

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**

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Michael Wolfe



noriver@att.net



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”

Major Topics

Major Messages

- ◆ 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!***

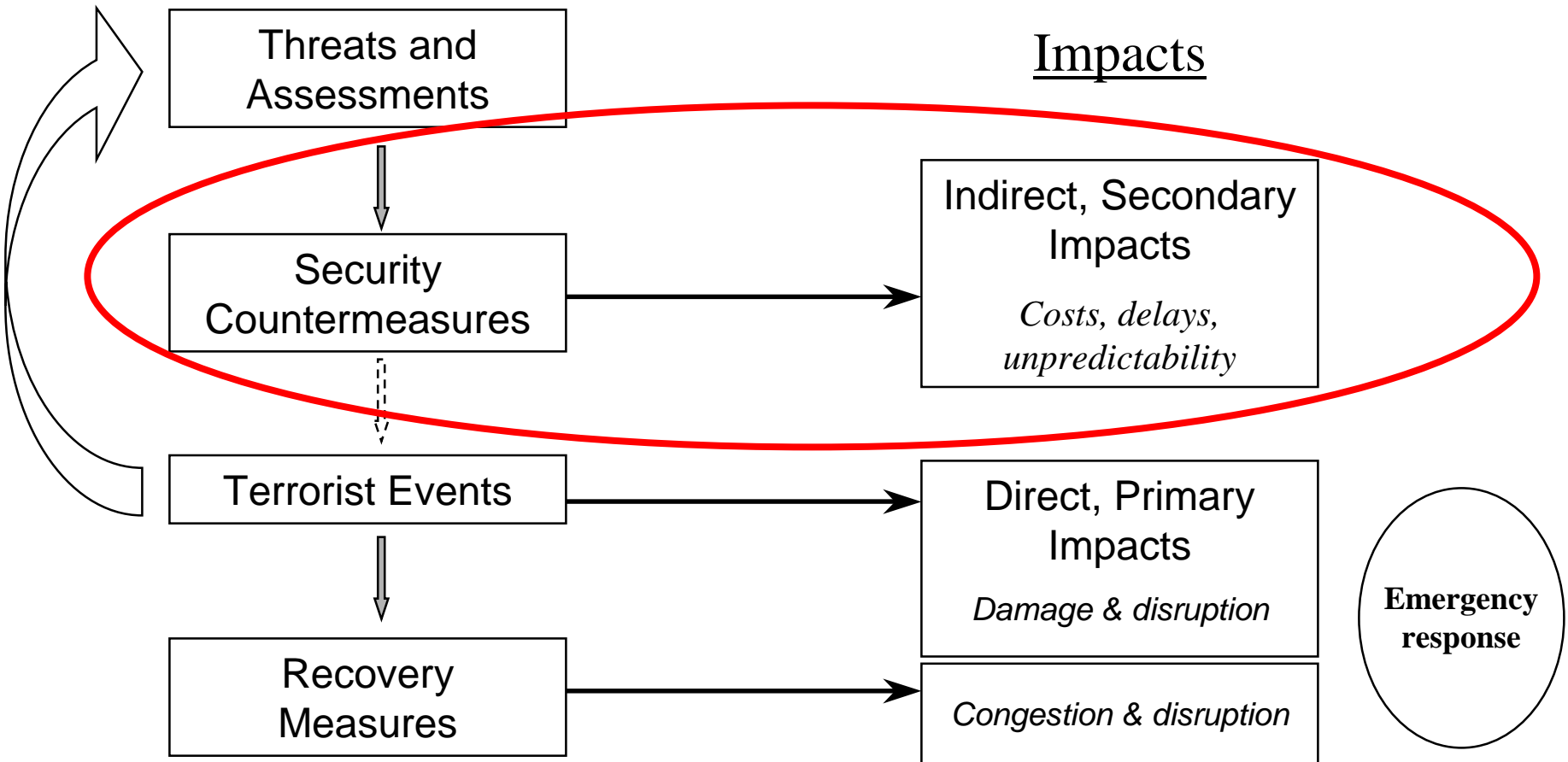
The Productivity Context

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



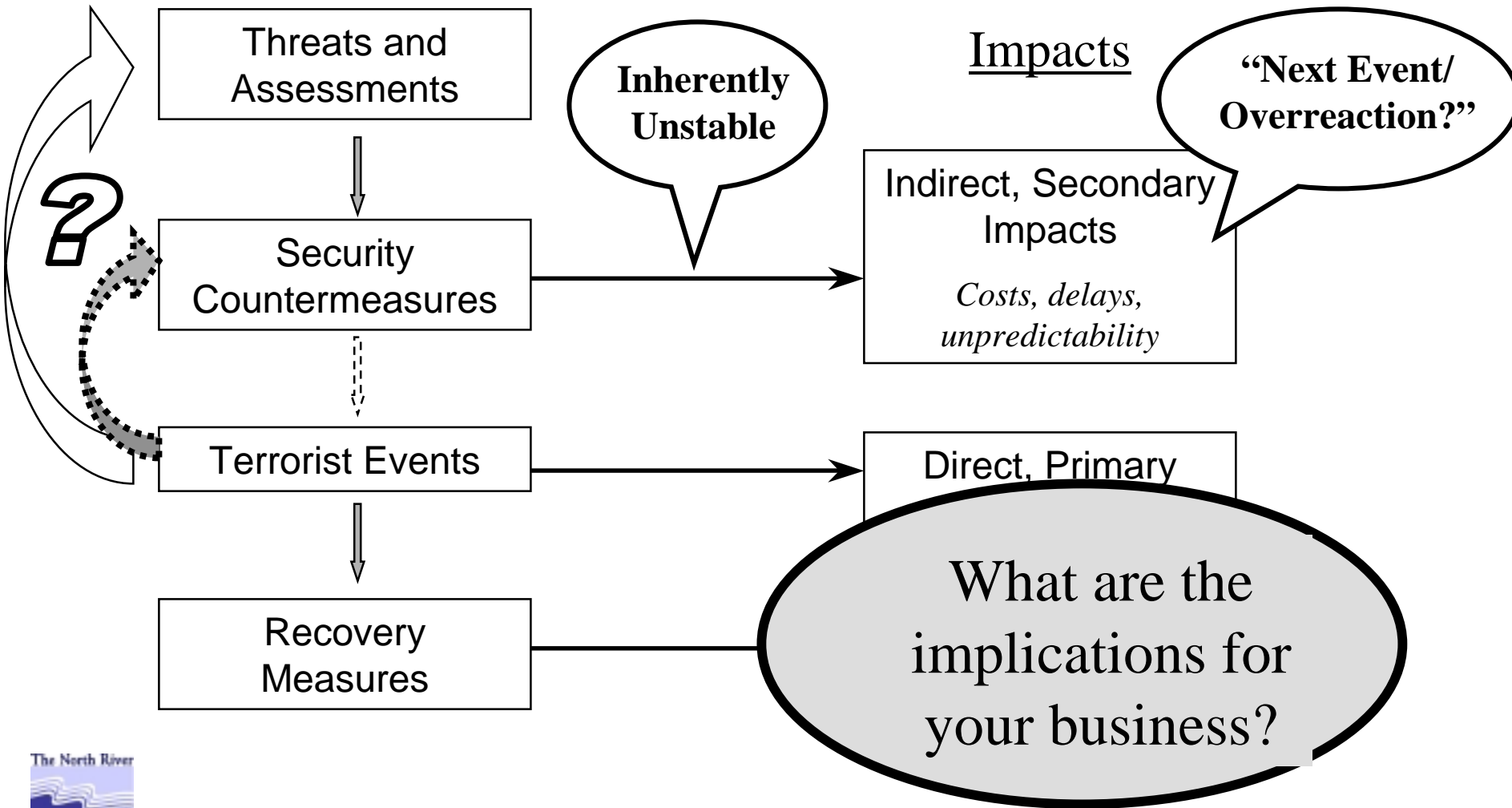
Indirect, Secondary Impacts

- ◆ 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



Main Topics

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

“Thoughtful Security Measures”

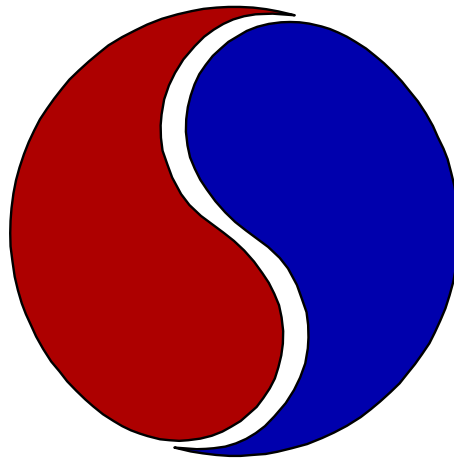
- ◆ Drive variability out from manufacturing to the store-shelf
 - 20-30% supply chain savings for “the normal stuff of commerce”

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
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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 Should Increase Over Time

<u>Now</u>	<u>Near Term</u> <u>(<1-2 years?)</u>	<u>Intermediate</u> <u>(3-5 years?)</u>
<ul style="list-style-type: none">◆ High security manual seals<ul style="list-style-type: none">- <i>Auditable chain of custody</i>◆ Enhanced mobile monitoring<ul style="list-style-type: none">- <i>Hazmat</i>	<ul style="list-style-type: none">◆ Electronic seals<ul style="list-style-type: none">- <i>Local reporting of tampering</i>◆ <i>Better emergency response</i>	<ul style="list-style-type: none">◆ Mobile container monitoring<ul style="list-style-type: none">- <i>Global reporting of tampering</i>◆ “Future Smart Container”<ul style="list-style-type: none">- <i>Superb security and management</i>

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
ALLTrack
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

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- ◆ 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

Mike Wolfe
noriver@att.net
781-834-4169

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
- ◆ Technology for security and productivity
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www.ops.fhwa.dot.gov/freight/transportation_security.htm
 - “Electronic Cargo Seals: Context, Technologies, and Marketplace”
 - » Same as prior
 - “Automating Security: Do E-Seals Make Sense?”
 - » www.eyefortransport.com/index.asp?news=33911&nli=freight&ch=
 - “Trends in Freight Identification Technology”
 - » Email from Mike Wolfe