

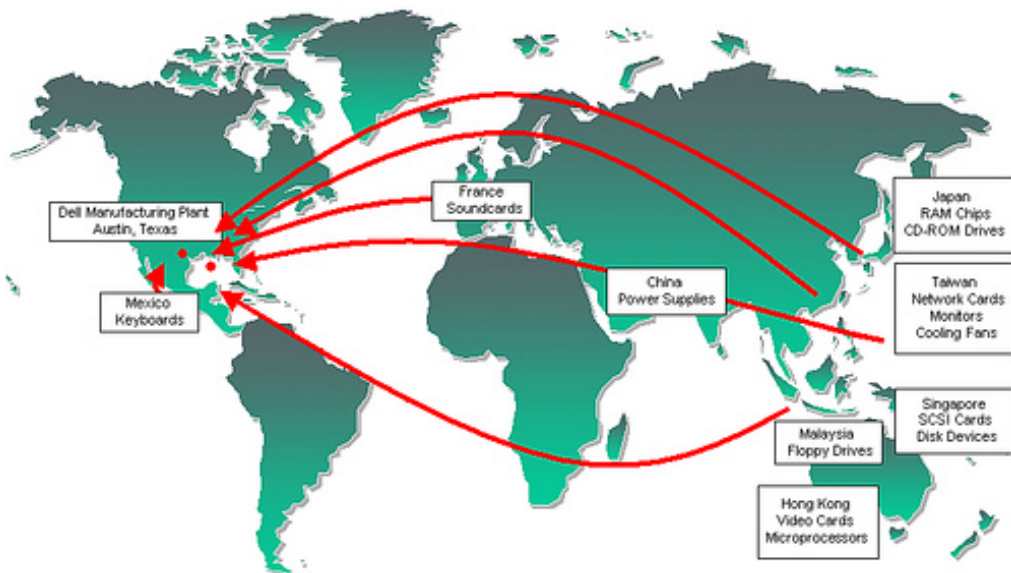
12 | Location Strategies

OM 201

Principles of operations management

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Issues in Dell's Supply Chain



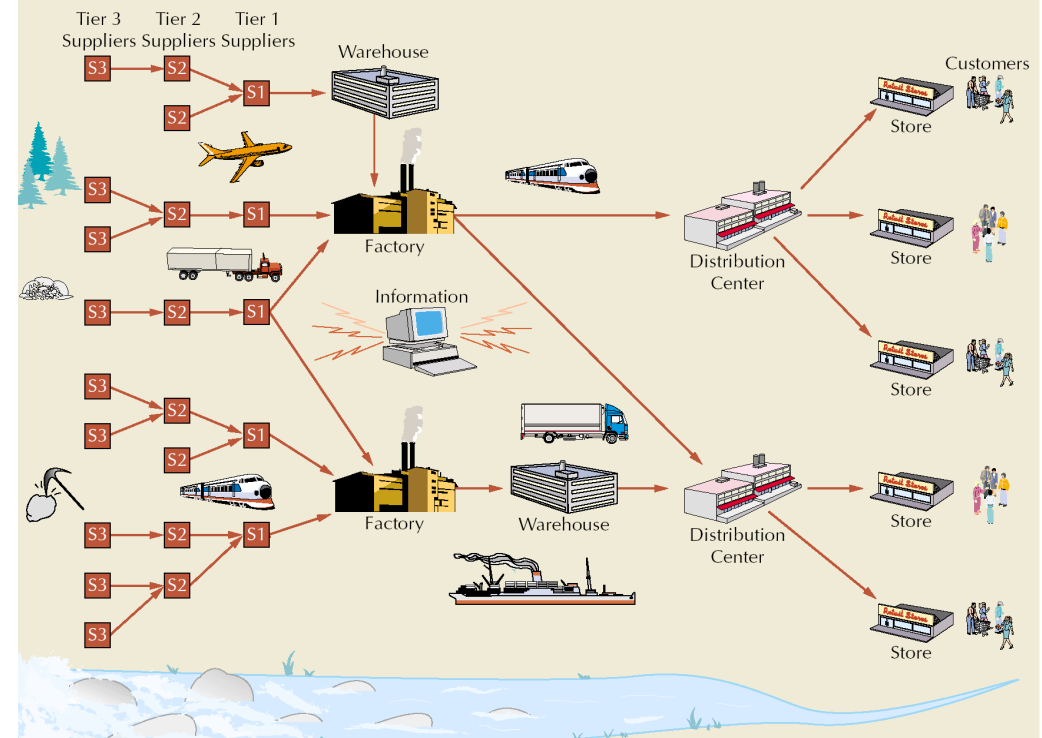
Lecture Outline

Topics

- Issues in Facility Location Strategy
- Break-even analysis
- In class / Case exercises

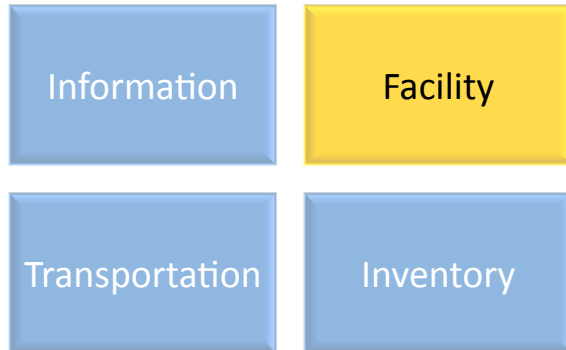
Reference

- Roberta Russell & Bernard W. Taylor, (2009), *Operations Management along the supply chain* (Supplement 7) Ed 6, John Wiley & Son.



Supply Chain Driver

- These drivers determine the performance of a supply chain.
- How these drivers are used in the design, planning, and operation of the supply chain?



Facility Location Competitive Advantages

- The need to produce close to the customer due to time-based competition, trade agreements, and shipping costs.
- The need to locate near the appropriate labor pool to take advantage of low wage costs and/or high technical skills.



Discussion



Suppose you are considering to own and manage a 7-eleven retail ...

- What are issues regarding location for 7-eleven retail?
- What are key information we need to know?

Issues in Facility Location

- Proximity to Customers
- Business Climate
- Total Costs
- Infrastructure
- Quality of Labor
- Suppliers
- Other Facilities
- Free Trade Zones
- Political Risk
- Government Barriers
- Trading Zones
- Environmental Regulation
- Host Community



Plant Location Methodology: Factor Rating Method Example

Procedures

1. Identify factors that are important in the location decision
2. Prioritize the factor by its importance. Each factor is weighted from 0 to 1.00
3. Subjective score (0 to 100) is assigned to each site for each factor
4. Sum up the weighted score.
5. The site with highest score is the most attractive

Location Factor	Weight	Score (0-100)			Weighted Score		
		Site 1	Site 2	Site 3	Site 1	Site 2	Site 3
Labor pool and climate	0.3	80	65	90	24.00	19.50	27.00
Proximity to suppliers	0.2	100	91	75	20.00	18.20	15.00
Wage rates	0.15	60	95	72	9.00	14.25	10.80
Community environment	0.15	75	80	80	11.25	12.00	12.00
Proximity to customers	0.1	65	90	95	6.50	9.00	9.50
Shipping modes	0.05	85	92	65	4.25	4.60	3.25
Air service	0.05	50	65	90	2.50	3.25	4.50
					77.50	80.80	82.05

Plant Location Methodology: Factor Rating Method Example



- Select Location for Boutique Hotel
 - Silom project – smaller size
 - Ladprao project – larger size



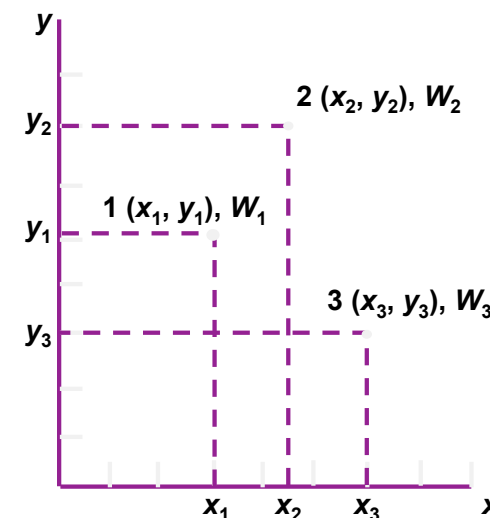
Plant Location Methodology: Center-of-Gravity Technique

- Used for locating single facility that considers existing facilities, the distances between them, and the volumes of goods to be shipped between them.
- Involves formulas used to compute the coordinates of the two-dimensional point that meets the distance and volume criteria stated above.
- The coordinates for the location of the new facility are computed as follows:

$$x = \frac{\sum_{i=1}^n x_i W_i}{\sum_{i=1}^n W_i}, \quad y = \frac{\sum_{i=1}^n y_i W_i}{\sum_{i=1}^n W_i}$$

x, y = Coordinates of the new facility at center of gravity
 x_i, y_i = coordinate of existing facility i
 W_i = Annual weight shipped from facility i

Grid Map Coordinates

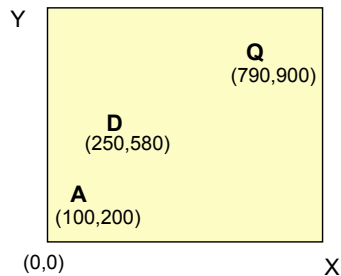


$$x = \frac{\sum_{i=1}^n x_i W_i}{\sum_{i=1}^n W_i}, \quad y = \frac{\sum_{i=1}^n y_i W_i}{\sum_{i=1}^n W_i}$$

where,
 x, y = coordinates of new facility at center of gravity
 x_i, y_i = coordinates of existing facility i
 W_i = annual weight shipped from facility i

Ex 1: Center-of-Gravity Technique

- Several automobile showrooms are located according to the following grid which represents coordinate locations for each showroom.



Showroom	# of Z-mobiles sold per month
A	1250
D	1900
Q	2300

Question:

What is the best location for a new Z-Mobile warehouse/temporary storage facility considering only distances and quantities sold per month?

Plant Location Methodology:

Load-Distance Technique

- Various locations are evaluated using a load-distance value.
- For a single potential location, a load-distance value (ld) is computed as follows:
- Select the location with lowest ld value

$$LD = \sum_{i=1}^n l_i d_i$$

x, y = coordinates of the new facility
 x_i, y_i = coordinate of existing facility
 LD = the load-distance value
 l_i = the load expressed as weight, number of trips, or unit
 d_i = the distance between the new and existing facility

$$d_i = \sqrt{(x_i - x)^2 + (y_i - y)^2}$$

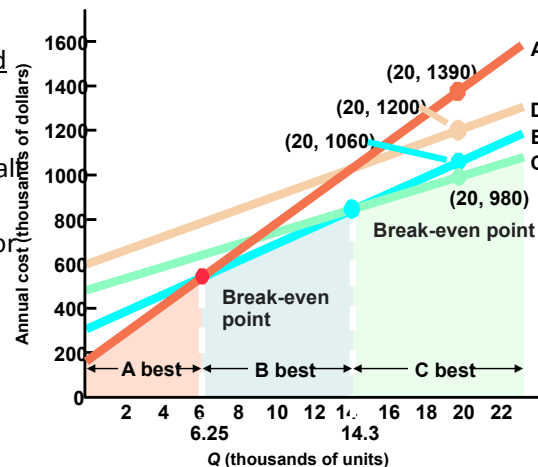
Ex 2: From ex 1, evaluate two possible different sites of warehouse to supply to showroom A, D, and Q. Given that
 Warehouse site 1: $x = 420$ and $y = 450$
 Warehouse site 2: $x = 250$ and $y = 980$

Plant Location Methodology:

Break-even analysis

Basic steps for break-even analysis in facility location decisions:

- Determine variable costs and fixed costs
- Plot the total cost lines (sum of fixed costs and variable costs) for all alternatives in a single graph
- Identify the approximate ranges for sites with lowest total cost
- Solve algebraically for the break-even points over the relevant ranges



Location Methodology:

Break-even analysis Example

Berry Company narrowed their choice for a new distribution center to 3 locations. Fixed and variable costs are as follows.

Describe the appropriate decision plan for this company.

Locations	Fixed cost per year	Variable cost per unit
Rangsit	\$350,000	\$980
Bang Bua Thong	\$1,500,500	\$240
Bann Paew	\$1,100,000	\$500

Location Methodology:

Break-even analysis Example

