



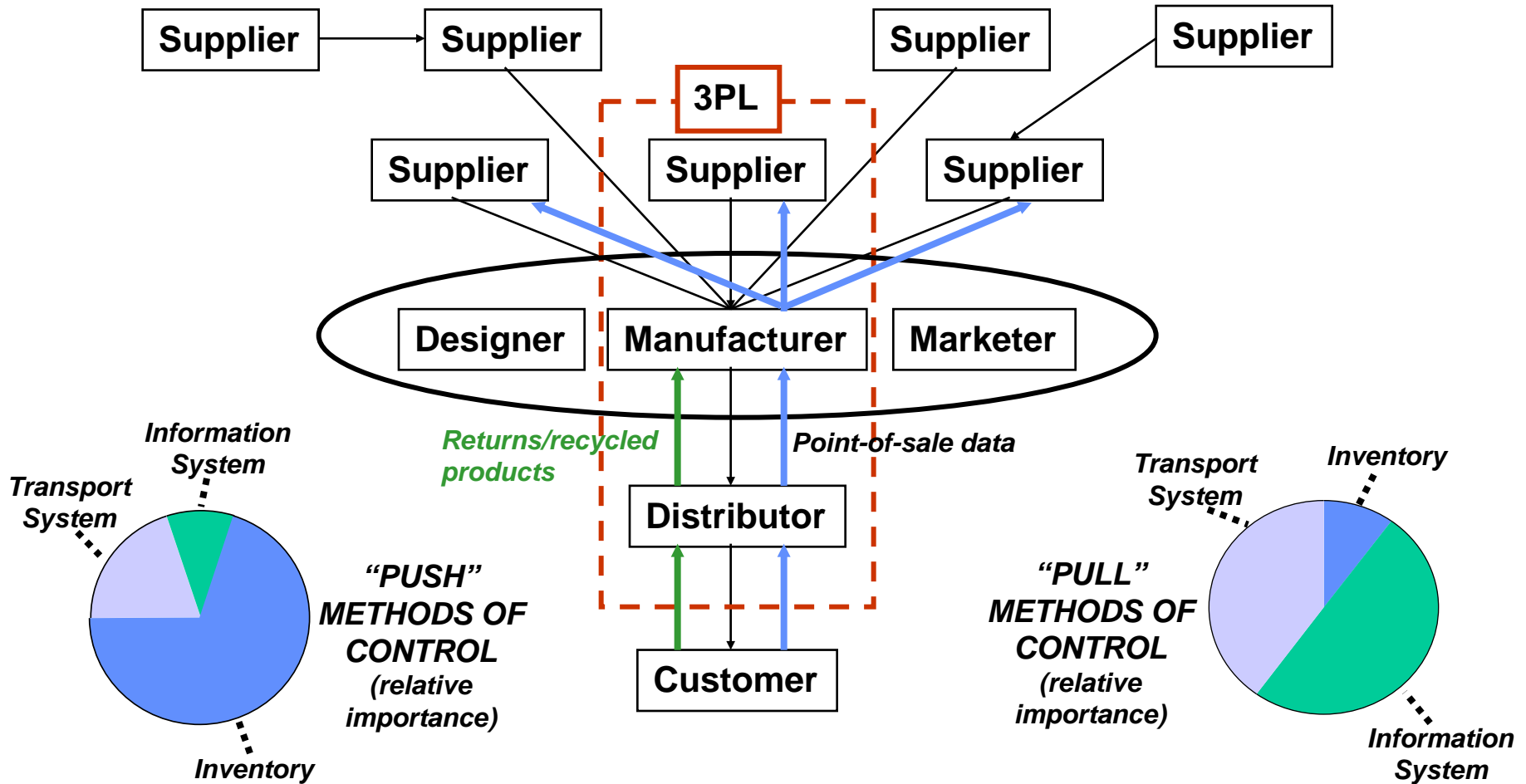
Trends in Freight Transportation

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Private sector perspective - shipper & carrier

- Freight transportation industry trends, particularly freight with a high value to weight ratio
- What these trends might mean for a national freight policy
- What such a policy should look like
- Issues to be addressed in a national freight policy

Supply Chain Systems



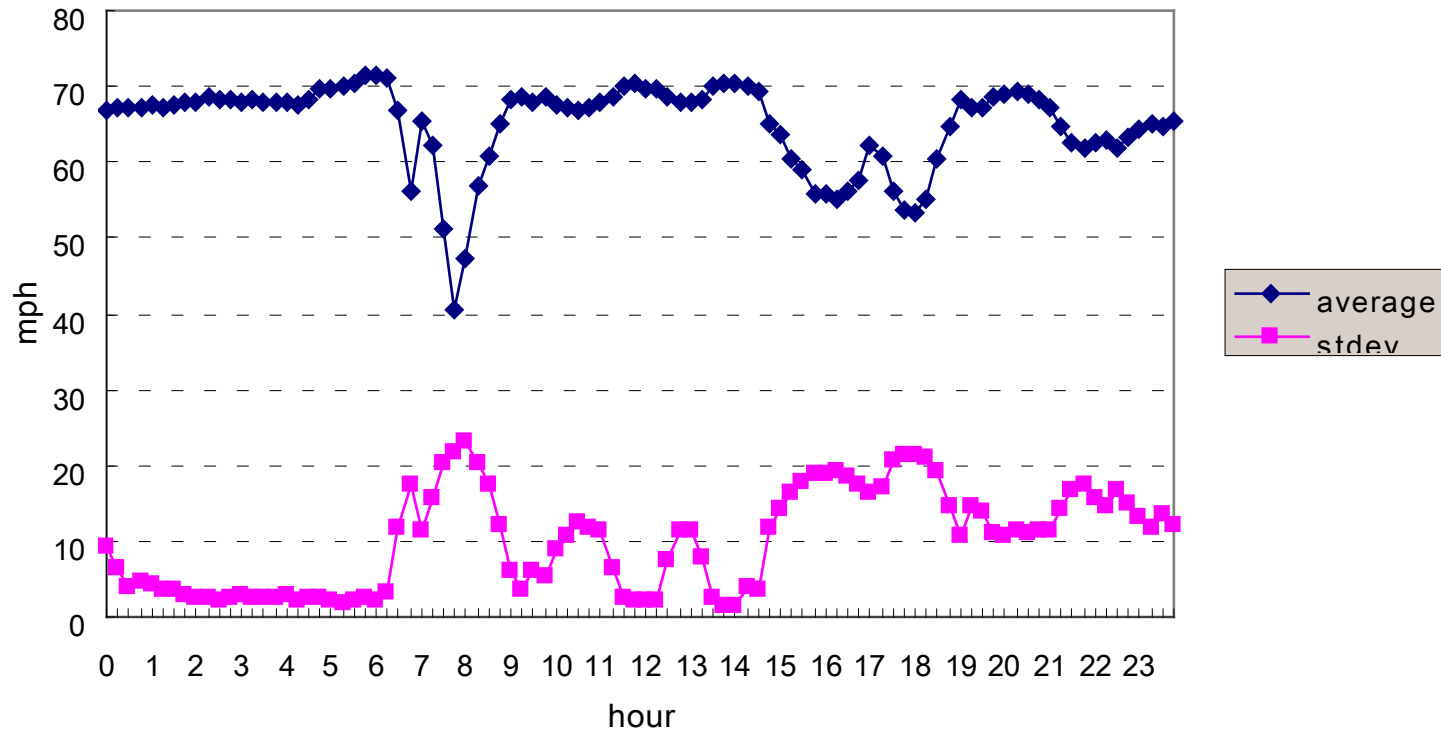
Background – Supply chain design

- Focused on min cost & max customer service
 - Direct costs – tariffs, tolls, fuel, personnel
 - Indirect costs – lead time mean & variance (affects how much buffer inventory/holding cost needed to satisfy customer service)
- All modes are of interest, linked
- Supply chain re-design:
 - Results in modal & intermodal shifts
 - Due to changes in energy costs, infrastructure, regulations, mode availability, etc.
- **Implication:** All modes and their interfaces are part of a system

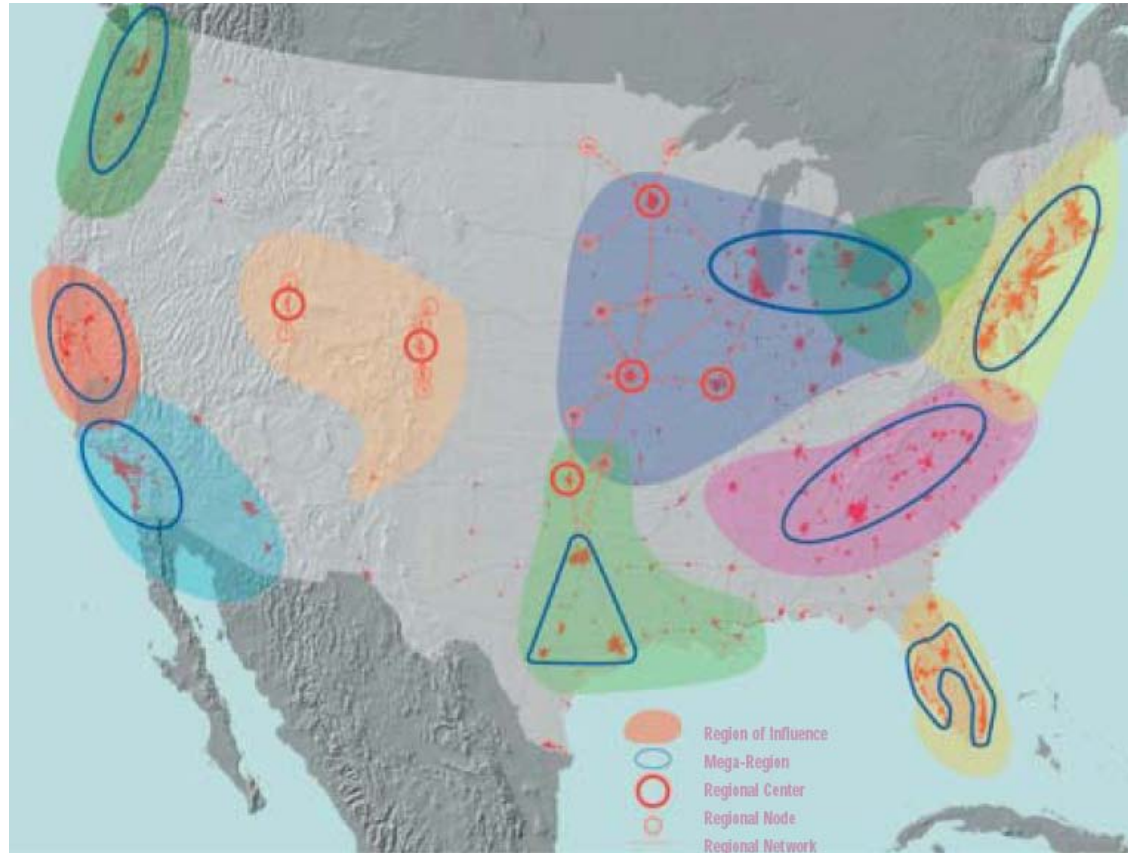
System of systems – externalities & constraints

- Energy cost and availability
- Labor cost and availability
- Regulation
 - EPA
 - HOS
 - Size & weight
 - Safety
 - Security
- Changing demographics – corridors, super regions
- Changing freight transportation infrastructure – 3rd set of locks, Panama Canal
- Congestion

Congestion & Leadtime Uncertainty



Evolving Mega-Regions in the U.S



Source: Carbonell et al, *Global Gateway Regions, The United States of America's Third Century Strategy*, Southern California Association of Governments, Los Angeles, CA, Sept. 2005; based on "Toward an American Spatial Development Perspective," University of Pennsylvania, Department of Planning, Spring 2004.

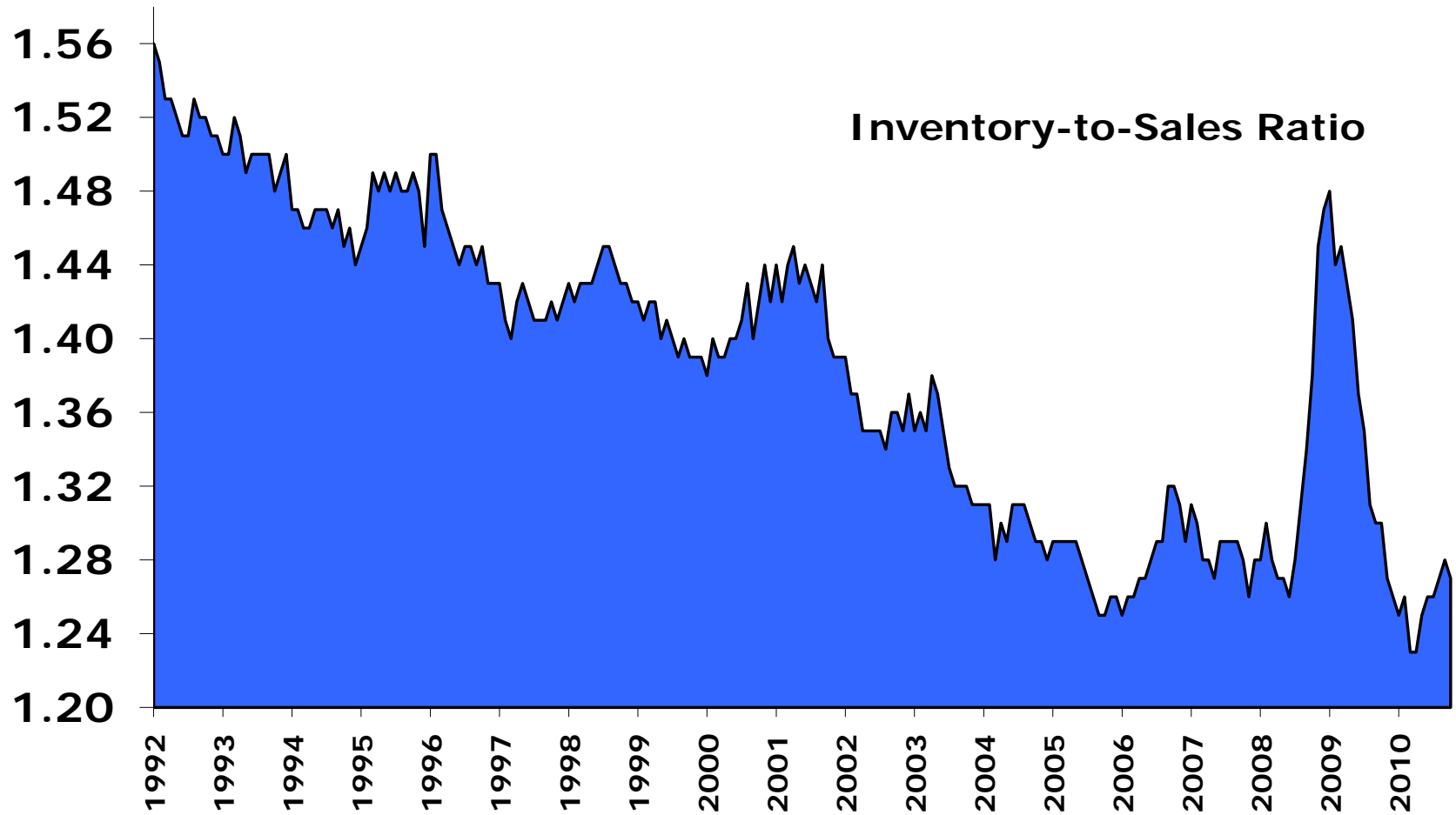
Trends – near shoring

- “Reverse globalization” - supplier footprints moving closer to assembly and destination markets
- Cause: rising fuel costs, rising labor costs, and buffer inventory holding costs associated with long supply chains
- Large buffer inventories due to supply chains with large means and variances larger than expected (growing realization)
- Note: ratio of lead-time variance to lead-time mean in ‘high velocity’ supply chains particularly large
- **Implication:** A need to increase focus on improving border crossing efficiency with NAFTA countries/Caribbean

Trends – beyond lean (JIT)

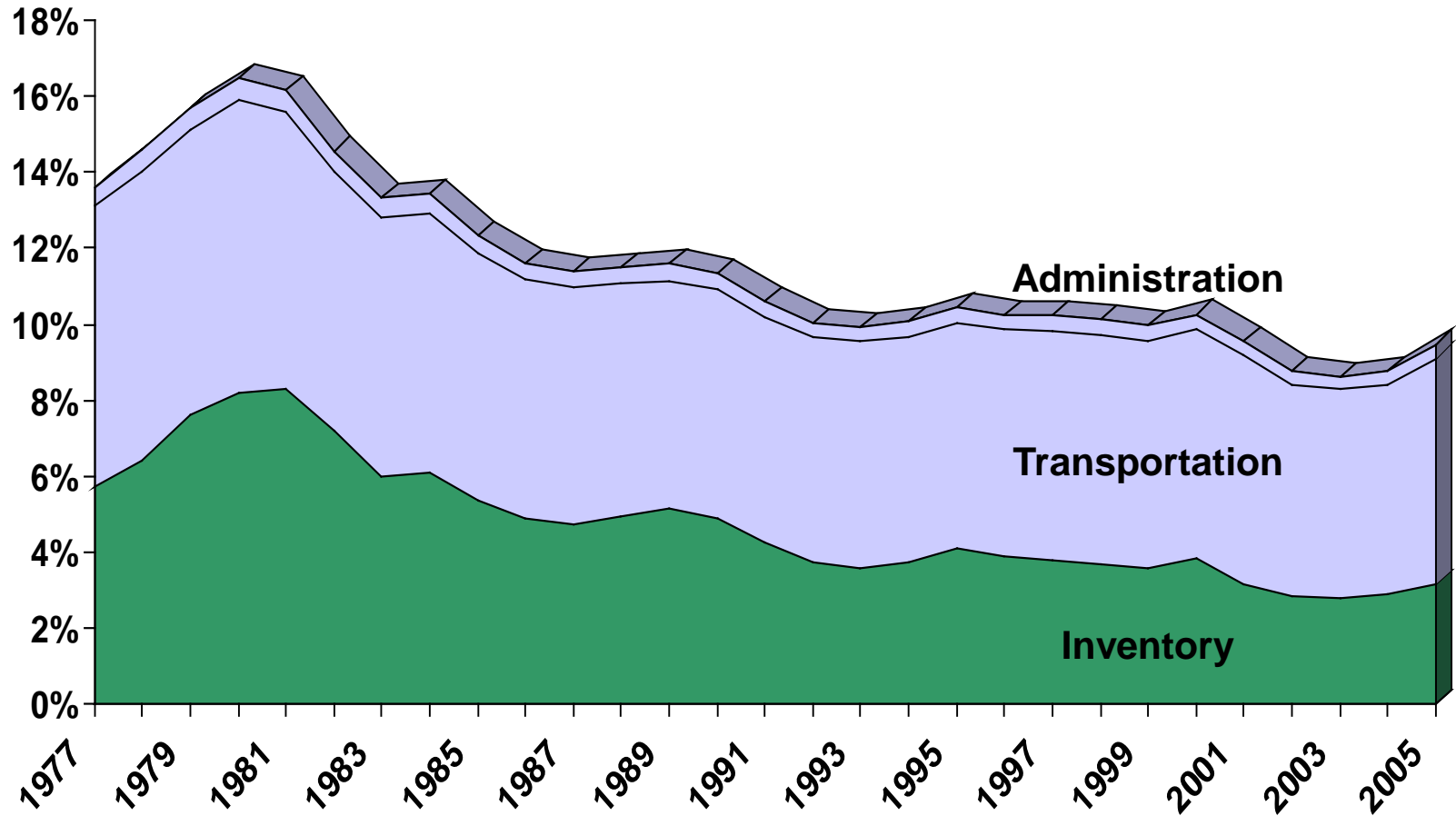
- Beyond lean – *resilient* supply chains needed to mitigate the risk of major disruptions (e.g., weather, accidents, strikes, fuel shortages, terrorist acts & threats, etc.)
- Remark: lean supply chains are very fragile
- Expected economic impact of a major disruption affected by:
 - Disruption likelihood (frequency of occurrence, related to investment in prevention)
 - Rapid recovery
- **Implication:** the importance of investment in both prevention and rapid recovery from major disruptions

Inventory Trends Total Supply Chain



Logistics Costs

Percentage of U.S. Gross Domestic Product



Source: Rosalyn A. Wilson, *State of Logistics Report*, Council of Logistics Management, 2006

Trends – real time supply chain control

- Real time supply chain control, based on real time data – the next level of supply chain efficiency
- Enabled by public and private investments in IT
- Multiple sources of data in a supply chain:
 - Inventory levels
 - Production rates
 - Vehicle, vessel, or trailer: position, speed, direction, engine temperature, oil or air pressure
 - Driver alertness
 - Traffic congestion
 - Weather
 - Freight status & visibility

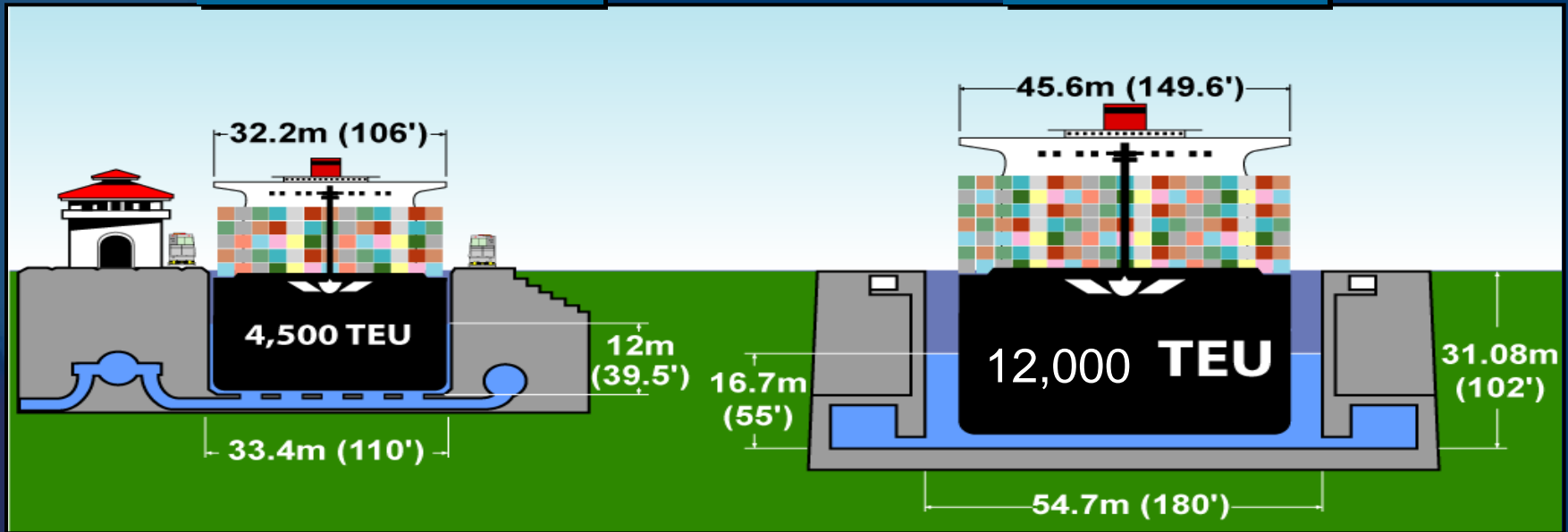
Trends – real time supply chain control

- Examples, based on real time congestion information:
 - Route determination in real-time: re-route in-route
 - Tour determination in real-time: dynamic tour determination
- The value of information:
 - How to assess this value?
 - How to extract this value in real time operations?
 - Is the value always positive?
 - What is the impact of data delay on this value?
- **Implication:** A need for R&D investment and innovation

Panama Canal expansion 3rd Set of Locks & Vessel Dimensions

Existing Lock

New Lock*



Chamber Length 305m (1,000')
Vessel Beam 294.3m (965')

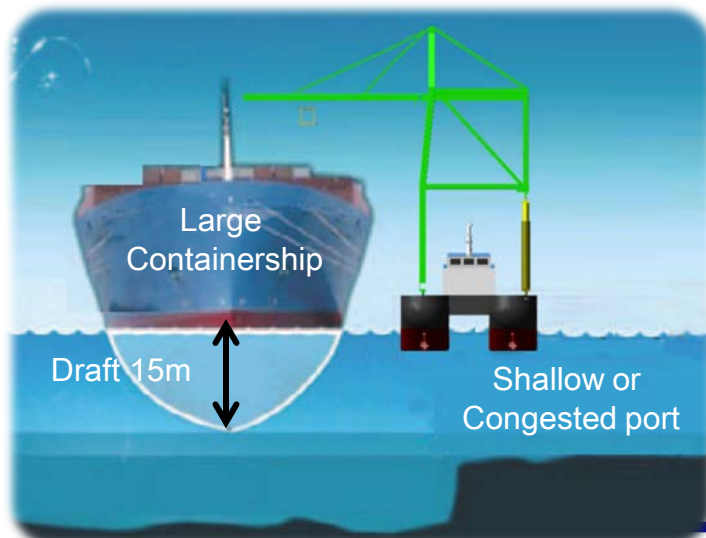
Chamber Length 427m (1,400')
Vessel Beam 385.8m (1,265')

*These dimensions were defined for a typical 8,000 TEU vessel

Mobile Harbor (MH)

Novel maritime cargo transport solution that can connect a large containership anchored in the open sea and ports with shallow water

- Execute high speed loading and unloading in the wavy open sea
 - Deploy original, advanced technologies



Thank you!