Warehouse Location Strategy

The Impact on Overall Logistics Costs

Sponsored by:

PDC
Precision Distribution Consulting, Inc.

Presented by:

SCPI
Supply Chain Process Improvement, Inc.
‘Hurricane’ Preparedness

Beer Industry Outlook

What must we do to prosper given our market and competition?
Warehouse Location Strategy Defined
Location Strategy is…

A strategic analysis that defines the number, location, and function of network facilities (warehouses or cross docks), equipment and resources while maintaining delivery service levels.

When to Use
- Acquisition
- Facility Relocation
- Facility Consolidation
- Territory Redesign
- Brand Integration

The objective is to minimize total cost over the long term…
Location, Location, Location

- Location drives performance
  - Driving miles; access to roads
  - Equipment utilization
  - Volume; Operational efficiency
  - Workforce
  - Other costs; taxes, utilities

- Advantage of fewer warehouses
  - Volume to Support Automation
  - Combined overhead
  - Less safety stock inventory
  - “Simpler” to manage

“But what is the Best Location and what will our Route Costs be...?”
The Analysis Components

- Simultaneously decide:
  - Facilities; Number, Location, and Size
  - Facility Territories
  - Route Territories

- While Considering:
  - Inbound costs
  - Facility costs
  - Outbound costs
  - Customer service requirements

Which customers together should be served by a route?

Which customer to be served by which branch?

Combined network optimization and routing typically by Truck Type
What’s So Complex About it?

**CASE DEMAND V. DELIVERY FREQUENCY**

Analysis Must Comprehend the Complexity of Delivery Frequency

Bay Demand

Bulk Demand

Strategy For Profit - Tactics For Performance
What To Look For
Strategic Analysis v. Daily Routing

- Daily routing tools aren’t built for open/close analysis and most strategic tools have difficulty modeling routes.
- Look for transportation optimization tools that can effectively model multi-stop routes.

<table>
<thead>
<tr>
<th>Cost Driver</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miles</td>
<td>Per Mile Lease Costs, Fuel, Inbound Transport</td>
</tr>
<tr>
<td>Routes</td>
<td>Driver, Per Unit Lease Costs, Trailer Capacity</td>
</tr>
</tbody>
</table>

- The ability to accurately model current operating costs and constraints in order to understand the impact and benefit of both demand and supply side changes.

Minimizing Routes for Available Equipment Minimizes Costs!
Typical Mistakes

1. Winging it!
2. Static spreadsheet models
3. Separate analysis for facility vs. inbound vs. routes
4. Using standard network optimization tools built for full truck analysis (LogicTools, etc..)
5. Approximate modeling of customers (grouping them before loading into modeling tool).

Inbound separate from Facility separate from Route

Approximate Cost to Serve

Multi-Stop Route Costs

Full Truck Tools

NO

YES
DSD Model – Route Utilization

- Location consolidation, in particular, will add miles and challenge stem time rules of thumb
- Consolidation may provide the volume (and capital?) required to improve route efficiency at the warehouse

High Utilization
Run out Capacity
Before Time

Low Utilization;
Run out Time
before Capacity

High Utilization Modeling Tactics:
- Trailer Options
- Stop Productivity

Low Utilization Modeling Tactics:
- Double Bottom
- Cross Dock
- Stop Productivity

Data
- Sum of Util by Wt
- Sum of Avg Hours
### DSD Modeling - Typical Project Sequence & Timing

<table>
<thead>
<tr>
<th>1/3</th>
<th><strong>Data Collection, Summary, and Process Review</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Understand current route counts and costs by trailer type, prepare model data, geo code customers and prepare baseline costs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1/3</th>
<th><strong>Baseline Network Model</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Current case demand &amp; delivery frequency, modeled with actual cost structures; provides comparison for subsequent runs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1/3</th>
<th><strong>Optimized Baseline Model</strong></th>
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<tbody>
<tr>
<td></td>
<td>To identify short term opportunities Optimized network flows</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1/3</th>
<th><strong>Benchmark Model</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Design year volumes with current network Optimized network flows Basis for alternative evaluation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1/3</th>
<th><strong>Network Alternative Models</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Explore costs and case loads for all candidate locations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1/3</th>
<th><strong>Sensitivity Analysis</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Content is defined in project startup. Examples are fuel, volume, etc...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1/3</th>
<th><strong>Results Evaluation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Cost matrix including fixed and variable annual costs, route attributes, inventory carrying costs, etc... for each scenario</td>
</tr>
</tbody>
</table>

| 1/3 | **Network Recommendation** |
DSD Model - Typical Data Inputs

- **Current state data**
  - Actual Delivery Costs
  - Current Route Count, Miles Driven

- **Customer Data**
  - Location Geo Code
  - Customer Name & Address
  - Case Demand & Frequency
  - Delivery Format, Current Warehouse

- **Item / Facility (Whse/Cross dock)**
  - Facility Location, Capacity, Fixed & Variable Costs, Real Estate Value
  - Product Suppliers, Locations, Inbound / Transfer Costs
  - Inventory Snapshots

- **Delivery Data**
  - Working Hours, Fixed & Variable Costs, Stop Times, Equipment Capacity

![Diagram of DSD Model]

- Operating Costs
  - Fixed Costs
    - Facility
  - Fleet Costs
  - Fleet

- Inbound Costs
  - Product Sourcing
  - Product

- Customer

Strategy For Profit - Tactics For Performance
DSD Modeling: Fit to Capacity and Time

- Demand volume and frequency is satisfied considering:
  - Equipment Costs & Capacity
  - Drive time
  - Stop time
  - Work time
  - Fleet capacity

- Routes are not determined in advance of the modeling; tools utilize road data (e.g. PC Miler) to ensure accuracy of results
DSD Model - Typical Model Outputs

- Multiple scenarios are run for each analysis:
  - Optimize current locations
  - Best single candidate
  - Forced candidate
  - Drop 2, add 1 from candidates

- Scenario outputs include:
  - Cases by location
  - Total Cost / Cost Per Case
    - Route Costs
    - Inbound costs
    - Inventory carrying costs
    - Labor Costs
    - Warehouse Costs
- Route Info
  - Route count by trailer type
  - Route Miles
  - Average stem, travel and stop time
  - Average MPH
  - Territories
  - Trailer Utilization

Territories and Routes are created simultaneously in the software.
Territories are made up of customers assigned to strategic routes.
Routes are created based on cost and time factors.

Route details include average time and distance statistics as well as sample daily routes or Trips with expected quantity and distance considerations.

Scenario Outputs Compared Against Baseline
Warehouse Relocation Case Study
Background - Warehouse Relocation

- Current warehouse operation was out of space and had inefficient layout for expanding brands and volume.
- Additional shared services operation couldn’t fit on site and required additional leased property.
- Employee retention would be a big factor in any relocation decision.
- Questioned current use of cross docks in southern part of territory.

What are best of candidate locations for new combined warehouse & shared service yard?
Location Strategy – Warehouse Relocation

- Analyze fifteen potential sites within 30 miles radius for delivery and shared services costs.
- Determine best site for investment based on operating cost factors along with taxes and other incentives.
- Provided initial center-of-gravity location; proved to be oversimplified by not accounting for dynamics of:
  - Frequency
  - Road speed
  - Cross docks
  - Truck capacity

Two Locations Added After First Round; 10% More Effort to Include
Candidate Costs - Warehouse Relocation

Annual Cost Differences

Candidates
(Option 1 is Current Site)

% From Current

Route Difference to Base ($K)  Total Cost Difference ($K)

Center-Of-Gravity Selection Closest to Option 7
## Results – Warehouse Relocation

### Background
Distributor volume and brand growth had exceeded the capacity of the current warehouse operation. New locations needed to be considered for a new warehouse and shared services location.

### Warehouse Location Strategy
Analyze potential sites for total inbound, route and shared services costs. Determine best site for investment.

<table>
<thead>
<tr>
<th>Results</th>
<th>Previous</th>
<th>Best Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Delivery Warehouses/Truck Yards</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Number of Cross Docks</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Annual Delivery Miles</td>
<td>Base</td>
<td>+2.7%</td>
</tr>
<tr>
<td>Delivery Routes / Cross Dock Routes</td>
<td>Base / Base</td>
<td>-2 / -2</td>
</tr>
<tr>
<td>Annual Logistics Costs Savings</td>
<td>-</td>
<td>2.7%</td>
</tr>
</tbody>
</table>

**Transportation Savings of 2¢ Per Case**
Integration / Consolidation Case Study
Background - Integration / Consolidation

- Current west coast warehouse network included high value real estate that wasn’t very efficient for current operations
- Additional brands had been acquired that included a more efficient leased warehouse and additional fleet – warehouse was being sought by adjacent tenant
- Interest to know impact of selling other smaller owned warehouse
- Traffic and toll costs were a location factor

- How much would costs increase if high value real estate were sold and all brands were delivered on each route truck?
Location Strategy – Integration / Consolidation

- Analyze eight potential sites for delivery and inbound costs. Determine best site for operating efficiency based on operating cost factors along with gain from real estate sale.
- Model integrated business baseline; rebalance territories
- Provide insight on sensitivity to number of warehouses
  - Drop 1
  - Add 1, Drop 1
  - Add 1, Drop 2
  - Etc...

Right Location Can Actually Reduce Costs
## Analysis Results – Integration / Consolidation

### Background
Minimize operating costs impact from closing and selling high value warehouse asset and consolidating DSD network into new or existing facilities.

### Warehouse Location Strategy
Model current sites for integrated business baseline. Analyze eight potential sites for delivery and inbound costs. Determine best site for operating efficiency based on operating cost factors along with gain from real estate sale.

### Results

<table>
<thead>
<tr>
<th></th>
<th>Previous</th>
<th>Best Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Delivery Warehouses</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Annual Delivery Miles</td>
<td>Base</td>
<td>+0.6%</td>
</tr>
<tr>
<td>Delivery Routes</td>
<td>Base</td>
<td>-5</td>
</tr>
<tr>
<td>Annual Operating Costs Savings</td>
<td>-</td>
<td>3.8%</td>
</tr>
</tbody>
</table>

**Close Three, Open One with 4¢ per Case Transportation Savings!**
Acquisition / Consolidation
Case Study
Background - Acquisition / Consolidation

- Distributor had grown through acquisition but had not yet consolidated operations.
- Had new opportunity to add to current territory and wanted to understand cost effect of operations
  - Use current warehouses
  - Consolidate to candidate locations
- Questioned current use of cross docks.

- What are best of candidate locations for new high volume warehouse under current and potential volume?
- Should we continue to use cross docks?
Location Strategy – Acquisition / Consolidation

- Analyze half dozen potential sites for delivery and inbound costs.
- Determine best site for investment based on operating cost factors along with taxes and other incentives.
- Acquisition model inputs vary
  1. Have customer address, case demand and delivery frequency
  2. Have total case demand and approximate county/zip code coverage

Weighted Population Data Used If No Customer Demand/Frequency
## Results – Acquisition / Consolidation

### Background
Wholesaler had grown through acquisition but had not yet consolidated operations. Had new opportunity to add to current territory and wanted to understand cost effect of operations; using current warehouses, and consolidating to several candidate locations.

### Warehouse Location Strategy
Analyze both current and candidate sites to determine:
1. short term gains from territory adjustments within current locations
2. best consolidated location for current volume
3. best consolidated location for current + acquisition volume

### Results

<table>
<thead>
<tr>
<th>Results</th>
<th>Previous</th>
<th>Consolidated (2)</th>
<th>Full Volume (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Delivery Warehouses</td>
<td>Base</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>Volume Increase</td>
<td>Base</td>
<td>n/c</td>
<td>+19.7%</td>
</tr>
<tr>
<td>Annual Delivery Miles</td>
<td>Base</td>
<td>+4.0%</td>
<td>+20.6%</td>
</tr>
<tr>
<td>Delivery Routes</td>
<td>Base</td>
<td>-3%</td>
<td>+13%</td>
</tr>
<tr>
<td>Annual Operating Costs Savings</td>
<td>-</td>
<td>2.5%</td>
<td>1.6%</td>
</tr>
</tbody>
</table>

Short Term and Long Term Savings Identified From New Location
Final Thoughts
Summary

- The complexity of operational improvements or location changes begs for thorough evaluation
  - Acquisition
  - Facility Relocation
  - Facility Consolidation
  - Territory Redesign
  - Brand Integration
- The tools exist to accurately analyze your costs
- Take the time and do it right; putting your operations in the right location will save you every day!

Thank You
Thank You
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