The Dynamics of Supply Chain Security, Productivity, and Technology

MIT CTL Affiliates Program in Logistics – SC Education Partners
Freight Lane Security in the Supply Chain Workshop
April 29, 2003

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Making Sense at the Intersection of

- Supply Chain Systems
- Freight Operations
- Tracking & Monitoring Technologies
- Business Economics
- Security
Sources & References

◆ Security and productivity
  - “Freight Transportation Security and Productivity”
  - “Supply Chain Security Without Tears”
  - “Defense Logistics…” trends and implications

◆ Technology for security and productivity
  - “Technology to Enhance Freight Trans. Security & Productivity”
  - “Electronic Cargo Seals: Context, Technologies, and Marketplace”
  - “Automating Security: Do E-Seals Make Sense?”
  - “Trends in Freight Identification Technology”
The Context and its Implications
- The rules of the game are unstable

Win/Win vs. Zero Sum
- Smart security measures can mitigate significant costs

Role for Technology
- Done well, it can be a boon; but if done poorly...

Moving Forward
- Action strategies for business
Main Topics

- The Context and its Implications
  - Win/Win vs. Zero Sum
  - Role for Technology
  - Moving Forward
3 Views of Supply Chain Security

- Containerization magnifies security risks
- Security measures threaten efficiency
- Supply chain tools can improve security while improving efficiency

Technology can support both goals when well conceived and well executed!
The Productivity Context

Total Logistics Costs*

- 1980  16.1%  GDP = $2.8 T
- 2001  9.5%  GDP = $10.2 T

6.6% of GDP = ~$650 B

Threats, Countermeasures, and Impacts

Threats and Assessments

Security Countermeasures

Terrorist Events

Recovery Measures

Impacts

Indirect, Secondary Impacts
- Costs, delays, unpredictability

Direct, Primary Impacts
- Damage & disruption
- Congestion & disruption

Emergency response
Indirect, Secondary Impacts

- Countermeasures affect commerce
  - Two types of economic impacts
    » Added security costs
    » Changes in operating practices that affect efficiency
Factors That Compound Economic Risks

◆ Potential for self-inflicted wounds
  “How rational will we remain after a second or third major terrorist attack?”

◆ “Wolfe’s Paradox”
  “Overall logistics systems capabilities are growing simultaneously more robust and more fragile”

◆ “Complex Terrorism”
Threats, Countermeasures, and Impacts

Threats and Assessments

Security Countermeasures

Terrorist Events

Recovery Measures

Inherently Unstable

Impacts

Indirect, Secondary Impacts

Costs, delays, unpredictability

Direct, Primary

“Next Event/Overreaction?”

What are the implications for your business?
Main Topics

- The Context and its Implications
- **Win/Win vs. Zero Sum**
- Role for Technology
- Moving Forward
“Thoughtful Security Measures”

◆ Drive variability out from manufacturing to the store-shelf
  - 20-30% supply chain savings for “the normal stuff of commerce”

Jonathan Byrnes
Improving Security and Productivity

Some security measures can enhance both:

Security needs from logistics

Supply chain needs from security

"Win/Win Template" Reflects Both Views
Security Needs From Logistics

- Assured integrity of conveyance loading and documentation
- Significantly reduced risk of tampering in transit
- Accurate, complete, and timely information about shipments

These are the requirements for exceptional supply chain security
Logistics Needs From Security

- Reliable, predictable processing times
- Protection of commercial information
- Globally harmonized security processes
- Security as a byproduct of supply chain management

Technology can have great impact here
Improve Visibility and Control

- This is the most common recommendation to improve both security and productivity

- Major challenges
  - Institutional
  - Technical
Visibility Discussion is Confusing

Visibility of what?
- Visibility of items and assets

By what means?
- Event-driven data and integrated systems

In what timeframes?
- Timeliness keyed to needs

From what sources?
- Data from shippers, carriers, and third parties
Main Topics

- The Context and its Implications
- Win/Win vs. Zero Sum
- **Role for Technology**
- Moving Forward
High Potential Technologies

- Tools to assure loading integrity
- Electronic seals
- Sensors
- Mobile communications platforms
- Biometrics
The Underlying Trend

Simultaneous improvements in information technology components:
- Function
- Form
- Integration
- Reliability
- Cost

That trend will keep changing “best practices” for security as well as productivity
Keep Technology in Perspective

- Technology is not magic
  - “Just because it’s electronic doesn’t mean it’s better”
  - Good processes and discipline are critical
  - Institutional challenges are toughest

- Technology is not irrelevant
  - “Just because it’s electronic doesn’t mean it’s a mistake”
  - Smart technology can
    » Enhance good processes
    » Simplify demands on the workforce
# Technology Expectations

**Technology Expectations Should Increase Over Time**

<table>
<thead>
<tr>
<th><strong>Now</strong></th>
<th><strong>Near Term</strong> (&lt;1-2 years?)</th>
<th><strong>Intermediate</strong> (3-5 years?)</th>
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</thead>
</table>
| - High security manual seals  
  - Auditable chain of custody | - Electronic seals  
  - Local reporting of tampering | - Mobile container monitoring  
  - Global reporting of tampering  
  - “Future Smart Container”  
  - Superb security and management |
| - Enhanced mobile monitoring  
  - Hazmat | - Better emergency response | |

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Future Smart Container

◆ Three goals
  - Significant increase in security
  - Significant increase in efficient and effective management
  - Very affordable

◆ It’s an analytic device for balancing
  - Requirements
  - Technical feasibility
  - Economic affordability
  - Timeframes

Not a mandate!
Electronic Cargo Seals

- Core components
  - Ability to test seal integrity
  - Memory for seal ID and more
  - Communications
  - Mechanical seal capabilities
RFID Bolt Seals on Container Market

eLogicity eSeal

Savi EchoPoint SmartSeal
RFID Seals on or Near Container Market

Hi-G-Tek
Data Seal

AllSet Tracking
ALLLTrack
Indicative Seal
Five Major Issues for E-Seals

◆ Efficacy
  - Do they work?
◆ Universality
  - Can they be global?
◆ Reusability
  - Should they be disposable, reusable or permanent?
◆ Inspection strategy
  - Should there be a ‘person-in-the-loop’ or not?
◆ Affordability
Data Management

- Virtually every security innovation will expand the data management challenge

For example:
- 24 hour rule
- E-seals
- Smart containers
- Automated shipboard monitors
Main Topics

- The Context and its Implications
- Win/Win vs. Zero Sum
- Role for Technology

Moving Forward
Constraints to Change

◆ Complexity
  - Variability of business practices and needs
  - Harmonization among ~160 nations
  - Bureaucratic friction

◆ Skepticism
  - About requirements and solutions

◆ Concerns about cost

◆ Resistance to regulation
One Approach to Business “Preparedness”

- Minimal contingency planning
  - ‘International trade is always subject to uncertainty’
  - ‘Terrorism is too unpredictable to plan for’

- Implicit assumptions
  - September 11 was a one time event
  - If it happens again, government responses will be about the same

“Norm Mineta won’t let them shut down the ports”
Think About
The Future Business Environment

What is that environment likely to be after ‘the time after next time?’

- Access
- Reliability
- Cost
Be Proactive “Internally,” Within Your Supply Chain(s)

- Reassess sourcing and routing strategies
- Create redundancy
- Standardize processes
- Hedge against risks
- Identify, pursue, *and measure* for win/win
counter-terrorist security
  - Cut theft and contraband exposure
  - Enhance efficiency and service quality with
    security-oriented tools
Be Proactive Externally

- Lobby:
  - Push governments to harmonize security

- Foster public dialog
  - Prepare public and leaders to respond wisely to ‘the next one’
  - Highlight need to sustain reciprocity
Thank you for your attention

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Sources & References

Security and productivity
- “Freight Transportation Security and Productivity”
  » reachable from the freight security page at:
    www.ops.fhwa.dot.gov/ freight/ transportation_security.htm
- “Supply Chain Security Without Tears”
  » www.manufacturing.net/ scm/ index.asp?layout=articleWebzine&articleid=CA278114
- “Defense Logistics…” trends and implications
  » http:// www.ops.fhwa.dot.gov/ freight/ theme_papers/ theme_paper_index.htm

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- “Electronic Cargo Seals: Context, Technologies, and Marketplace”
  » Same as prior
- “Automating Security: Do E-Seals Make Sense?”
- “Trends in Freight Identification Technology”
  » Email from Mike Wolfe