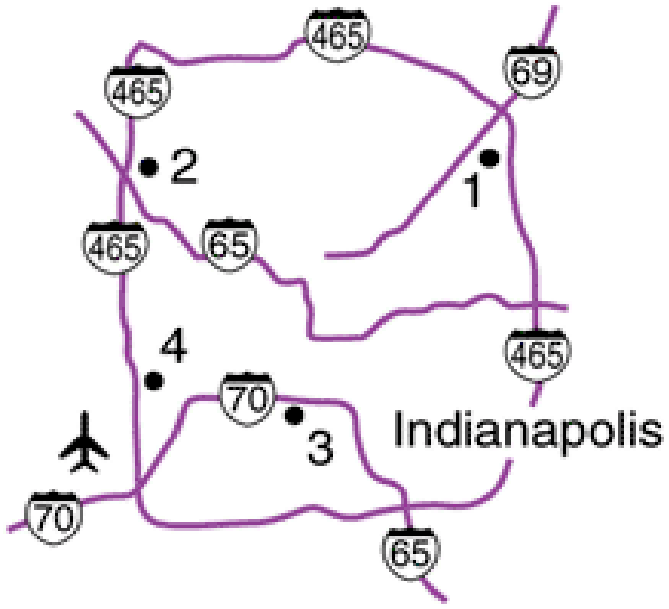


Figure 8.1

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
6. Customer density and demographics

Global Competitiveness Index of Countries – World Economic Forum

TABLE 8.1

Competitiveness of 144 Selected Countries (2014)

COUNTRY	2015 RANKING
Switzerland	1
Singapore	2
U.S.	3
Finland	4
Germany	5
Japan	6
Canada	15
Israel	27
China	28
Russia	53
Mexico	61
Vietnam	68
Haiti	137
Chad	143
Guinea	144

Factors That Affect Location Decisions

- Labor productivity
  - Wage rates are not the only cost
  - Lower productivity may increase total cost

$$\frac{\text{Labor cost per day}}{\text{Productivity (units per day)}} = \text{Labor cost per unit}$$

South Carolina

$$\frac{\$70}{60 \text{ units}} = \$1.17 \text{ per unit}$$

Mexico

$$\frac{\$25}{20 \text{ units}} = \$1.25 \text{ per unit}$$

Factors That Affect Location Decisions

- 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** – not as easy to quantify and include education, public transportation, community, quality-of-life

Factors That Affect Location Decisions

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    utilities, labor, ma
  - **Intangible** – not a
    include education
    community, qualit

Location decisions based on costs alone can create difficult ethical situations

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 toward turnover, unions, absenteeism
  - Globally cultures have different attitudes toward punctuality, legal, and ethical issues

Ranking Corruption

Rank	Country	2015 CPI Score (out of 100)
1	Demark	91
2	Finland	90
3	Sweden	89
4	New Zealand	88
5	Netherlands, Norway,	87
7	Switzerland	86
8	Singapore	85
9	Canada	83
10	Germany, UK	81
16	USA	76
18	Japan	75
17	USA	74
30	Taiwan	62
37	South Korea	56
83	China	37
119	Russia	29

Least Corrupt

Most Corrupt

TRANSPARENCY INTERNATIONAL
the global coalition against corruption

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

TABLE 8.3 Clustering of Companies

INDUSTRY	LOCATIONS	REASON FOR CLUSTERING
Wine making	Napa Valley (U.S.), Bordeaux region (France)	Natural resources of land and climate
Software firms	Silicon Valley, Boston, Bangalore, Israel	Talent resources of bright graduates in scientific/technical areas, venture capitalists nearby
Clean energy	Colorado	Critical mass of talent and information, with 1,000 companies
Theme parks (e.g., Disney World, Universal Studios, and Sea World)	Orlando, Florida	A hot spot for entertainment, warm weather, tourists, and inexpensive labor
Electronics firms (e.g., Sony, IBM, HP, Motorola, and Panasonic)	Northern Mexico	NAFTA, duty-free export to U.S. (24% of all TVs are built here)
Computer hardware manufacturing	Singapore, Taiwan	High technological penetration rates and per capita GDP, skilled/educated workforce with large pool of engineers
Fast-food chains (e.g., Wendy's, McDonald's, Burger King, Pizza Hut)	Sites within 1 mile of one another	Stimulate food sales, high traffic flows
General aviation aircraft (e.g., Cessna, Learjet, Boeing, Raytheon)	Wichita, Kansas	Mass of aviation skills (60–70% of world's small planes/jets are built here)
Athletic footwear, outdoor wear	Portland, Oregon	300 companies, many spawned by Nike, deep talent pool and outdoor culture

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 and total the score for each location
  6. Make a recommendation based on the highest point score

Factor-Rating Example

TABLE 8.4 Weights, Scores, and Solution

KEY SUCCESS FACTOR	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
  1. Determine fixed and variable costs for each location
  2. Plot the cost for each location
  3. 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

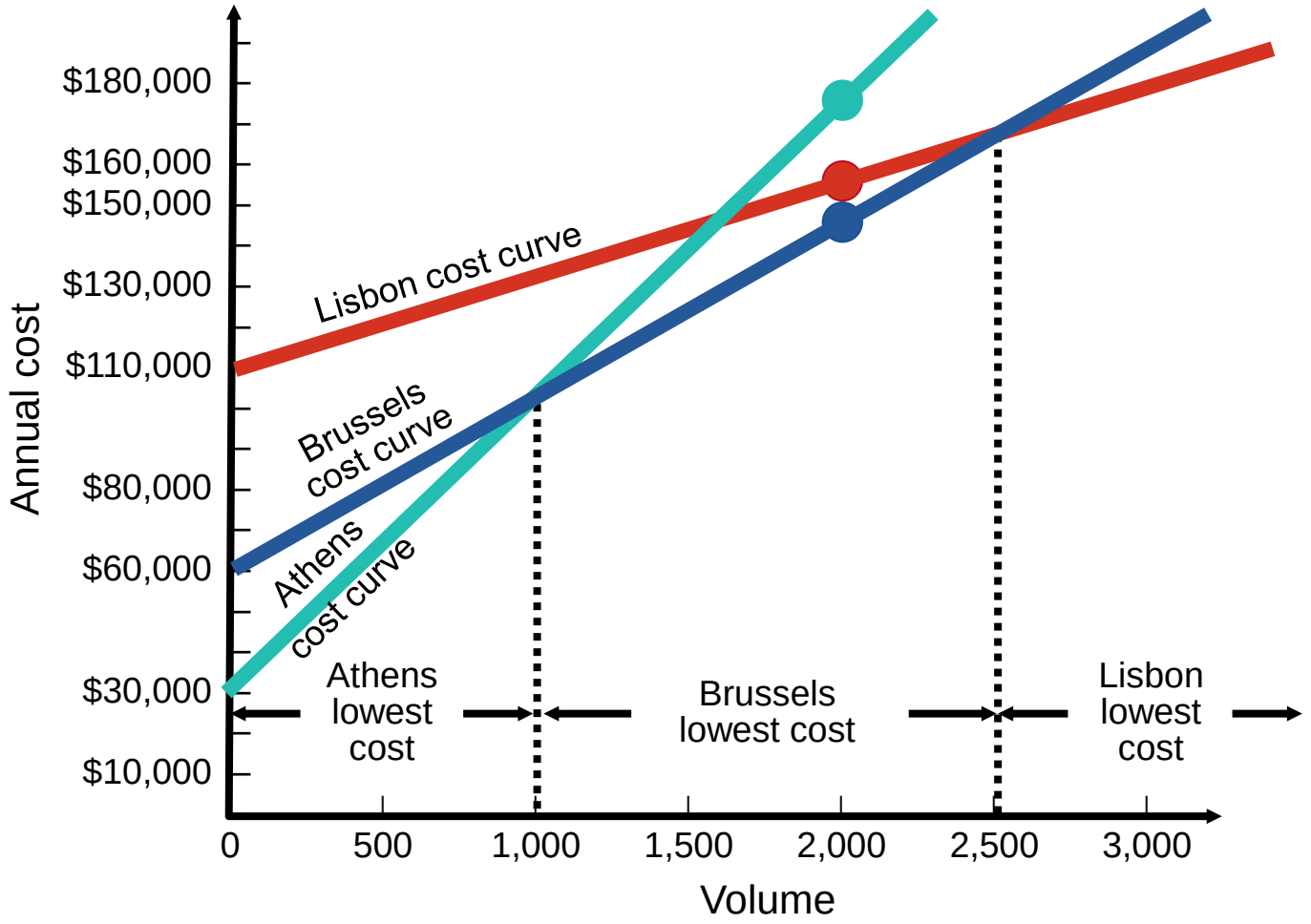
$$
\begin{aligned}
30{,}000 + 75(x) &= 60{,}000 + 45(x) \\
30(x) &= 30{,}000 \\
x &= 1{,}000
\end{aligned}
$$

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

Figure 8.2



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)

Center-of-Gravity Method

- Place existing locations on a coordinate grid
  - Grid origin and scale are arbitrary
  - Maintain relative distances
- Calculate x and y coordinates for 'center of gravity'
  - Assumes cost is directly proportional to distance and volume shipped

Center-of-Gravity Method

$$x\text{-coordinate of the center of gravity} = \frac{\sum_i x_i Q_i}{\sum_i Q_i}$$

$$y\text{-coordinate of the center of gravity} = \frac{\sum_i y_i Q_i}{\sum_i Q_i}$$

where
- x_i = x-coordinate of location i
- y_i = y-coordinate of location i
- Q_i = Quantity of goods moved to or from location i

Center-of-Gravity Method

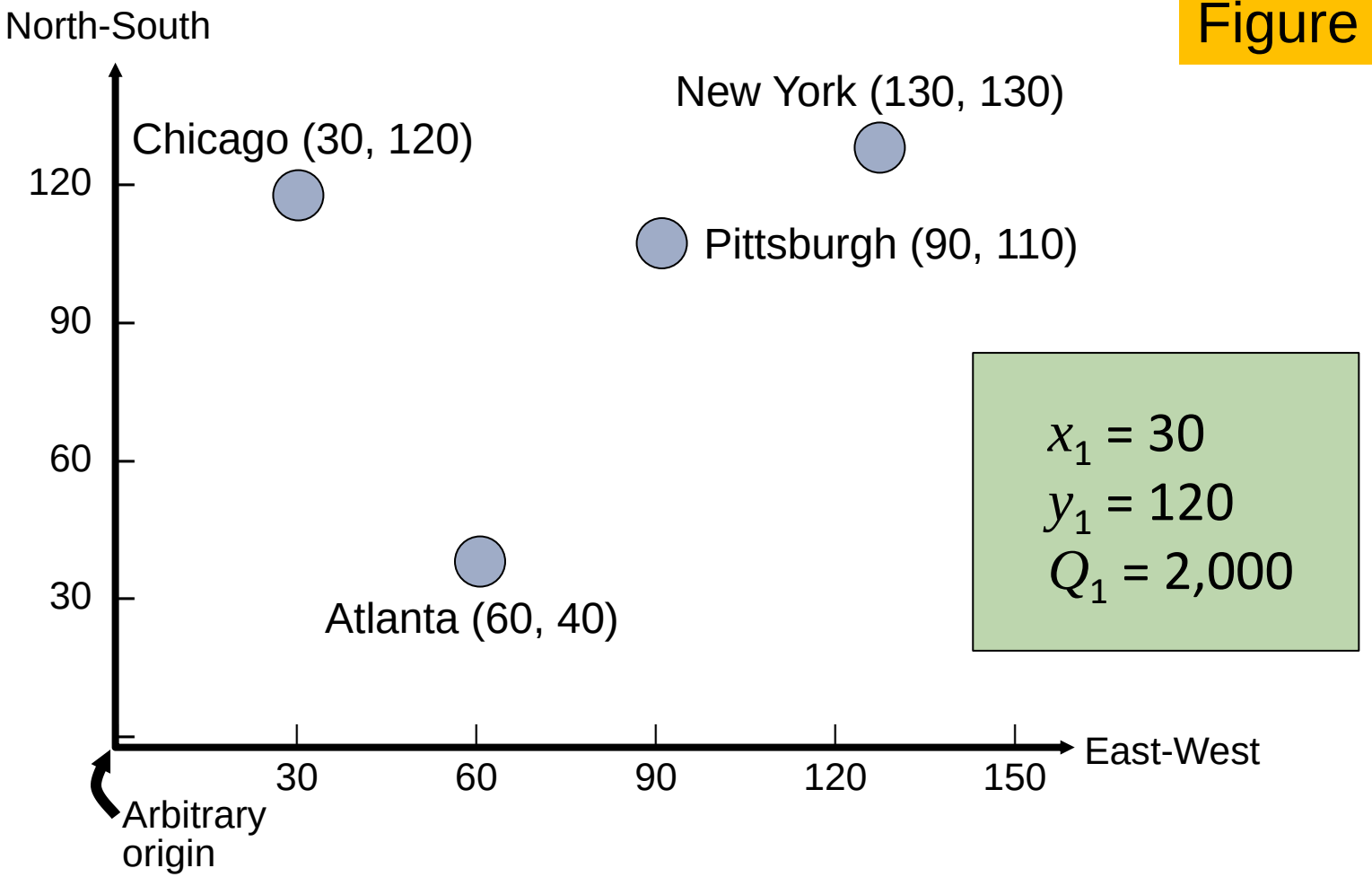
Quain's Discount Department Stores, has store locations shown in Table 6.5: they are currently being supplied out of an old and inadequate warehouse in Pittsburgh, site of first store. The firm wants to find a "central" location to build a new warehouse. We want to apply center-of-gravity method to determine this new location.

TABLE 8.5 Demand for Quain's Discount Department Stores

STORE LOCATION	NUMBER OF CONTAINERS SHIPPED PER MONTH
Chicago	2,000
Pittsburgh	1,000
New York	1,000
Atlanta	2,000

Center-of-Gravity Method

Figure 8.3



Center-of-Gravity Method

Using data in Table 8.5 and Figure 8.3 for each cities we can determine:

$$x\text{-coordinate} = \frac{(30)(2000) + (90)(1000) + (130)(1000) + (60)(2000)}{2000 + 1000 + 1000 + 2000}$$

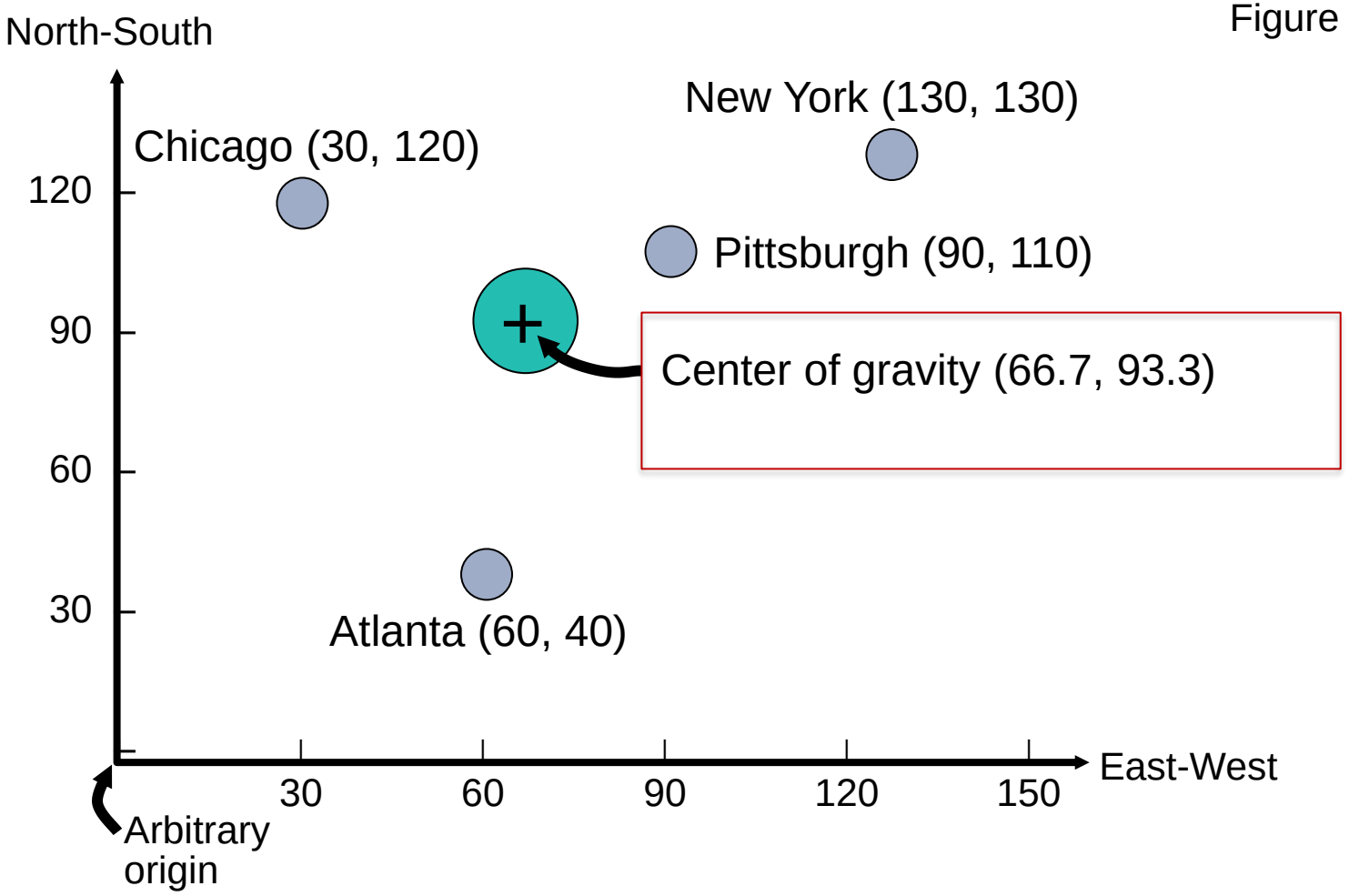
$$= 66.7$$

$$y\text{-coordinate} = \frac{(120)(2000) + (110)(1000) + (130)(1000) + (40)(2000)}{2000 + 1000 + 1000 + 2000}$$

$$= 93.3$$

Center-of-Gravity Method

Figure 8.3

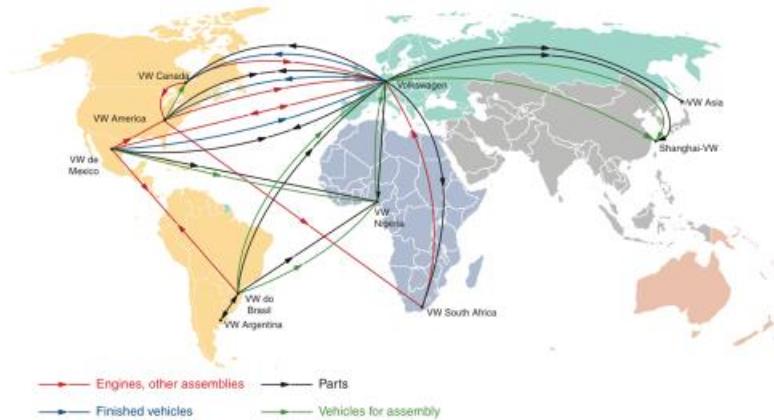


Transportation Model

- 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

Figure 8.4



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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 8.6	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 8.6	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

How Hotel Chains Select Sites

- Location is a strategically important decision in the hospitality industry
- La Quinta started with 35 independent variables and worked to refine a regression model to predict profitability
- The final model had only four variables
  - Price of the inn
  - Median income levels
  - State population per inn
  - Location of nearby colleges

How Hotel Chains Select Sites

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- The final model had only four
  - Price of the inn
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R^2 = .51

51% of the profitability is predicted by just these four variables!

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)