SUPPLY CHAIN OPTIMIZATION
EXECUTIVE STRATEGY SESSION

Investigating the Components of a Synchronized, Demand-Driven Value Network

October 6, 2016
The MEP Network

The National Institute of Standards and Technology’s Manufacturing Extension Partnership (MEP) Centers
Supply Chains - 12 areas of need

**Critical**

1. Better Total Cost of Ownership decisions
2. Increase effectiveness of MRP/ERP
3. Mitigate global risks
4. Reduce/manage volatility
5. Expand supplier matching capabilities to source for emergent needs
6. Improve OEM/Supplier product development collaboration

**Highly Important**

7. Document supply chain strategy
8. Align supply chain metrics with long-term business focus
9. Identify and address choke points in a sustainable manner
10. Optimization of supply chain
11. Recognize the emergent needs for future capabilities and technology
12. Enhance value chain collaboration among suppliers, OEMs and customers
Supply Chain Optimization Roadmap

**Strategy Development**
- Develop/Enhance Strategy:
  - Evaluate Current Supply Chain Maturity
  - Apply Constraint Theory Concepts
  - Identify Supply Chain Challenges
  - Evaluate Innovation and Sustainability Objectives
  - Establish Supply Chain Strategic Objectives
  - Align with Organizational Objectives
  - Create Supply Chain Strategy Deployment Plan

**Strategy Implementation**
- Deploy Strategy:
  - Develop Supply Chain Risk Management Plan
  - Implement TCO Methodology
  - Align Supplier Performance Metrics with Supply Chain Strategy
  - Assess Supply Chain Visibility
  - Identify Supply Chain Constraints
  - Develop Supply Chain Communication and Collaboration Plan

**Partner Engagement**
- Communicate Strategy:
  - Share Strategic Objectives
  - Communicate Supply Chain Performance Metrics
  - Align Organizational Objectives with Supply Chain Performance Metrics
  - Establish Constraints Theory Concepts
  - Identify Opportunities for Collaboration
  - Create Supply Chain Optimization Plan

**Partner Deployment**
- Implement Improvements:
  - Assess Supplier Maturity
  - Align Lead Time, Capacity and Quality Systems
  - Integrate Performance Measurements
  - Improve System Visibility
  - Enhance Collaboration
  - Deploy Risk Mgmt Practices
  - Implement TCO Methodology
  - Implement Sustainability Initiatives
  - Evaluate Next Tier Suppliers
  - Apply Strategic Sourcing
  - Extend Network Diagram
  - Optimize Flow

**Alignment**

**Visibility**

**Collaboration**

**Optimization**

MEP Supply Chain OPTIMIZATION
Purpose

• To investigate in a workshop setting:
  – the components of a synchronized demand driven value network,
  – the importance of good strategy and execution within your supply chain, and
  – the tradeoffs required in making major decisions about your supply/value chain
Objectives of the Program

- Provide executives with a mechanism to better understand the cause and effect decisions within the supply chain
- Provide a method to understand the critical (key) areas controlling the performance of supply chain, and foster collaboration among the supply chain alliance members (Tier 1, and beyond)
Themes of the Program

- Focus
- Communication
- Collaboration
- Visibility

Goal: Think about Supply Chains differently
Agenda

Day One: 8:00 am to 5:30 pm

- Introduction
- The Major Elements of Supply Chain Management
- Your Supply Chain Maturity
- A Brief Introduction to Constraint Theory
- An Executive Education Supply Chain Game
- Developing Your Supply Chain Plan
  - Five Bold Steps
- Groups Report

Day Two: 8:00 am to 3:00 pm

- Developing Your Supply Chain Plan
  - Graphic Game Plan
- Groups Report
- Prioritization and Synthesis
- Questions
- Next Steps for follow up
- Wrap up comments
Why did corn yields stay constant until 1935?

What Changed?

Innovation thru HYBRIDIZATION!
How Long Have Supply Chains Existed?
All Roads Lead to Rome
What is a Supply Chain?
Supply Chain Fundamentals

Plan → Build → Move → Sell → Return

Plan → Buy → Move → Return → Plan

Strategy → Execution/Implementation → Performance
What is Strategy?

“Our thinking about being competitively successful” - Jay Barney
The Strategic Five

1. What business or businesses should your company be in?
2. How should you add value to your businesses?
3. Who should be the target customers for your businesses?
4. What should be your value propositions to those target customers?
5. What capabilities should differentiate your ability to add value to your businesses and deliver their value propositions?
## Strategy versus Tactics

<table>
<thead>
<tr>
<th>STRATEGY (WHAT?)</th>
<th>TACTICS (HOW?)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What</strong></td>
<td><strong>Quick View</strong></td>
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<tr>
<td>Stratos: army, or resources Ago: leading</td>
<td>Greek Definition</td>
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<td>To lead your resources, a plan, method, or series of maneuvers or stratagems for obtaining a specific goal or result</td>
<td>Greek Definition</td>
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<td>Stable, democratic Iraq, through the Surge and Clear-Hold-Build</td>
<td>Example</td>
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<td>Organization-level determinant: Foster the growth of youth to be the strong leaders of tomorrow.</td>
<td>Organization Example</td>
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<tr>
<td>How &amp; Who</td>
<td>A plan for attaining a particular goal</td>
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</table>

Taktike: the art of organizing an army, a maneuver

Operation Sinbad including the various ways to advance on a city, to clear a house, and to detect mines

Staff-level auctioning: Develop programs that teach civic responsibility and leadership.

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How Trafalgar was Won

• Lord Nelson’s Circumstances
  – Less capable fleet
  – Inferior resources
  – Superior strategic capability
  – Ingrained British naval culture (Hearts of Oak)

• Key Elements of Resource Based Theory (RBT)
  – Imitatable vs Non-imitatable
  – Rarity
  – Causal Ambiguity
  – Culture
Factors for Success

• A good strategy
  – Cost
  – Differentiation
  – Focus (flexibility, speed)

• A good operating model
  – Lean, JIT, Quality (Six Sigma), Constraint Theory

• People

• Demand
A Supply Chain Game
Rules:
- All Rolls must take place at the same time (synchronized)
- You can only move (process) WIP that existed PRIOR to the current roll
- Process materials using good “Pull” methods - start with FG and move BACKWARDS through process #6, #5, #4, #3, #2, #1, RM

To the Customer
Factory Operational Performance

<table>
<thead>
<tr>
<th>WEEK #1</th>
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**PERFORMANCE MEASURES**

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Supplier #1

Supplier #2

Supplier #3

Supplier #4

Supplier #5

Supplier #6

FG

To the Customer

WIP 1

WIP 2

WIP 3

WIP 4

WIP 5
Factory Operational Performance

### WEEK #3

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<th>ROLL # (1)</th>
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<th>PIECES MOVED (3)</th>
<th>EFFICIENCY = (3) / (2)</th>
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Realities of “The Chain”

- The existence of dependent events and the resulting interactions between resources (our capacity to supply) and products (our demand)
- The occurrence of statistical fluctuations and random events within every manufacturing environment
Supply Chain Visibility

Improve Supply Chain Visibility through a Network Diagram
Supply Chain Visibility

Companies have little visibility beyond tier 1 suppliers

How much visibility of supply and capacity information do you have across your suppliers and logistics partners?

<table>
<thead>
<tr>
<th>Visibility Level</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>No visibility</td>
<td>4%</td>
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<tr>
<td>Some visibility</td>
<td>49%</td>
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<tr>
<td>Enhanced visibility</td>
<td>32%</td>
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<td>Complete visibility</td>
<td>9%</td>
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No visibility: Little to no Tier 1 supplier visibility
Some visibility: Limited Tier 1 supplier visibility, but not Tier 2 and beyond
Enhanced visibility: Tier 1 supplier visibility and some Tier 2 supplier visibility
Complete visibility: Tier 1, 2, and beyond suppliers visibility

Source: Economist Intelligence Unit survey, Nov. 2012.
Supplier Network Mapping

Network analysis is used to identify bottlenecks and the constraint, based on both lead time *and* variation.

Tier 1

Supplier Network Mapping

Network analysis is used to identify bottlenecks and the constraint, based on both lead time *and* variation.

Tier 1
Supplier Network Mapping

As the performance of Tier 1 Suppliers is improved, visibility into Tier 2 Suppliers and their performance is gained.

Tier 2
Supplier Network Mapping

Continuing on, as the performance of Tier 2 Suppliers is improved, visibility into Tier 3 Suppliers is gained.
Closing Comments

Think of Supply Chains differently

• Focus
• Communication
• Collaboration
• Visibility
Thank You!