Designing Sourcing and Logistics for Flexibility and Innovation

www.bostonstrategies.com
(1) (781) 250-8150

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Summary

- Convergence of procurement and operations
  - The Boston Logistics – EIU study
  - A sea of change – key drivers
  - Outsourcing – implications
  - A sea of change – other drivers
  - Criticality of procurement
  - The new face of purchasing
  - From procurement to supply chain
  - CRM-SRM linkage
  - Early supplier involvement
  - “Lean-ing” into the suppliers
  - Supplier consolidation
  - Partnering
  - Acquiring new skill sets
  - Building the center-led organization

- The new logistics optimization: flexibility
  - Flexible product design
  - Flexibility in the supplier chain
  - Flexible network design
  - Flexible supply: how much to consolidate
  - Flexible supply: modeling the supplier split
  - Flexible inventory – service trade-off
  - Flexible inventory – multi-echelon
  - Dynamic delivery – cross-docking
  - Cross-docking: which SKUs?
  - Dynamic routing – mapping zones

- The new procurement optimization: contracts with options
  - Making complex decisions involving risk
  - Typical causes
  - Term options
  - Pricing options – types of indexation
  - Terms and conditions (Ts & Cs)

- Measuring flexibility
  - Sourcing and supply chain metrics
  - Supply chain flexibility metrics
  - New concepts in measuring flexibility
  - Flexibility imperatives
What’s Driving Your Company

Objectives
- Lower cost?
- Stimulated innovation?
- Globalized supply base?

Strategic Purpose
- Market share?
- Technological leadership?
- Access to resources?

Stakes
- Lower profits?
- Lower market capitalization?
- Premature exit strategy?
Convergence of Procurement and Operations
Boston Logistics-Economist Study

- 358 respondents, 45 countries
  - 56% from Europe
  - 26% from Americas
  - 18% from Asia
- Procurement & supply focus
  - 45% in procurement
  - 81% with influence on supplier management strategies
- Broad representation
  - 15+ industry sectors
  - Mix of small, medium and large enterprises
- Interviews with thought leaders in industry, services, and academia

Source: Economist Intelligence Unit, April 2005
A Sea Change – Key Drivers

“Which business drivers are likely to have the most influence on your company’s purchasing strategies in the next 10 years?”

- Globalization
  - Low-cost country sourcing
  - Growth markets
- Cost leadership
  - A bid qualifier, not an order winner
  - Even the high-end
- Innovation
  - Shorter product lifecycles
  - Technology / R&D
- Outsourcing
  - Core competency
  - Faster time to market

Source: Economist Intelligence Unit data, April 2005
Outsourcing – Implications

Increasing the amount of external spend

- Traditional outsourcing
  - Call Centers
  - Logistics
  - Manufacturing
  - I.T.

- Emerging off-shoring models
  - Research & Development
  - Diagnostic testing
  - Lab services
  - Procurement

“This transforms Purchasing’s job from transacting orders to running virtual factories”
– Barbara Kux, CPO Royal Philips

Sources: EIU, Nasscom
"Which drivers are likely to have the most influence on your company’s purchasing strategies in the next 10 years?"

- **Service focus**
  - More product-services
  - Better methods and technologies
- **Industry consolidation**
  - Booming 90’s
  - 2003-2005 rebound
  - Leveraging operational synergies / shareholder value
- **Industry-specific trends**
  - Regulatory compliance
  - Customer intimacy

**Drivers**

- Globalization: 49%
- Cost leadership: 41%
- Innovation: 29%
- Outsourcing: 25%
- Service focus
- Industry consolidation
- Regulatory compliance
- Customer intimacy

Source: Economist Intelligence Unit data, April 2005
Criticality of Procurement

“How important a role do procurement executives play in establishing your company’s strategic objectives?”

- Acknowledgement of procurement’s role in establishing corporate strategic objectives
  - 90% within procurement believe procurement will be important or vital
- More respect from outside of procurement
  - 65% outside of procurement think purchasing will be important or vital

“We need a different type of manager ... not a purchaser but an Executive Supply Manager”
  - CPO

Source: Economist Intelligence Unit, April 2005
The New Face of Purchasing

• Enlarging the Scope of Procurement
  1. From Procurement to Supply Chain
  2. CRM-SRM Linkage
  3. Early Supplier Involvement in Design
  4. “Lean-ing” into the Suppliers

• Restructuring the Supplier Relationship
  5. Supplier Consolidation & Partnering
  6. Cost Over Price
  7. Supply Networks

• Revolutionizing the Function
  8. Redefining the Mission
  9. Acquiring New Skill Sets
  10. Building the Center-Led Organization
1. From Procurement to Supply Chain

Visibility and management of the extended supply chain

- From the supplier’s supplier…
  - Collaborative forecasting
  - VMI/auto-replenishment
- To the customer’s customer…
  - Postponement
  - Direct ship
- Transparency between levels
  - Visibility
  - CRM-SRM linkage
- Custom supply chains
  - End-to-end, worldwide, segmented
  - Adaptive, sense-and-respond
  - Learning organization
2. CRM-SRM Linkage

- Delphi Automotive
  - Consider the whole supply chain first
  - Establish suppliers close to manufacturing, and assembly close to customers
  - Target the lowest-cost supply chain

- IBM
  - On-demand supply chain
  - Two-tier mentality
  - Visibility and reactivity

- Exxon-Mobil
  - Call-center via SAP
  - Payables via SAP
  - Providing suppliers visibility to customer’s orders
3. Early Supplier Involvement

Pre-designing instead of re-designing

- Eliminating waste before it gets into the product/process
  - Joint research/conception
  - Collaborative development
  - Early prototyping
- Accelerating the NPD/design and NPI cycle for speed advantages
  - Collaborative systems
  - Teaming
  - Design for manufacturability

Source: Boston Logistics Group, Inc.
4. “Lean-ing” into the Suppliers

How effective are your suppliers at helping deliver value to your customers in the following areas?

- **Cheap vs. lean**: Cost-focused and only moderately effective
- **Leaders are changing this:**
  - Establishing trust and credibility through results
  - Empowering through environmental management and goal orientation

<table>
<thead>
<tr>
<th></th>
<th>Effectiveness</th>
<th>Not effective</th>
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</thead>
<tbody>
<tr>
<td>Faster NPD</td>
<td>Highly effective: 3, 22</td>
<td>41, 22</td>
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<tr>
<td>Better Design/Quality</td>
<td>Highly effective: 5, 32</td>
<td>39, 17</td>
</tr>
<tr>
<td>Lower Cost</td>
<td>Highly effective: 9, 34</td>
<td>32, 16</td>
</tr>
<tr>
<td>Faster Time to Market</td>
<td>Highly effective: 5, 29</td>
<td>32, 21</td>
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</tbody>
</table>

Source: SAP and Economist Intelligence Unit, April 2005
5. Supplier Consolidation

**Fewer, closer supplier relationships**

- Searching for synergy
  - Supply chains
  - Channels
  - Technologies
- Improving capabilities
  - Cost
  - Quality
  - Service
- Managing a portfolio
  - Rewarding
  - Rotating
  - Investing

**Last 10 Years**

- Increase 35%
- Decrease 44%
- No change 17%
- Don’t Know 5%

**Next 10 Years**

- Increase 19%
- Decrease 59%
- No change 17%
- Don’t Know 5%
Consolidation – Partnering

Trend toward single sourcing

Largest Supplier’s Percent of the Spend

Source: Boston Logistics Group, Inc.
A Partnering Framework

Partnership Continuum

- Strategic Partnership
  - Mutuality of needs and vision
  - Open information sharing
  - Joint problem-solving

- Alliance
  - Joint project (e.g., value engineering)
  - Sharing of goals and information
  - Start and end-point

- Value Added Supplier
  - Distinctive competency
  - Product and service purchases
  - Traditional contractual relationship

- Preferred Supplier
  - Recognized, consistent quality
  - Traditional contractual relationship

- Commodity Supplier
  - Based on bid specs and RFQs

Note: Adapted from Michael Maccoby

6. Cost Over Price

Drilling deeper

- From Price to Cost…
  - Knowledge is power
  - Results = credibility
- From Best-in-Class Cost to Best-in-World Cost…
  - Low-cost country sourcing
  - Economies of scale and scope
- From Best-in-World Cost to Strategic Supplier…
  - Innovation
  - Agility
  - Overall performance
7. Supply Networks

Co-location, co-ordination, co-operation

- Covenants
  - Empowerment
  - Commitment
  - Full resources to bear
- Long-term commitments
  - Reward for good performance
  - Win-win
  - Risk-sharing
- Information-Sharing
  - Designing
  - Planning, scheduling
  - Executing, monitoring
8. Redefining the Mission

Which will be most important to your customers in 2010?

- Quality is king
  - Yet only 37% believe their suppliers help deliver better design and quality

- Understanding the customer
  - Yet only 34% believe their suppliers help personalize the product

- Low price: Yes

“It’s about value, not just cost. You’ve got to use the full resources of the supplier.”

– Christie Breves, CPO of Alcoa

Source: EIU/SAP Business 2010 survey
9. Acquiring New Skill Sets

“What are the greatest challenges to achieving maximum efficiency within your company’s purchasing practices?”

- Applicants must possess…
  - Leadership
  - Creativity
  - Aggressiveness
  - Financial acumen
  - Problem-solving skills
  - Drive for results

- Need not apply:
  - Lifetime purchasing career
  - Individual contributors
  - Win-lose negotiators

Source: SAP and Economist Intelligence Unit, April 2005
10. Building the Center-Led Organization

“Do you have a person who performs the role of CPO?”

- The CPO of 2015 will have...
  - **Clout** to redirect price concerns to performance demands
  - **Strategic vision** as well as operational acumen
  - **Willingness to get involved** in the design stage
  - **Technical savvy** to craft systems with a multi-tiered supplier network
  - **Financial and risk management expertise**

Source: SAP and Economist Intelligence Unit, April 2005
The New Optimization: Flexibility
Flexible Product Design

• Commodityization of cost management
  • Strategic sourcing
  • Outsourcing
  • Off-shoring

• Emergence of flexibility as a differentiator
  • Agility
  • Creativity
  • Responsiveness
Flexibility in the Supply Chain

- Flexible product design
- Flexibility of supply
- Flexible network design
- Flexible inventory deployment
- Flexible delivery
- And so on
Flexible Network Design

Before

Service: 40% next day
Logistics Cost: $42 million

After

Service: 80% next day
Logistics Cost: $39 million

Example from LogicTools
Flexible Network Design

- Collection points
- Distribution points
- Mixing platforms
- Trunk and feeder network
Flexible Supply: How Much to Consolidate

- RFQ just completed on a critical material
  - Supplier A quoted $9/unit
  - Supplier B quoted $11/unit
- Additional Information
  - Both supplier’s availability is 97% plus or minus 2%
  - Cost of a stock-out is about $2/unit
  - 1-year testing period to test a new supplier’s products
- Which supplier split would you choose?
  A. Single supplier (Supplier A)
  B. Two suppliers (A=50%, B=50%)
  C. Another option

What would you do?
Flexible Supply: Modeling the Supplier Split

**Parameters**

- Frequency
- Cumulative Frequency
- Units Supplied on Time
- Units Backordered
- Units Short
- Shortage Cost
- Spend
- Expected Value

**Solution**

<table>
<thead>
<tr>
<th>Input Assumptions</th>
<th></th>
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<tbody>
<tr>
<td>Mean Volume</td>
<td>100</td>
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<tr>
<td>Cost of Shortage per Unit</td>
<td>$2.00</td>
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</table>

<table>
<thead>
<tr>
<th>Option 1: Only One Supplier</th>
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<tbody>
<tr>
<td>Price per Unit</td>
<td>$9.00</td>
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<tr>
<td>Forecast Availability</td>
<td>95.0%</td>
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<tr>
<td>Variability of Availability</td>
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<tr>
<td>Standard Deviation</td>
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<table>
<thead>
<tr>
<th>Option 2: 2 Suppliers</th>
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<tbody>
<tr>
<td>Price per Unit - Supplier 2</td>
<td>$10.00</td>
</tr>
<tr>
<td>Supplier 2 Share</td>
<td>28%</td>
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<tr>
<td>Price per Unit - Average</td>
<td>$9.28</td>
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<tr>
<td>Forecast Availability</td>
<td>99.8%</td>
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<tr>
<td>Variability of Availability</td>
<td>5.0%</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>5.0%</td>
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</tbody>
</table>

**Results**

Best Option is Option 2: 2 Suppliers
Flexible Inventory – Service Trade-Off

Total Cost Curve

- EOQ for dependent demand
- \( EOQ = \sqrt{\frac{2 \times \text{Annual Usage} \times \text{Ordering Cost/Order}}{\text{Carrying Cost/Year}}} \)
  - Ordering cost traditionally defined as labor
  - Carrying cost usually the company’s “hurdle” rate
- \( \text{POQ} = \frac{\text{EOQ}}{\text{average period usage}} \)
Flexible Inventory – Multi-Echelon

Optiant PowerChain
Dynamic Delivery – Cross-Docking
Cross-Docking: Which SKUs?

- Volume
- Frequency
- Timing and pattern of inbound vs. outbound shipments

Inbound vs. Outbound Frequency and Volume for a Sample SKU
Contracts with Options
Making Complex Decisions Involving Risk

- Which pricing is best for a critical commodity buy?
  - 5-year, indexed price
  - 2-year, fixed price with option to renew
  - Buy on spot market
- What supplier split is best for the company?
  - Single supplier (partner, has 100% of the business)
  - Two suppliers (A=70%, B=30%); B’s price is 15% higher
  - Two suppliers (A=70%, B=30%); B’s price and quality are lower
- Is it better to commit volume to secure a lower price?
  - Price of 100 with no volume commitment
  - Price of 90 with a commitment to buy 100,000/year
Making Complex Decisions (Continued)

• What size plant should be built for a new product?
  • Large initial fixed investment with a low cost/unit
  • Small pilot investment, followed by a possible large expansion
  • 3 incremental investments with a higher average cost/unit

Real Options Decision Tree (Lattice)
Typical Clauses

- Recitals
- Definitions
- Confidentiality
- Scope
- Purchase order
- Payment, discounts and refunds
- MFN
- No guaranty
- Hold harmless

- Term
- Governing law
- Assignment
- Entire agreement
- Appendices
  - Prices and price structure
  - Notices
  - Terms and Conditions
Term Options

- Supplier offers a long-term agreement deal with volume commitment
  - Current 1-year agreement price: $10/unit
  - Potential 3-year agreement price: $8/unit
  - Additional information
    - Sales projects demand of 100 units/year
    - Sales, profit margin, and supplier costs +/- 10% per year
    - Salvage value $5/unit
- Would you sign the 3-year agreement? Why or why not?
  - Yes
  - No
Term Options (continued)

Parameters
- Distribution of probable usage period
- Cumulative Frequency
- Units Over-Ordered
- Over-Ordering Cost
- Spend
- Expected Value

Solution

<table>
<thead>
<tr>
<th>Mean Expected Product Cycle Length</th>
<th>36 Months</th>
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<tr>
<td>Variability of Product Cycle Length</td>
<td>1%</td>
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<tr>
<td>Std Dev</td>
<td>1%</td>
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<tr>
<td>Salvage Revenue per Unit</td>
<td>$5.00</td>
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</table>

Option 1: 1 Year Contract
- Price per Unit $10.00
- Standard deviation of market price 10% over 36 months

Option 2: 3 Year Contract
- Fixed Price $10.50

Results

Best Option is Option 2: 3 Year Contract
Pricing Options – Types of Indexation

- Y = a*x + b
  - Y = price to be paid
  - Ax = variable cost component
    - A = index value
    - X = the variable cost per unit of the raw material or service at a specific point in time
  - B = the fixed cost component of the price

- Lagging and leading indexation
- Moving averages (smoothing)
Terms and Conditions (Ts & Cs)

• Inspection
• Substitution
• Independent Contractor
• Alteration of Terms
• Indemnification
• Drawings, Design, Data, Creative Work and Inventions
• Changes
• Waiver
Terms and Conditions (Ts & Cs)

- Delivery; Schedule; Delays
- Payment
- Subcontracting
- Warranty
- Safety
- Patents; Indemnification
- Termination for Cause
- Title
- Publicity
- Special Conditions
Terms and Conditions (Ts & Cs)

- Termination for Convenience
- Insurance & Indemnification
- Force Majeure
- Audit Rights
- Liens
- Taxes
- Spare Parts
- Severability
- Exceptions
Confidentiality Agreements

- Purpose of the transaction
- Scope of articles or property covered
- Marked “Confidential”
- Non-disclosure, non-publication, etc.
- Non-use
- Irreparable harm
- Reasonable care
- Third parties under NDA
Confidentiality Agreements

- Termination by written notice
- Survive termination of the agreement
- Term
- Waivers
  - Prior knowledge
  - Other sources
  - Publicly available
  - Ordered by courts
Measuring Flexibility
Sourcing and Supply Chain Metrics

Boston Logistics Group's House of Metrics

Supply Chain Results
- Delivered Cost/Unit
- Inventory Cost
- Production Cost
- Logistics Cost
- Packaging Cost
- Customer Service Cost

Sourcing Results
- Material or Service Cost
- % Defective or Returned
- % Perfect Orders
- NPI Cycle Time

Sourcing Processes
- % Suppliers 80% of Spend
- % Spend Largest Supplier
- % Impl. of P-Council
- % Change Unit Price
- Largest Supplier’s Cost
- % Certified Suppliers
- % On-Time Delivery
- Fill Rate
- Order Cycle Time

Cost
Quality
Service
Agility
Asset Utilization

Source: Boston Logistics Group, Inc.

6/30/2008
Supply Chain Flexibility Metrics

- Sourcing cycle time
- Supplier production ramp-up time
- Your change-over time
- Your production ramp-up time
- Total new product introduction cycle time
New Concepts in Measuring Flexibility

• GE – CENCOR
  • Calibrate
  • Explore
  • Create
  • Organize
  • Realize

• P&G
  • Less emphasis on features
  • More measurement of customer feelings
Flexibility Imperatives

- Thinking outside the box!
- Ensuring that operational metrics contribute to customer delight
  - From suppliers
  - To customers
- Ensuring that the supply chain facilitates marketing innovation, not just cost improvement
  - Product or service design
  - Introduction
Global Supply Chain Economists™

Boston Strategies International helps supply chain executives make critical supply chain decisions that involve investment and risk by forecasting the evolution of supply markets and technologies. Our mission is to help our clients develop globally competitive supply networks that maximize Supply Chain Value.™ Our products and services include:

- **Industry Research** that helps investors and policy makers identify emerging issues that affect their supply chains, and quantify the impact that they will have
- **Cost and Pricing Analysis** that helps financial and operational managers plan and budget by providing benchmark, best practice, and forecast data tailored to their companies' supply chains
- **Strategy Consulting** that helps supply chain leaders make high-stakes decisions related to mergers & acquisitions, market entry, capital investments, outsourcing, off-shoring, and make-or-buy

David Jacoby: djacoby@bostonstrategies.com