Managing Supply Chain Risk in the Sourcing Process

Robert (Bob) Carroll
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Key Take Aways

• Supply Chain risk is a journey
  – "Perfection is not attainable, but if we chase perfection we can catch excellence." *Vince Lombardi*
  – “Sixty years ago I knew everything; now I know nothing; education is a progressive discovery of our own ignorance.” *Will Durant*

• Finding and using the best available tool is key to any job
  – "Give me six hours to chop down a tree and I will spend the first four sharpening the axe." *Abraham Lincoln*
Defense Logistics Agency (DLA)

Business Overview
- 131,000 requisitions per day
- 10,000 contract actions per day
- $44 billion annual sales

5M items, 9 Supply Chains
- Land
- Maritime
- Aviation
- Fuel/Energy
- Subsistence
- Medical
- Clothing & textiles
- Construction & equipment
- Industrial hardware

Business environment
- Demand uncertainty due to changing budgets, maintenance programs, and world events
- Critical items stocked regardless of demand
- Many low production, long lead-time items
Hardware Focus

• 4 Million items within 5 Supply Chains
  – ~1.4M with demand in past year
  – ~800K actively planning to stock
  – ~65K statistically forecastable

  ~600K Buy on demand Non-Stocked
  ~735K Non-Forecastable Stocked

• Examining the risks and sourcing strategies
  – ~600K Buy on Demand Non-Stocked (i.e., special order)
  – ~735K Non-forecastable Stocked
  – ~65K Forecastable Stocked
Assessment of Active Items

- Infrequent demand: ~1.1 million items
- Frequent demand: ~350,000 items

Infrequent and highly variable demand lead to large forecasting errors.

Frequency of demands:
- Infrequent demand
- Frequent demand

Investment and customer support risk:
- High variability
- Low variability
Segmenting by Forecastability

- **Non-Forecastable**
  - Low Frequency Model
    - ~1.1 million items
    - Infrequent demand

- **Forecastable**
  - High Frequency/High Variability Model
    - ~285,000 items
    - Frequent demand
    - High variability
  - Forecasting Suite
    - ~65,000 items
    - Frequent demand
    - Low variability

Need inventory control methods appropriate for each segment of inventory
Risks Associated with Sourcing

• What are they?
  – Fraud
  – Pricing
  – Performance
  – Minimums
  – Long Supply
  – Long lead-times
  – Non-conforming parts
  – Inability to find source
## DLA Sourcing Strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Planning</th>
<th>Order</th>
<th>Stock</th>
<th>Distrib</th>
<th>Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Depot Direct</strong></td>
<td>Government</td>
<td>Government (Pull)</td>
<td>Government Stores &amp; Owns</td>
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<td>Govt Sets Return Levels</td>
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<tr>
<td><strong>Customer Direct</strong></td>
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<tr>
<td><strong>Vendor Managed Inventory (VMI)</strong></td>
<td>Industry</td>
<td>Industry (Push)</td>
<td>Government Stores &amp; Industry Owns</td>
<td>Govt</td>
<td>Varies by Contract</td>
</tr>
<tr>
<td><strong>Supplier Initiated Orders (SIO)</strong></td>
<td>Govt sets Max SOH; Industry the remaining</td>
<td>Industry (Push)</td>
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<td><strong>SIO Performance Based Logistics (PBL)</strong></td>
<td>Industry paid regularly on performance</td>
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# DLA Sourcing Strategies

## Approach

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### Buy on demand/ Special order
- ~600K
- Customer Direct
- ✓ ✓ ✓ ✓ ✓ ✓ ✓

### Non-Forecastable Low Frequency
- ~450K
- Depot Direct
- ✓ ✓ ✓ ✓ ✓ ✓ ✓

### Non-Forecastable Freq/High Var
- ~285K
- Depot Direct
- ✓ ✓ ✓ ✓ ✓ ✓ ✓

### Forecastable
- ~65K
- Depot Direct
- ✓ ✓ ✓ ✓ ✓ ✓ ✓

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## DLA Sourcing Strategies

- Buy on demand/ Special order
- Non-Forecastable Low Frequency
- Non-Forecastable Freq/High Var
- Forecastable

## Risk Types

- Fraud
- Pricing
- Performance
- Minimums
- Long Supply
- Lead Times
- Non-Conform
- No Source

## SIO - Trans

## SIO - PBL
## DLA Sourcing Strategies

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Significant majority of item and procurement workload and more difficult to source and support … greater sourcing innovations/options needed
Summation

- Flexible and fluid relations between Govt/Industry
- Sourcing strategies help mitigate Supply Chain risks
- Finding the ‘right’ strategy is key
- No single strategy always right
- No right strategy always right … constant monitoring and adjustment required
- Item populations most in need of new sourcing options to reduce risk are buy on demand/special orders & non-forecastable DLA Direct/stocked items
Infrequent Demand

- Problem to be solved: Inventory control for infrequent, irregular demand
- Solution:
  - Order when inventory gets down to some % of Peak demand
  - Order a quantity based on unit price

\[
\text{Min} = (\text{Price-based mult.}) \times (\text{Peak demand})
\]

\[
\text{Max} = \text{Min} + (\text{Price-based order qty.})
\]

How to get good values for multipliers & order quantity

20% of innovation

80% of innovation
Frequent Highly Variable Demand

New Methods Use Empirical Distributions

- Inter-arrival time histogram (for frequent demand)
- Demand size histogram
- Leadtime demand probabilities
- Inventory position probabilities

Optimization

Stock Levels
Min Level
Max Level

NextGen

More accurate metrics tradeoff yields better business outcomes

Each step retains important information
Using Trade Off Curves

Single decision point ... trade off inventory, customer service, and buyer workload to fit business objectives

15% inventory $ reduction
17% wait time reduction
32% workload reduction

6% inventory $ reduction
23% wait time reduction
56% workload reduction