

**TED 2006**

**LITTLE ROCK**



**CONFERENCE ON TRANSPORTATION  
& ECONOMIC DEVELOPMENT**

March 29 -31, 2006  
Little Rock, Arkansas



# Integrating Supply Chain Benefits Into the Economic Impact Analysis of Freight Investments

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# Agenda

- **The Importance of Supply Chain Benefits**
- **Benefits from Lower Transport Cost**
- **Benefits from Fewer Bottlenecks**
- **Service Level and Pricing Benefits**
- **Conclusions**

# Importance of Supply Chain Benefits

# Evolution of the supply chain concept

- Physical distribution (NCPDM): 1963
- Logistics (CLM)
- Supply Chain Management (CSCMP)

## Boston Strategies International's Supply Chain Types™

		FLOW/CONTINUOUS		BATCH/CELLULAR			
		Vessel/Railcar	TL/IM	Vessel/Railcar	TL/IM	LTL/Sm. Pkg/Air	
Make to Plan	RAW MATERIAL SOURCE	1. Extraction (EX)		3. Make-to-Stock Manufacturing (MS)			CONSUMER
Make to Stock			2. Process Manufacturing (PM)		5. Distribution (DS)		
Assemble to Order						6. Re-Selling (RS)	
Make to Order				4. Design-to-Order Manufacturing (DO)			
Engineer to Order							

# Major supply chain movements

- **Strategic sourcing**

- Purchasing
- Procurement
- Strategic sourcing

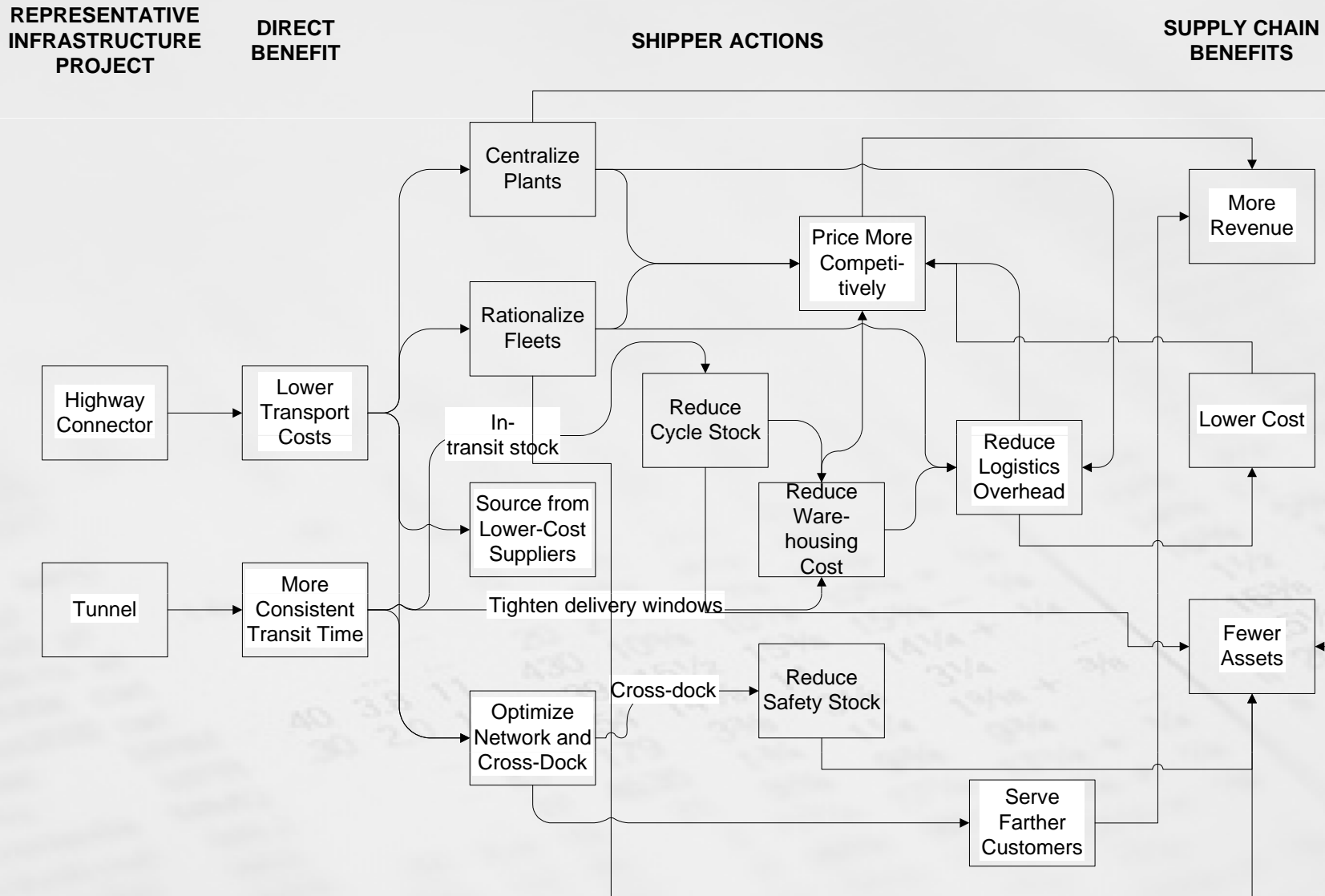
- **Lean**

- Minimization of the amount of all the resources (including time) used in the various activities of the extended enterprise

- **Visibility**

- Ability to manage material at any point in the process from the beginning to the end of the supply chain

# Supply chain benefits of transport projects

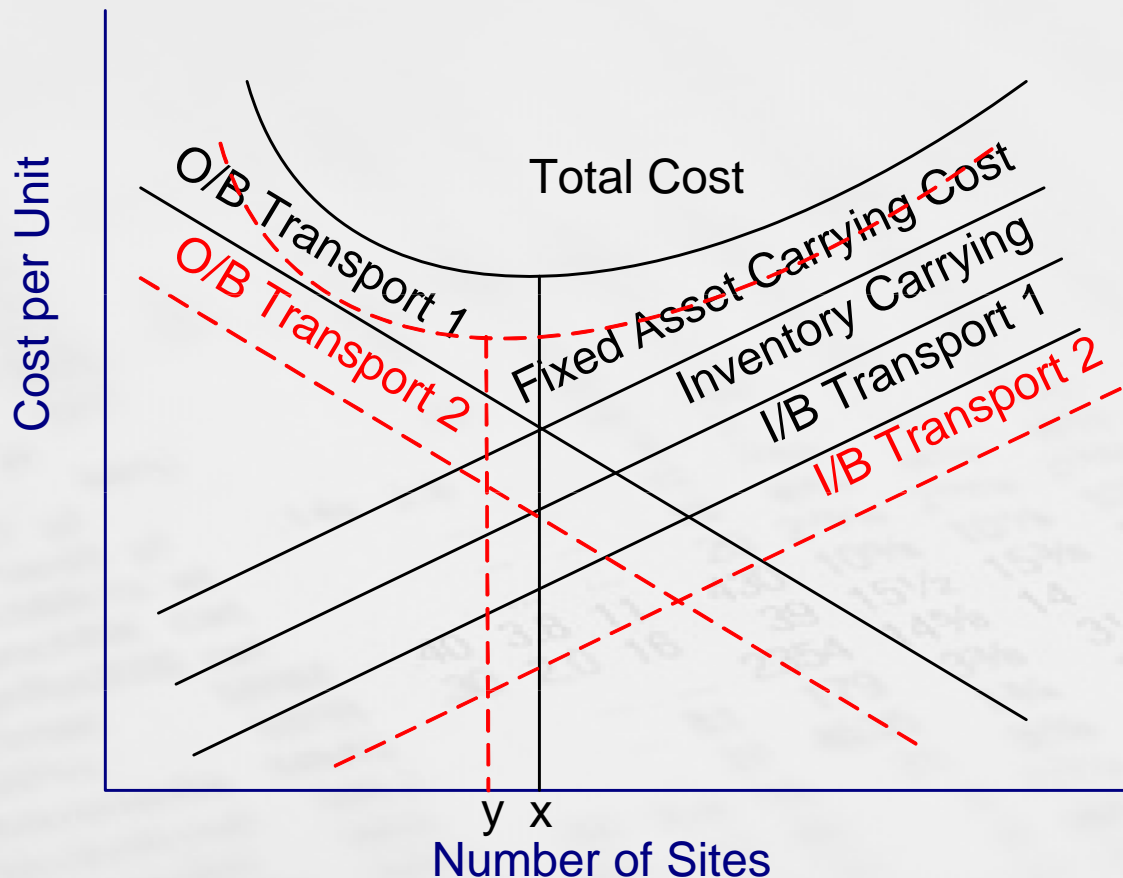


# Benefits from Lower Transport Cost

# Operating fewer plants, increasing ROA

## EFFECT

### Site Location Cost Drivers



## BENEFIT

10% decrease in transport costs



Supply Chain Benefits  
0.2% of operating cost  
4.1% of transport costs



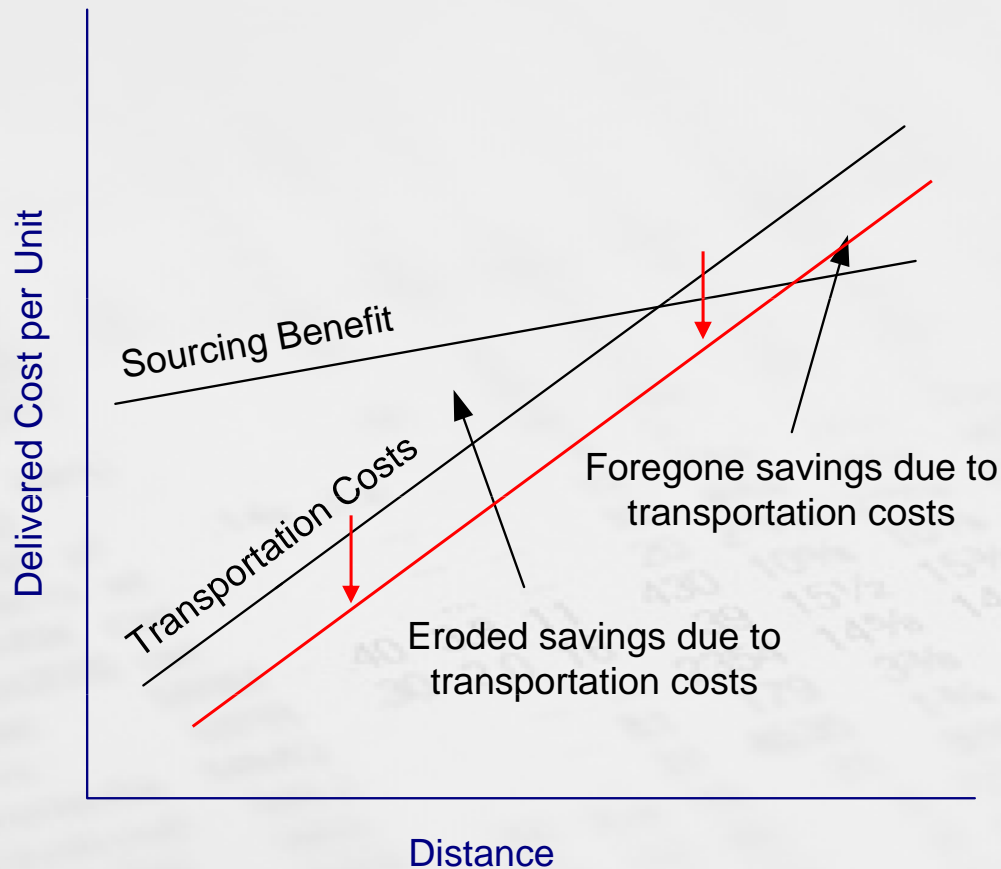
SC Type	Impact
EX	1.54
PM	0.93
MS	0.84
DO	0.73
DS	1.39
RS	0.56



# Lower transport costs increase accessibility

## EFFECT

### Strategic Sourcing Savings vs. Transportation Costs



## BENEFIT

10% decrease in transport costs



Supply Chain Benefits  
0.1% of operating cost  
1.5% of transport costs

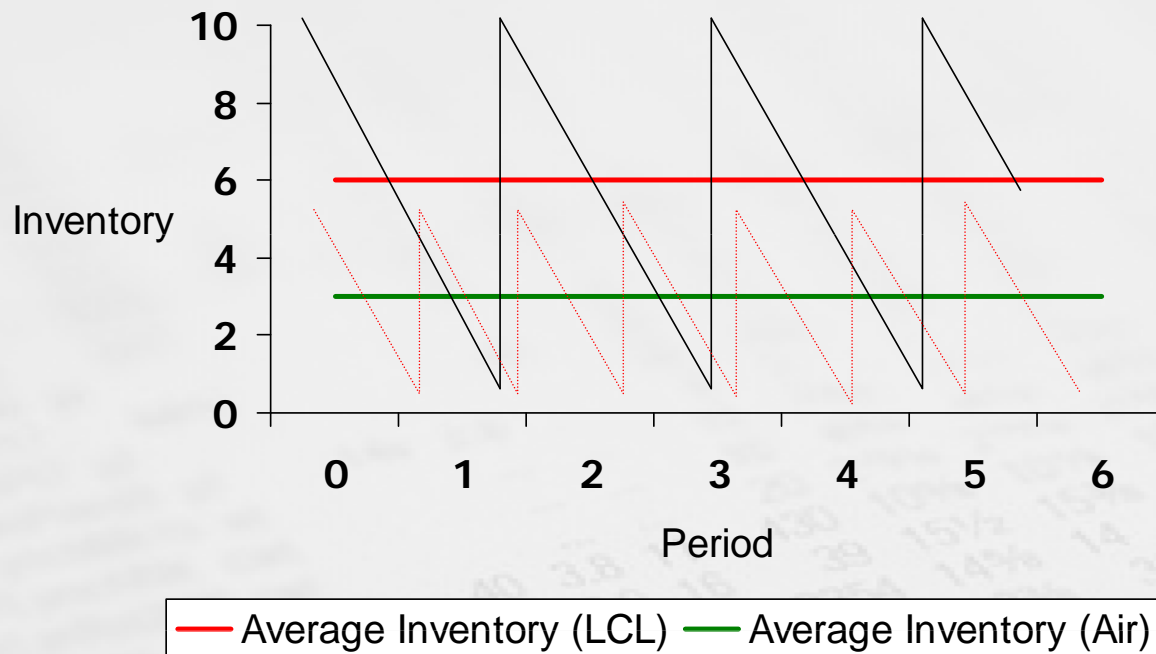


SC Type	Impact
EX	0.76
PM	0.86
MS	0.93
DO	0.93
DS	1.06
RS	1.46

# Reducing inventory due to more frequent deliveries

## EFFECT

**Inventory Requirements by  
Inbound Mode and Order Quantity**



## BENEFIT

10% decrease in  
transport costs



Supply Chain Benefits  
0.1% of operating cost  
1.2% of transport costs



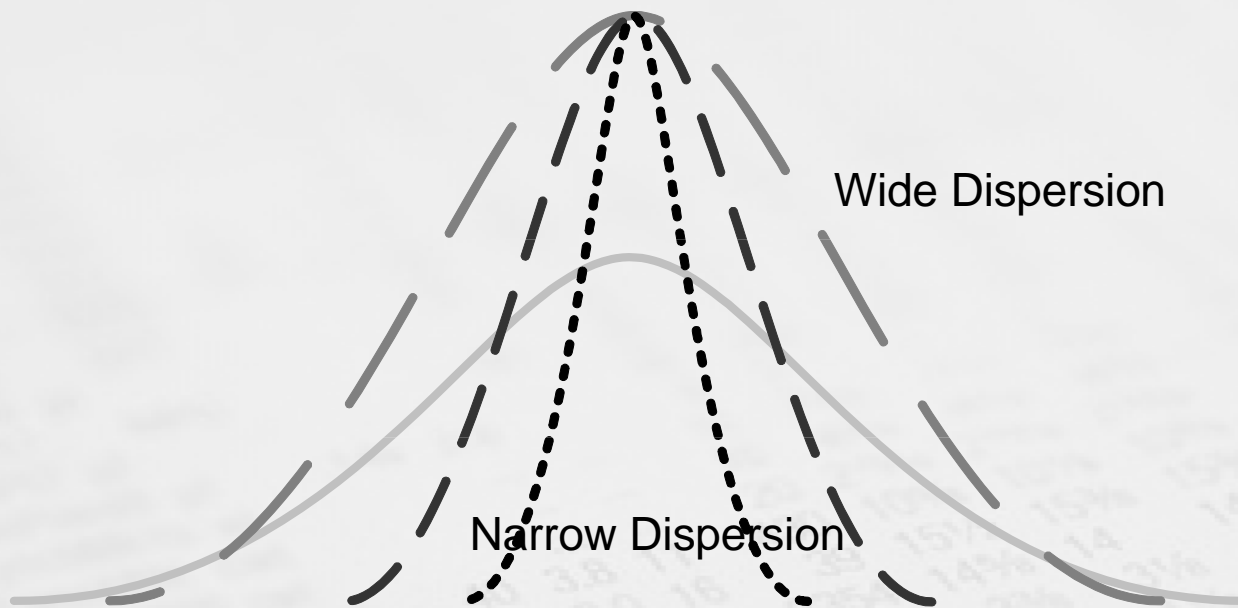
SC Type	Impact
EX	0.82
PM	0.95
MS	1.11
DO	1.09
DS	1.03
RS	1.00

# Benefits from Fewer Bottlenecks

# Increasing Inbound Reliability, Reducing Inventory

## EFFECT

Transit Time Variability  
Compression, Same Mode



## BENEFIT

10% more transport reliability  
(capacity increase)



Supply Chain Benefits  
0.1% of operating cost  
1.1% of transport costs



SC Type	Impact
EX	0.82
PM	0.95
MS	1.11
DO	1.09
DS	1.03
RS	1.00

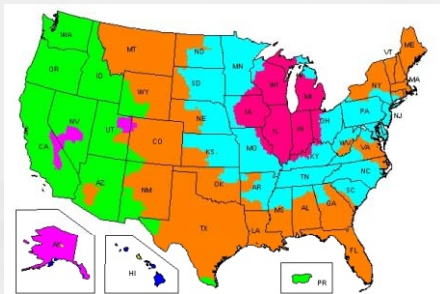
# Rationalized Fleet and Warehouse Assets

- Reduced congestion



- Fewer spare vehicles
- Less warehouse space
- More miles/day

Truck Delivery Zones by Number of Days, from Chicago



**Higher ROA**

## BENEFIT

10% more transport reliability  
(capacity increase)



Supply Chain Benefits  
0.01% of operating cost  
0.3% of transport costs

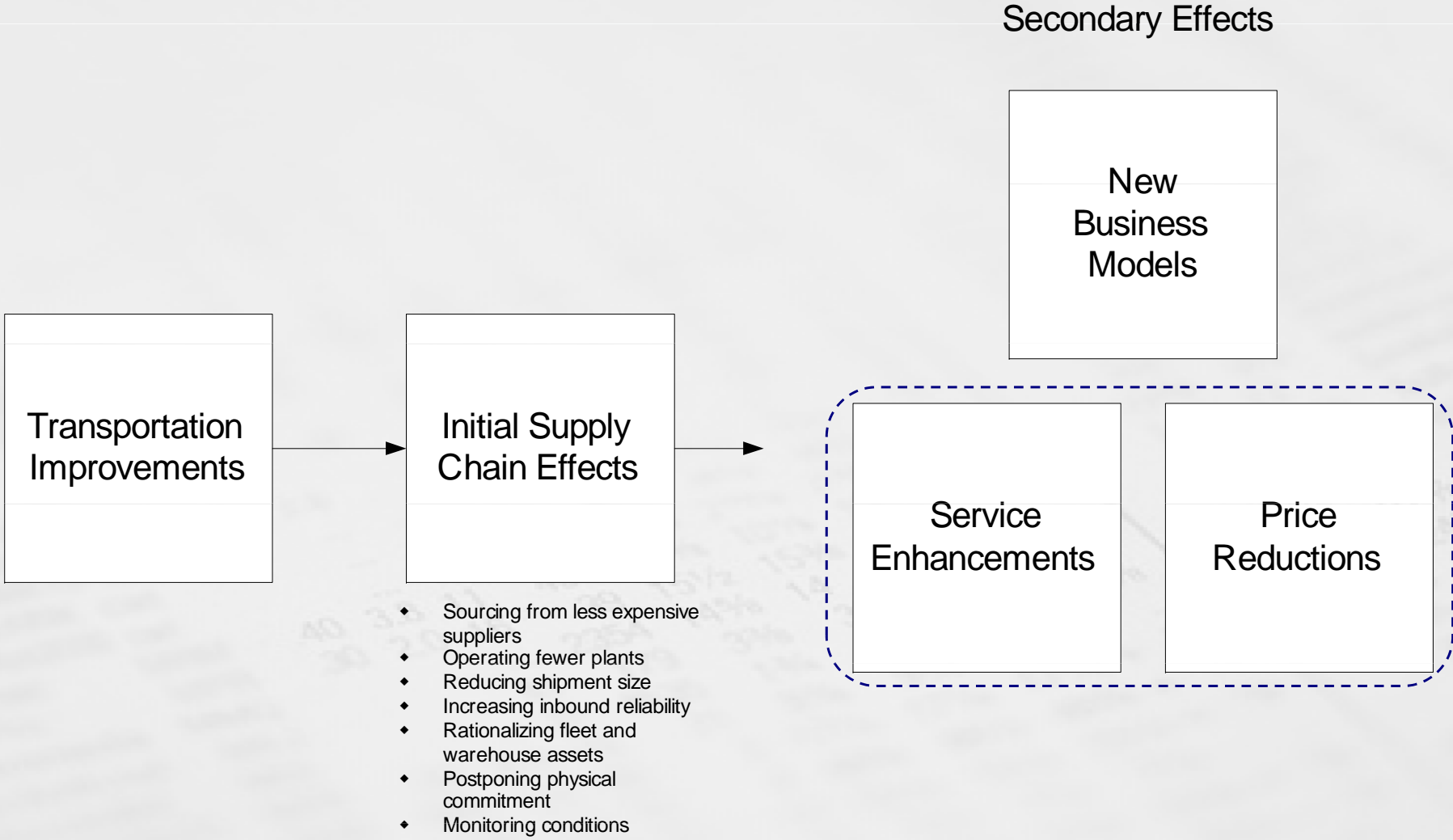


SC Type	Impact
EX	2.7
PM	0.7
MS	0.5
DO	0.5
DS	0.6
RS	1.0

# Service Level and Pricing Benefits

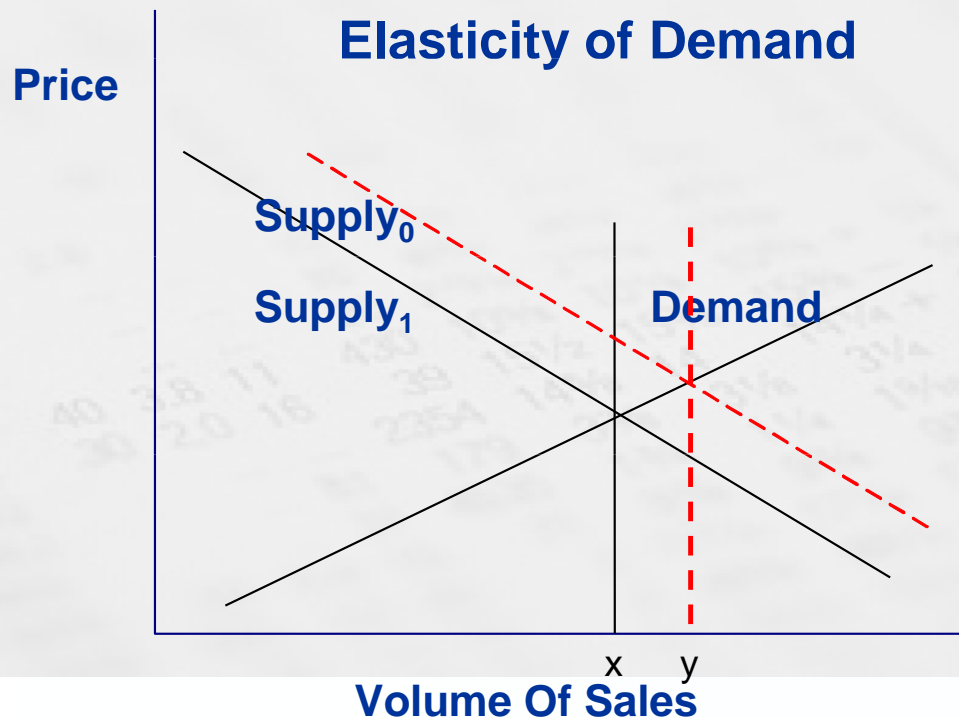
# Secondary benefits

## Creation of Secondary Benefits



# Increased service/cost ratio, enhancing revenue

- Same service level (shorter order-to-delivery leadtimes) for a lower price
- Higher service levels for the same price (higher revenue)
- Higher service levels for a higher price (higher margin)

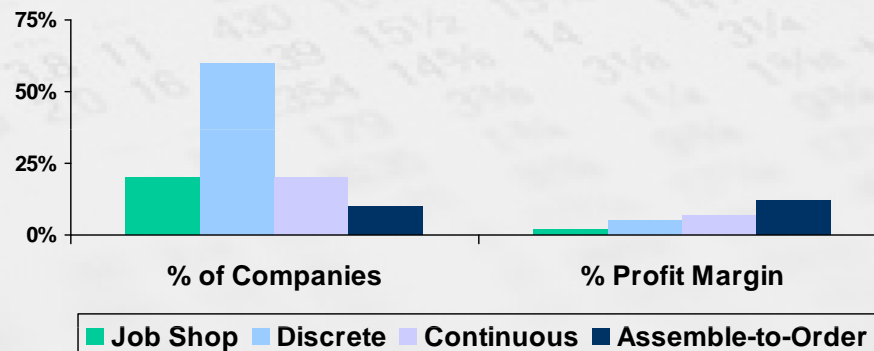




# Creating on-demand supply chains

- **Postponing physical commitment**
  - Postponing order fulfillment
  - Dynamic pricing
    - In-transit visibility
- **Monitoring conditions**
  - Damage
  - Loss
  - Theft
- **More sales revenue**
  - Flexibility can command a premium price
- **Higher margins**
  - Dynamic pricing can clear slow-moving inventory before it becomes obsolete
- **Less in-transit loss**
  - Loss & damage (L&D) claims

## Illustrative Profitability by Type of Manufacturing Operation



# Conclusions

# Conclusions

- **Transportation infrastructure investments generate significant supply chain benefits.**
- **Direct transportation cost benefits could be off by order of magnitude without considering supply chain benefits**
- **Additional price reduction and service enhancement benefits could be substantial**

# Recommendations

- **Further research is recommended to improve completeness and accuracy of the methodology.**
- **Increase completeness**
  - Develop a method to determine the **revenue impact** of the demand
  - Develop a method to determine the **profit impact** of increases in service level made possible through transportation improvements.
- **Improve accuracy**
  - Extend and refine mapping of Supply Chain Types™ to NAICS industry definitions
  - Consider how this varies by region