Chapter 12  Supply Chain Network Analysis and Design

- The location of logistics and manufacturing facilities is critical, as firms search for new ways to lower costs and improve service to their customers
- An effective and efficient supply chain network can differentiate a firm in the market
Need for Long Range Supply Chain Network Planning

- In the short run, a firm’s supply chain network and the locations of its key facilities are fixed.

- Site availability, leases, contracts, and investments make changing facility locations impractical in the short run.

- In the long run, the design of the overall supply chain network is variable.
Need for Long Range Supply Chain Network Planning

- Strategic Importance of Logistics/Supply Chain Network Design

- All businesses operate in a very dynamic environment in which change is the only constant.

- It is questionable whether any existing supply chain network can be truly up to date.
Need for Long Range Supply Chain Network Planning

- Changing Customer Service Requirements
  - Logistical requirements of customers are changing in numerous ways.
  - Some customers have intensified their demands for more efficient and more effective logistics services.
  - Others are seeking relationships with suppliers who can take logistical capabilities and performance to new heights.
  - Not just customer service requirements may change, the types of customers served may also evolve over time.
Need for Long Range Supply Chain Network Planning

- Shifting Locations of Markets and/or Supply Sources
  - Population shifts
  - Move to JIT-based manufacturing
  - Political or customs union, free trade agreements
  - Continuous search for lower-cost manufacturing locations & sourcing from offshore suppliers
  - Growing economic importance of Asia, especially China
Need for Long Range Supply Chain Network Planning

- Change in corporate ownership, M & A
  - Reconfigure network for new, merged operation

- Cost pressures
  - Take cost out of Supply Chain (e.g. lower manufacturing cost locations)

- Competitive capabilities
  - Improve service or lower cost
  - Exploit new transport alternatives (e.g. locate close to hub of express companies)
Current Trends Governing Site Selection

- Positioning of inventories located at "market-facing" logistics facilities
- General trend toward "disintermediation" of many wholesaler-distributor operations, greater use of "customer direct" delivery
- Fewer, more versatile logistics facilities
- Growing use of "cross-docking"
- Emphasis on access to major airports and/or ocean ports for import and export shipments
- Greater use of providers of third-party logistics services

Figure 12-1  Key Steps in the Logistics/Supply Chain Network Design Process

1. Define process steps
2. Perform logistics/supply chain audit
3. Examine network alternatives
4. Conduct facility location analysis
5. Network/Location decision making
6. Develop implementation plan

Logistics network reengineering team involved in every step
Location selection team
<table>
<thead>
<tr>
<th>NATIONAL/REGIONAL DETERMINANTS</th>
<th>SITE-SPECIFIC DETERMINANTS</th>
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<tbody>
<tr>
<td>Labor climate</td>
<td>Transportation access</td>
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<td>• Truck</td>
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<td>• Water</td>
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<td>Availability of transportation</td>
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<td>Services</td>
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<td>Infrastructure (road, rail, port, law, regulation, border management process, trade &amp; transport impediments)</td>
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<td>Proximity to markets and customers</td>
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<td>Quality of life</td>
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<td>Taxes and industrial development incentives</td>
<td>Inside/outside metropolitan area</td>
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<td>Supplier networks</td>
<td>Availability of workforce</td>
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<td>Land costs and utilities</td>
<td>Land costs and taxes</td>
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<td>Company preference</td>
<td>Utilities</td>
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Optimization Models

- Mathematical procedures that aim to find the “best,” or optimal solution
- Optimization selects the “best” course of action from a number of feasible alternatives
- Simulation models & heuristics models are often used for network optimization
- Relies heavily on computers
- Optimization models have limitations
- A stable, good enough solution can be better than an optimal solution that do not last
Potential Supply Chain Modeling Pitfalls to Avoid

- Short-term horizon
- Too little or too much detail
- Thinking in two dimensions, ignore other factors
- Using published costs instead of real cost
- Inaccurate or incomplete costs
- Use of erroneous analytical techniques