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• Transport Planning and Governance
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• Transportation and Disasters
The Nature of Transport Policy
## Main Involvement Sectors for Public Policy

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<th>Sector</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulatory Policy</td>
<td>Financial regulation; Antitrust laws and regulations; Effective legal enforcement; Product liability laws; Tort law; Ease of doing business</td>
</tr>
<tr>
<td>Infrastructure Policy</td>
<td>Water; Transportation; Electric; PPP; Broad investment support</td>
</tr>
<tr>
<td>Labor Policy</td>
<td>Wages; Benefits; Labor unions; Workplace safety; Discrimination; Severance; Worker rights</td>
</tr>
<tr>
<td>Science &amp; Technology</td>
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</tr>
<tr>
<td>Economic Development</td>
<td>Export-import bank; Export incentives/restrictions; Strategic industries; Small &amp; medium-sized enterprises; Special economic zones</td>
</tr>
<tr>
<td>Energy &amp; Environmental Policy</td>
<td>Conventional energy; Alternative energy; Energy efficiency; Energy security; Environmental regulation and compliance</td>
</tr>
<tr>
<td>Tax Policy</td>
<td>Corporate taxes; Individual taxes; Dividend and capital gains taxes; Tax incentives; Value-added taxes; Offshore taxes</td>
</tr>
<tr>
<td>Trade Policy</td>
<td>Trade agreements; Tariffs, taxes, quotas &amp; duties, Single window trade system</td>
</tr>
<tr>
<td>Education, Talent &amp; Innovation</td>
<td>Investment/support for science; Visas and immigration; Labor retention; Training; Certification</td>
</tr>
<tr>
<td>Healthcare</td>
<td>Access to healthcare</td>
</tr>
</tbody>
</table>
Transport Regulations

Economic Regulations
- Investments in transportation infrastructure (modal and intermodal).
- Control of routes, ports of entry, pricing, scheduling.
- Level of ownership and competition.

Safety Regulations
- Safety and operation regulations (speed and design).
- Labor regulations (work hours).
- Security (passengers and cargo).

Environmental Regulations
- Transportation of hazardous materials (HAZMAT).
- Pollutant emissions.
### Some Legislations in the Deregulation of Transport in the United States and Canada

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>Legislation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967</td>
<td>Canada</td>
<td>National Transportation Act</td>
</tr>
<tr>
<td>1977</td>
<td>USA</td>
<td>Air Cargo Deregulation Act</td>
</tr>
<tr>
<td>1978</td>
<td>USA</td>
<td>Aviation Deregulation Act</td>
</tr>
<tr>
<td>1980</td>
<td>USA</td>
<td>Staggers Act; Motor Carrier Act</td>
</tr>
<tr>
<td>1982</td>
<td>USA</td>
<td>Bus Regulatory Reform Act</td>
</tr>
<tr>
<td>1984</td>
<td>USA</td>
<td>Ocean Shipping Act</td>
</tr>
<tr>
<td>1987</td>
<td>Canada</td>
<td>National Transportation Act; Shipping Conference Exemption Act; Motor Vehicle Transport Act</td>
</tr>
<tr>
<td>1991</td>
<td>USA</td>
<td>Intermodal Surface Transportation Efficiency Act</td>
</tr>
<tr>
<td>1995</td>
<td>USA</td>
<td>Interstate Commerce Commission Termination Act</td>
</tr>
<tr>
<td>1996</td>
<td>Canada</td>
<td>Canada Transportation Act</td>
</tr>
<tr>
<td>1998</td>
<td>USA</td>
<td>Ocean Shipping Reform Act</td>
</tr>
<tr>
<td>1998</td>
<td>Canada</td>
<td>Canada Marine Act</td>
</tr>
<tr>
<td>2001</td>
<td>Canada</td>
<td>Canada Shipping Act</td>
</tr>
</tbody>
</table>
Main Transport Policy Instruments

**Public Ownership**
- Full or partial (PPP) ownership of transportation modes (e.g. public transit) or assets (e.g. roads and bridges).

**Subsidies & Taxation**
- Funding for transport infrastructure and modes.
- Taxation on fuel and transactions.

**Regulatory Control**
- Technical standards for transport modes and assets.
- Entry and competing conditions.

**Research & Development**
- Funding research improving the technical, economic and environmental performance of transportation.

**Labor Regulations**
- Standards such as certification, working conditions and compensation and benefits in the transport sector.

**Safety & Standards**
- Operational standards for transport modes and assets such as speed and weight limits.
Regulations over Freight Transport Operations

- **Vehicles**
  - Registration
  - Weight and size restrictions
  - Emission standards

- **Facilities**
  - Zoning and permissible locations
  - Technical standards

- **Goods**
  - Perishable goods (sanitary standards)
  - Dangerous goods (safety standards)

- **Labor**
  - Certification
  - Working conditions
  - Compensation and benefits

- **Finance**
  - Insurance requirements and liability
  - Financing sources and conditions
### Rationale of Transport Privatization

<table>
<thead>
<tr>
<th>FAVORING PRIVATIZATION</th>
<th>IMPAIRING PRIVATIZATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve efficiency and performance of transport assets.</td>
<td>Loss of public service or social functions of transport.</td>
</tr>
<tr>
<td>New and additional financial resources for development and maintenance.</td>
<td>Potential higher tolls or fares.</td>
</tr>
<tr>
<td>Strengthen entrepreneurial and managerial capacity.</td>
<td>Public monopoly turned into a private monopoly.</td>
</tr>
<tr>
<td>Relieve public financial and administrative burden.</td>
<td>Poorer coordination of investments and operations.</td>
</tr>
<tr>
<td>Eliminate or minimize bureaucratic and political influence over transport management and operation.</td>
<td>Discriminatory treatment of transport users.</td>
</tr>
<tr>
<td>Reduce the power of public sector unions.</td>
<td>Requirement of expensive improvement of transport assets prior to privatization.</td>
</tr>
<tr>
<td>Loss of public land.</td>
<td></td>
</tr>
</tbody>
</table>

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# The Jones Act and International Maritime Markets

<table>
<thead>
<tr>
<th>Issue</th>
<th>Jones Act Market</th>
<th>International Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessel ownership</td>
<td>US nationality</td>
<td>Any (large shipping companies)</td>
</tr>
<tr>
<td>Vessel registration</td>
<td>USA</td>
<td>Any (flags of convenience)</td>
</tr>
<tr>
<td>Shipyard</td>
<td>US located</td>
<td>Any (mainly Asia)</td>
</tr>
<tr>
<td>Vessel crew</td>
<td>US citizens</td>
<td>Any (developing countries)</td>
</tr>
<tr>
<td>Vessel type</td>
<td>Mostly coastal and river</td>
<td>Mostly deepsea</td>
</tr>
<tr>
<td>Vessel trading privilege</td>
<td>Cabotage within USA</td>
<td>International shipments</td>
</tr>
<tr>
<td>Legal jurisdiction</td>
<td>US federal courts</td>
<td>Country of registry</td>
</tr>
<tr>
<td>Taxation</td>
<td>US corporate taxation system</td>
<td>Mostly offshore</td>
</tr>
<tr>
<td>Barriers to entry</td>
<td>Very high</td>
<td>Low</td>
</tr>
<tr>
<td>Competition</td>
<td>Statutory protection against foreign players</td>
<td>Intensive / Oligopolistic</td>
</tr>
</tbody>
</table>
Shift in Public Transport Policy Perspective

<table>
<thead>
<tr>
<th>Modes</th>
<th>Conventional</th>
<th>Emerging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Modes</td>
<td></td>
<td>Intermodal Systems</td>
</tr>
<tr>
<td>Scale</td>
<td>Local Economies</td>
<td>Regional / Global Economies</td>
</tr>
<tr>
<td>Jurisdiction</td>
<td>Independent Jurisdictions (&quot;turf wars&quot;)</td>
<td>Coalitions / Consensus</td>
</tr>
<tr>
<td>Provision</td>
<td>Build (infrastructure provision)</td>
<td>Manage (optimization of existing resources)</td>
</tr>
<tr>
<td>Funding</td>
<td>Publicly Funded</td>
<td>Public / Private partnerships</td>
</tr>
<tr>
<td>Revenue</td>
<td>Users (public subsidy)</td>
<td>Customers (revenue generation)</td>
</tr>
<tr>
<td>Framework</td>
<td>Plan (regulations; compliance)</td>
<td>Market (deregulations; price signals)</td>
</tr>
</tbody>
</table>
Shifts in the Intermodal Transport Industry

**Growth**
- Geographical and functional diffusion of containerization.
- Massive investments.

**Revolution**
- New standards, practices and technologies.
- Increasing returns.

**Deregulation**
- Consolidation (maritime, rail and trucking). Emergence of large operators.

**Maturity**
- Rationalisation (corridors and sites).

**Evolution**
- Incremental changes.
- Decreasing returns.

**Governance**
- PPP. Supply chain control. Added-value-capture.
### Common Problems Linked with Government Intervention

<table>
<thead>
<tr>
<th>Bureaucracy</th>
<th>Regulatory reflex. Heavy administrative burden. Slow to respond, adapt and change.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irresponsibility</td>
<td>Limited accountability for wrong policies. The blaming game.</td>
</tr>
<tr>
<td>Misallocations</td>
<td>Accumulation (diversion) of scarce capital in non-productive assets. “Pork barrel” politics. Parasitical stance on the productive economy.</td>
</tr>
<tr>
<td>Corruption</td>
<td>Using public power to regulate, coerce and confiscate. Privileging politically connected firms. Regulating competition out to protect special interests.</td>
</tr>
<tr>
<td>“Magic wand” syndrome</td>
<td>Belief that any problem can be fixed by an appropriate government policy and intervention.</td>
</tr>
</tbody>
</table>
Logistics Policy Bottlenecks

**Capacity Bottlenecks**

- Lack of terminal or connector capacity.
- Lack of absence of intermodal options.

**Operational Bottlenecks**

- Lack of logistical services.
- Lack of logistical performance (cost, time and reliability).

**Institutional Bottlenecks**

- Lack of clear mandate and jurisdiction.
- Lack of coordination and cooperation.

**Skills Bottlenecks**

- Lack of managerial capabilities.
- Lack of qualified labor.
- Lack of training programs.
A Customs and cross-border management
- Faster customs clearance and improved time performance of supply chains.
- Improving supply chain security, such as with the use of scanning technologies.
- Cross-border agreements to develop cross-border logistics (land border).

B Trusted trader program
- Reduction in the number of inspections for imported cargo and faster clearance.
- Exemptions from random non-intrusive inspections.
- Improved level of service for customs.

C Free zones (Foreign trade zones)
- Promotion of exports.
- Flexibility in the use of national customs regulations.
- Attract internationally focused logistics activities.

D Customs corridors
- Better integration between major gateways such as ports and airports.
- Additional flexibility in supply chain management.
Coordination and Implementation of National Logistics Policies: Improving the Global Interface of Logistics

**National gateways**
- Improve the capacity and throughput of ports or airports (new or existing facilities).
- Identify and coordinate transport infrastructure investment in gateway area.
- Facilitate modal shift and effective inland freight distribution.

**Concessioning**
- Improve the productivity of terminal operations.
- Better connectivity to global maritime shipping.
- Use and coordinate regional transportation more effectively.

**Privatization**
- Improve the efficiency of the privatized firms.
- Enables the entry of new providers.
- Increase competitiveness.

**Corridors and connectors development**
- Improve key capacity bottlenecks.
- Coordinate the operations and investments of various stakeholders.
- Improve hinterland transport capacity, efficiency, and reliability.
- Facilitate better asset utilization and modal shift.
**Port-centric logistics zone**
- Uses port real estate more effectively.
- Facilitates imports and exports (direct access to port terminal).
- Reduces local congestion.

**Inland / dry port**
- Promotes modal shift (if connected by rail or barge).
- Reduces port congestion (relocation of some port activities).
- Facilitates economies of scale in inland distribution (corridors).
- Lowers last mile transport costs (co-location).

**Inland container depot**
- Ensures availability of containers for exporters.
- Reduces port congestion.
- Lowers drayage costs.
Coordination and Implementation of National Logistics Policies: Developing Logistics Capabilities

A Labor training and certification
- Provide a labor pool to address expected demand.
- Increases labor productivity.
- Develops diversified skills.
- Attracts logistics firms.

B Research centres
- Identify trends, gaps and opportunities.
- Provide innovations suitable for the national market.
- Train researchers, consultants and managers.
- Collaborate with logistics firms.

C Logistics firms incubator
- Develop entrepreneurial capabilities, particularly for new firms.
- Improve the provision of specialized logistics services, such as 3PLs and 4PLs.
- Improve the competitiveness of the logistics market.
**Coordination and Implementation of National Logistics Policies: Digitalization**

**A Freight portal**
- Improves the interactions between the providers and consumers of logistics services.
- Promotes a better usage of transport assets and facilities.
- Enables the participation of small and medium-sized firms.

**B Port community system**
- Promotes competitiveness in port-related services.
- Promotes coordination between freight actors to improve port area efficiency.
- Improves the tracking of freight and transport assets.

**C Logistics observatory**
- Collects information about logistics activities.
- Reports key performance indicators benchmarking the industry.
- Assesses the effectiveness of logistics policies.
coordination and implementation of national logistics policies: developing niche logistics

A Green logistics / decarbonization
- Improve environmental impacts of logistics.
- Certified carriers (less emissions; energy efficiency).
- Certified distribution facilities (energy efficiency; lower footprint).
- Reduces material losses and carbon emissions.

B Cold chain logistics
- Promotes high-value reefers exports of perishables on global markets.
- Ensures higher quality exports and less waste.

C Transloading facility / Platform
- Promotes specialized commodity exports.
- Expand market opportunities for small and medium-sized producers.

D Reverse logistics
- Improves efficient recovery of recycled materials.
- Develop and expand the national recycling industry.
- Help meet sustainability goals.
**Rationalization of deliveries**
- Improves use of existing transport assets.
- Matches trip sequences (deliveries and pickups).
- Reduces congestion.

**Urban freight facilities**
- Promotes consolidation, sorting and deconsolidation in high density urban areas.
- Improves efficiency (time and energy) of urban deliveries.
- Supports the development of e-commerce.

**Modal adaptation**
- Reduces congestion and energy consumption.
- Reduces disruptions on local communities.
Transport Planning and Governance
Generic Planning Process

1. **Problem Statement, Vision and Goals**
   - Safety, health, mobility, equity, economic development

2. **Objectives**
   - Improve safety, improve roadway and trail facilities, increase non-motorized travel

3. **Evaluation Criteria**
   - Accident / injury rates, Bicycle Compatibility Index, non-motorized travel rate

4. **Program Evaluation**
   - Did program achieve its stated objectives? What is the program’s acceptance? What are its costs and benefits?
U.S. Dept of Transportation Forecasts of Future Driving vs. Reality

- May 2014
- 2014 C&P high scenario
- 2014 C&P low scenario
- 2010 C&P
- 2008 C&P linear growth
- 2006 C&P linear growth
- 2004 C&P cost to maintain*
- 2002 C&P cost to maintain*
- 1999 C&P cost to maintain*
- Actual**

C&P scenarios depicted based on linear growth; FHWA May 2014 forecast on compound growth.
* Based on "Cost to Maintain" scenario.
FHWA: Federal Highway Administration; C&P: Conditions & Performance report.

Frontier Group
## Market Distortions Impacting the Automobile

<table>
<thead>
<tr>
<th>Nature</th>
<th>Description</th>
<th>Potential Reform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Options and Information</td>
<td>Markets often offer limited alternatives to automobile transportation and automobile-oriented location.</td>
<td>Recognize the value of alternative modes and more accessible development in planning decisions.</td>
</tr>
<tr>
<td>Underpricing</td>
<td>Many motor vehicle costs are fixed or external.</td>
<td>As much as feasible, convert fixed costs to variable charges and charge motorists directly for the costs they impose.</td>
</tr>
<tr>
<td>Transport Planning Practices</td>
<td>Transportation planning and investment practices favor automobile oriented improvements, even when other solutions are more cost effective.</td>
<td>Apply least-cost planning so alternative modes and management strategies are funded if they are the most cost effective way to improve transport.</td>
</tr>
<tr>
<td>Land Use Policies</td>
<td>Current land use planning policies encourage lower-density, automobile-oriented development.</td>
<td>Apply smart growth policy reforms that support more multi-modal, accessible land use development.</td>
</tr>
</tbody>
</table>
Types of Land Use Zoning

- **Functional Zoning**
  - A zone for each type of land use.
  - Land use zones subject to different regulations.

- **Form-Based Zoning**
  - Focuses on physical characteristics.
  - Defined as a form of urban identity.

- **Intensity Zoning**
  - Sets land use intensity restrictions.
  - Flexibility in forms and functions of land use developments.

- **Incentive Zoning**
  - Rewards for development in defined areas.
  - Incite the provision of amenities.

### Functional Zoning Icons:
- Commercial
- Administrative
- Residential
- Industrial
- Green space

### Form-Based Zoning Icons:
- Downtown
- Uptown
- East Side
- Historical district
- Manufacturing district

### Intensity Zoning Icons:
- High density
- Average density
- Low density
- No development

### Incentive Zoning Icons:
- Incentives
- No incentives
# Regulation of Freight Transportation in the United States

## Who Regulates Freight Transportation Services

<table>
<thead>
<tr>
<th>MODE</th>
<th>Domestic – U.S.</th>
<th>International</th>
</tr>
</thead>
</table>
| Air Service | • Federal Aviation Administration  
• Environmental Protection Agency | • Federal Aviation Administration  
• International Air Transport Assoc.  
• International Civil Aviation Org.  
• U.S. Customs Service  
• U.S. Immigration and Naturalization Service (for imports) |
| Truck Service | • Federal Highway Administration  
• Environmental Protection Agency  
• Occupational Safety and Health Administration  
• Surface Transportation Board  
• State and Local Safety and Tax Officials | • U.S. Customs Service  
• U.S. Immigration and Naturalization Service (for imports)  
• Requirements of foreign country where truck is being operated |
| Rail Service | • Federal Railroad Administration  
• Surface Transportation Board  
• Environmental Protection Agency | • U.S. Customs Service  
• U.S. Immigration and Naturalization Service (for imports)  
• Requirements of foreign country where train is being operated |
| Barge | • U.S. Coast Guard  
• Environmental Protection Agency  
• Surface Transportation Board | • U.S. Customs Service  
• U.S. Immigration and Naturalization Service (for imports)  
• U.S. Coast Guard  
• Federal Maritime Commission  
• Requirements of foreign country where barge service is performed |
| Maritime | • U.S. Coast Guard  
• Federal Maritime Commission  
• Environmental Protection Agency | • U.S. Coast Guard (within U.S. territorial limits)  
• Federal Maritime Commission  
• U.S. Customs Service  
• U.S. Immigration and Naturalization Service (for imports)  
• International Maritime Organization  
• Requirements of foreign country where maritime service is performed |
| Pipeline | • Federal Energy Regulatory Commission  
• Office of Pipeline Safety of USDOT | N/A |

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Public / Private Partnership Options

CONVENTIONAL
- Design
- Bid
- Build
- Private Contract
- Fee Service

EMERGING
- Build
- Operate
- Transfer
- (BOT)
- Design
- Build
- Finance
- Operate
- (DBFO)
- Build
- Own
- Operate
- (BOO)

PUBLIC RESPONSIBILITY
PRIVATE RESPONSIBILITY
• **Service Contracts**: Contracting services or outsourcing refers to delegation of non-core operations from public sector to a private entity that specializes in operation, maintenance or management of that activity.

• **Management Contracts**: Airport owners can contract out management and operation of parking facilities, terminal concessions, terminal operations, reliever airports or their entire airport system to private operators. Management contracts for parking operations are particularly prevalent.

• **Developer Financing and Operation**: There is a wide variety of developer financing and operation employed, including passenger terminals, parking garages, rental car facilities, fuel systems, cargo facilities, general aviation facilities, and other major facilities. Private sector can provide full-scale development, operation, and maintenance services and sometimes financing under long-term leases or concessions.

• **Long-term lease (or concession agreement)**: airport owner grants full management and development control to private operator in return for operator undertaking capital improvements and other obligations (e.g., up-front payment, responsibility for outstanding debt, capital improvements).

• **Sale**: Airport is transferred on a freehold basis with requirement that it continue to be used for airport purposes.
Risk Transfer and Private Sector Involvement in Public-Private Partnerships

Design - Build

Degree of Private Sector Risk

PPP Models

Design-Build-Finance-Maintain

Build-Finance

Operation & Maintenance

D-B-F-M-Operate

Concession

Privatization

Degree of Private Sector Involvement
Government owned/operated (US, Spain, Singapore, Finland, Sweden)
Government owned, privately operated (US (via contracts), Chile, Hamilton {Canada?})
Major airports which have public-private partnerships in the form of BOO, BOT and management contract variants, such as in India
Independent not-for-profit corporations (Canada)
Fully private for-profit via IPO (Initial Public Offering) with stock widely held (originally BAA)
Fully private for-profit via trade sale with share ownership tightly held (Australia, New Zealand).
Partially private for-profit with private controlling interest (Denmark, Austria, Switzerland)
Partially private for-profit with government controlling interest (Hamburg Germany, France, China, Kansai Japan)
Transport Safety and Security
# Classification of Dangerous Goods

<table>
<thead>
<tr>
<th>Class</th>
<th>Subclass</th>
</tr>
</thead>
</table>
| 1 (Explosives) | 1.1 - Explosives with a mass explosion hazard (nitroglycerin, dynamite)  
1.2 - Explosives with a blast/projection hazard  
1.3 - Explosives with a minor blast hazard (rocket propellant, display fireworks)  
1.4 - Explosives with a major fire hazard (consumer fireworks, ammunition)  
1.5 - Blasting agents  
1.6 - Extremely insensitive explosives |
| 2 (Gases) | 2.1 - Flammable gas (acetylene, hydrogen).  
2.2 - Non-flammable gases (nitrogen, neon).  
2.3 - Poisonous gases (fluorine, chlorine) |
| 3 (Flammable liquids) | (fuel oil, gasoline) |
| 4 (Flammable solids) | 4.1 - Flammable solids (nitrocellulose, magnesium)  
4.2 - Spontaneously combustible solids (aluminum alkyls, white phosphorus)  
4.3 - Dangerous when wet (sodium, calcium, potassium) |
| 5 (Oxidizing agents and organic Peroxides) | 5.1 - Oxidizing agent (calcium hypochlorite, ammonium nitrate, hydrogen peroxide)  
5.2 - Organic peroxide oxidizing agent (benzoyl peroxides, cumene hydroperoxide) |
| 6 (Toxic and infectious substances) | 6.1 - Poison (potassium cyanide, pesticides)  
6.2 - Biohazard (virus cultures, used intravenous needles) |
| 7 (Radioactive) | (uranium, plutonium) |
| 8 (Corrosive) | 8.1 - Acids (sulfuric acid, hydrochloric acid)  
8.2 - Alkalis (potassium hydroxide, sodium hydroxide) |
| 9 (Miscellaneous) | (asbestos, air-bag inflators, dry ice) |
Worldwide Attacks Inside an Aircraft by Type, 1970-2009
Thefts by Type of Cargo and Location, United States, 2016

**Thefts**
- Alcohol: 7%
- Auto / Parts: 1%
- Building / Industrial: 4%
- Consumer Care Products: 6%
- Electronics: 11%
- Food / Beverages: 13%
- Home / Garden: 20%
- Miscellaneous: 8%
- Pharmaceuticals: 5%
- Tobacco: 1%

**Locations**
- Truck Stops: 29%
- Public Access Parking: 21%
- Secured Parking: 25%
- Unsecured Terminals / Lots: 5%
- Fictitious Pickup: 7%
- Other: 1%

- Piracy Attacks
- Piracy Attempts

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Transport Security Dimensions

Contents
- Contents consistent with the bill of lading or list of passengers.
- May involve direct or remote inspection.
- Cross-referencing with manifest.

Integrity
- Contents remain unchanged from origin to destination.
- Detect unauthorized access.
- Any change monitored and recorded (locks, alarms or sensors).

Route
- No deviation from the scheduled route.
- Cargo or passengers remain within secure modes and locations (terminals and distribution centers).

Information
- Authenticated and verifiable information about cargo or passengers.
- Information cannot read or modified without credentials.
Transport Security Measures

**Procedural**
- Access to modes and facilities recorded.
- Insuring security operations along the transport chain (monitoring and inspections).

**Physical**
- Secure facilities (terminals, distribution centers) and conveyances (modes).
- Security equipment (scanners, CCTV).
- Identification for access.

**Labor**
- Labor subject to screening and background checks.

**Information**
- Protection of the integrity of information.
- Tiers for information access.
- Secure transactions.
<table>
<thead>
<tr>
<th>Legislation</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aviation and Transportation Security Act (2001)</td>
<td>Gave the federal government broad authority in transportation security for all modes.</td>
</tr>
<tr>
<td>Critical Infrastructure Information Act (2002)</td>
<td>Created the framework that allows private-sector entities and others to voluntarily submit information regarding critical infrastructure/key resources in their possession to the U.S. Department of Homeland Security, with the assurance that this information will not be publicly available.</td>
</tr>
<tr>
<td>The Intelligence Reform and Terrorism Prevention Act (2004)</td>
<td>Required the development of the National Strategy for Transportation Security. This strategy is a classified document, but it is known that this document provides the framework for the federal government, working with state, local, and tribal governments and private industry, to secure the national transportation system and to prepare to respond to terrorist threats or attacks to transportation infrastructure.</td>
</tr>
<tr>
<td>Security and Accountability for Every Port Act (2006)</td>
<td>Required the secretary of homeland security, in coordination with relevant federal, state, local, and tribal government authorities and the private sector and international community, to develop and implement a strategic plan to “enhance the security of the international supply chain.”</td>
</tr>
</tbody>
</table>
## Maritime Security Initiatives Implemented by the United States or the European Union

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Type</th>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automated Targeting System (ATS)</td>
<td>Cargo screening</td>
<td>1999</td>
<td>Weighted model applied to inbound cargo manifests to assign risk factors.</td>
</tr>
<tr>
<td>Customs-Trade Partnership Against Terrorism (C-TPAT)</td>
<td>Certification</td>
<td>2001</td>
<td>Transferring some of the Customs responsibilities to importers and exporters to reinforce overall security levels. Benefits include reduced likelihood that containers of participating firms will be examined.</td>
</tr>
<tr>
<td>Container Security Initiative (CSI)</td>
<td>Cargo tracking and screening</td>
<td>2002</td>
<td>Increasing security related to ocean going containers by targeting and screening high risk containers bound for the US in a foreign port before they are loaded.</td>
</tr>
<tr>
<td>Megaports initiative</td>
<td>Cargo tracking and screening</td>
<td>2003</td>
<td>Installation of radiation detection equipment in key foreign ports. Reducing the illicit trafficking of nuclear and other radiological materials.</td>
</tr>
<tr>
<td>24 hour rule</td>
<td>Advance cargo information</td>
<td>2003</td>
<td>Implementing the cargo-related information at least 24 hours before a container is loaded aboard the vessel at the last foreign port.</td>
</tr>
<tr>
<td>Standards to Secure and Facilitate Global Trade (SAFE)</td>
<td>Certification</td>
<td>2005</td>
<td>Implementing C-TPAT and CSI security practices with foreign trade partners.</td>
</tr>
<tr>
<td>EU Authorized Economic Operator (AEO)</td>
<td>Certification</td>
<td>2008</td>
<td>Identifying reliable traders and providing them with trade facilitation measures.</td>
</tr>
<tr>
<td>Importer Security Filing and Additional Carrier Requirements (ISF, 10+2)</td>
<td>Advance cargo information</td>
<td>2009</td>
<td>Implementing the collection of cargo-related information by requiring information from both the importer (10 information elements) and the carrier (2 information elements) to be transmitted at least 24 hours before the goods are loaded.</td>
</tr>
<tr>
<td>EU Pre-arrival and Pre-departure</td>
<td>Advance cargo information</td>
<td>2009</td>
<td>Advance information on goods brought into, or exported from the Customs territory of the EU (perimeter).</td>
</tr>
<tr>
<td>100% scanning</td>
<td>Cargo screening</td>
<td>2012</td>
<td>Non-intrusive inspection of 100% of all inbound cargo containers.</td>
</tr>
</tbody>
</table>
Transportation, Disruptions and Resilience
Risks in Global Supply Chains

**RISKS**

- Supply Risks
- Demand Risks
- Operational Risks

**FACTORS**

**Environmental**
- Natural disasters
- Extreme weather
- Pandemic

**Geopolitical**
- Political instability
- Trade restrictions
- Terrorism
- Corruption
- Theft and illicit trade
- Piracy

**Economic**
- Demand shocks
- Price volatility
- Border delays
- Currency fluctuations
- Energy shortages

**Technological**
- ICT disruptions
- Infrastructure failures

**Probability**
- High (>30%)
- Average (15-30%)
- Low (<15%)

**Mitigation**
- Uncontrollable
- Influenceable
- Controllable

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Types of Supply Chain Risks and Their Resilience

<table>
<thead>
<tr>
<th>Risk Type</th>
<th>High Resilience</th>
<th>Low Resilience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration</td>
<td>LOW</td>
<td>HIGH</td>
</tr>
<tr>
<td>Geography and density of suppliers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substitution</td>
<td>HIGH</td>
<td>LIMITED</td>
</tr>
<tr>
<td>Capacity to find another supplier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interconnectivity</td>
<td>LOW</td>
<td>HIGH</td>
</tr>
<tr>
<td>Suppliers interdependent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synchronization</td>
<td>HIGH</td>
<td>LOW</td>
</tr>
<tr>
<td>Frequency and volume of deliveries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth</td>
<td>SHALLOW</td>
<td>DEEP</td>
</tr>
<tr>
<td>Number of supplier tiers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visibility</td>
<td>HIGH</td>
<td>LOW</td>
</tr>
<tr>
<td>Ability to trace suppliers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependence</td>
<td>LOW</td>
<td>HIGH</td>
</tr>
<tr>
<td>Reliance on a single supplier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inventory</td>
<td>HIGH</td>
<td>LOW</td>
</tr>
<tr>
<td>Inventory level and supply chain buffer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Types of Transportation Networks and Vulnerabilities

- **Air Networks**: Nodal hierarchy (hub-and-spoke)
- **Maritime Networks**: Circuitous nodal hierarchy
- **Logistical Networks**: Sequential multi-nodal hierarchy
- **Road Networks**: Hierarchical meshes
- **Rail Networks**: Linear nodal hierarchy
- **Power Grids**: Sequential linear hierarchy

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Resilience of Transportation Systems

Operational Level

Disruption

Impact

Recovery

Resilience

Time

Forms of Resilience

Network

Efficient

Resilient

Supply Chain
Probability of a Geomagnetic Storm with a Field Change Greater than 300 Nanoteslas per Minute (22-year cycle)