

Supply Chain Management 101

The Importance of Supply Chain Management in
Planning and Designing for Successful Freight
Systems

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Welcome - Kate Vitasek



Founder,
Supply Chain Visions
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University of Tennessee

- Thought Leader in Supply Chain Management
 - Woman on the Move in Trade and Transportation” by the Journal of Commerce
 - “Rainmaker” by DC Velocity Magazine
 - Woman of International Influence” by Global Executive Woman Magazine
 - Stevie Award Finalist for Woman in Business for “Best Entrepreneur”
 - Thought leader and “Resolute Benchmark” by Supply Chain Management Review
- Contributor/Author to 7 books and over 150 articles, including the Council of Supply Chain Management Professionals ***Supply Chain Process Standards***
- Served on Board of Directors for the Council of Supply Chain Management Professionals and Deliver Committee for Supply Chain Council

Session Topics

Introduction to Supply Chain Management

Case Study: Washington State DOT

Example Supply Chains

Interactive Working Session

Supply Chain Management (SCM) - Some Caveats

- **SCM is like art**
 - Multiple terms exist
 - Everyone has their own interpretation
 - The key is understanding the customer's own terminology
- **SCM is a strategy**
 - "It is not about moving stuff"
- **SCM is not a fiefdom**
 - It crosses organizations and functions and even companies
- **SCM is not rocket science**
 - Or is it?

The Evolution of Supply Chain Management

<p>1940</p>	<ul style="list-style-type: none"> ▪ WW II brought global logistics to the forefront to solve distribution problems. ▪ The heart of logistics is transportation.
<p>1950</p>	<ul style="list-style-type: none"> ▪ The founding of corporate Transportation Departments. ▪ Focus on reducing cost per hundred weight.
<p>1960</p>	<ul style="list-style-type: none"> ▪ The age of Physical Distribution Management, a cross functional approach. ▪ The introduction of total cost concepts.
<p>1970</p>	<ul style="list-style-type: none"> ▪ Total cost gained legitimacy and broad acceptance. ▪ The introduction of cost verses service trade off, top line revenue growth and bottom line profitability. ▪ Focus on finished goods distribution strategies.
<p>1980</p>	<ul style="list-style-type: none"> ▪ Advent of Materials Management the focus on upstream from manufacturer to supplier. ▪ Balanced approach to both inbound and outbound inventory movement and positioning. ▪ “Supply Chain Management” coined by Booz Allen.

The Evolution of Supply Chain Management

<p>1990</p>	<ul style="list-style-type: none"> ▪ Senior leaders embrace the concept of end-to-end integration. ▪ The introduction of supply chain collaboration and alignment.
<p>2000</p>	<ul style="list-style-type: none"> ▪ Movement to customer centric supply chains that respond to customer demand verses anticipating it. ▪ Introduction of technology that allows collaboration, real-time responsiveness, operational excellence and interactive management. ▪ Council of Logistics Mgmt formally changes name to Council of Supply Chain Mgmt Professionals.
<p>New Frontiers</p>	<ul style="list-style-type: none"> ▪ Information-driven supply chains. ▪ Development of supply chains with a net-zero environmental impact. ▪ The development of interactive business models and extreme postponement strategies.

Supply Chain Management (SCM) Defined

Supply Chain Management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all Logistics Management activities.

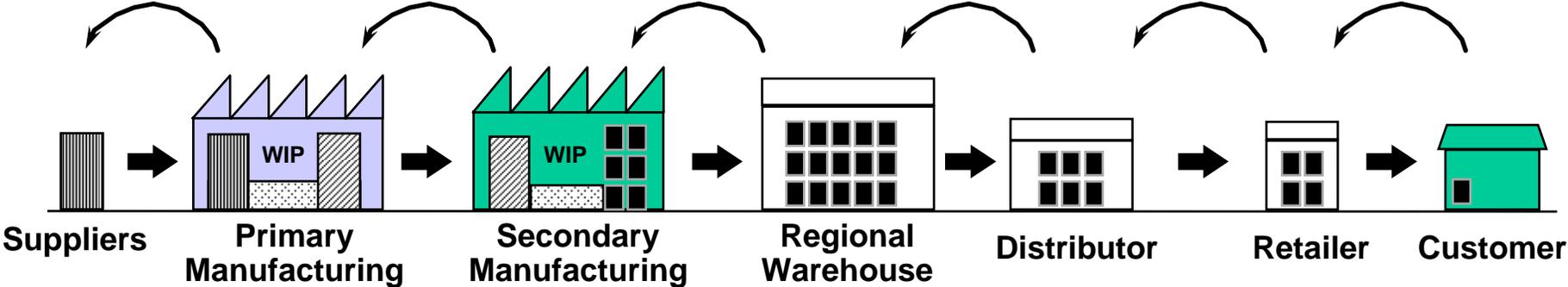
Importantly it also include coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers.

In essence, Supply Chain Management integrates supply and demand within and across companies.

Source: The National Council of Supply Chain Management Professionals

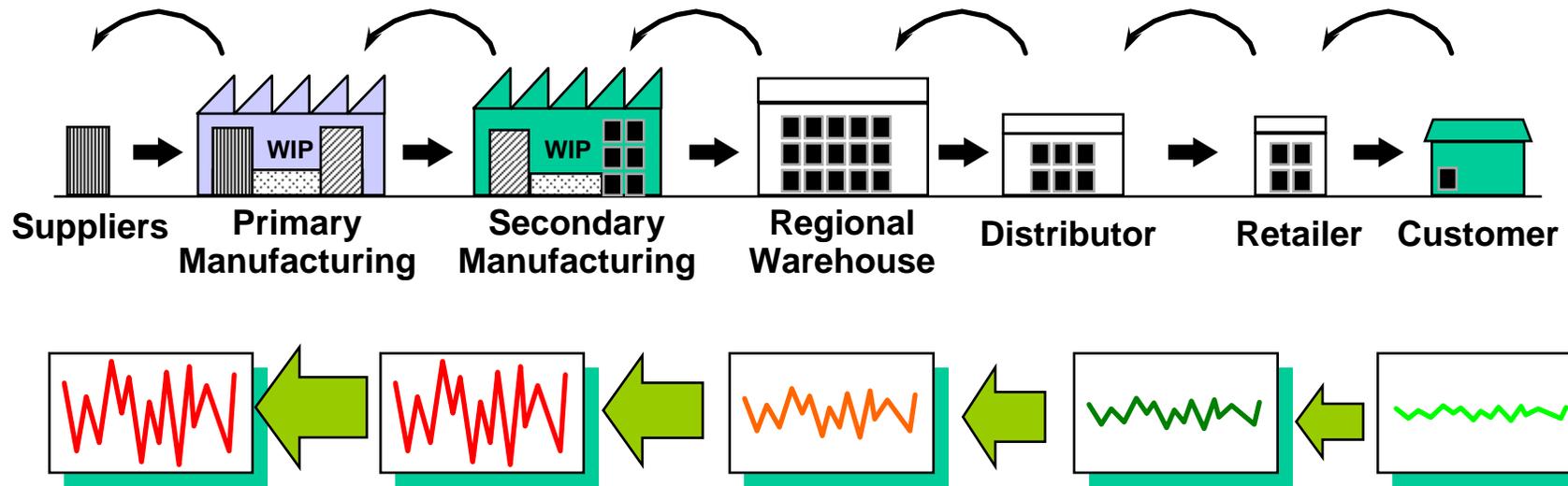
A Typical Supply Chain

Traditionally, businesses “PUSH” their products down the customer channels.



The “Bullwhip” Effect

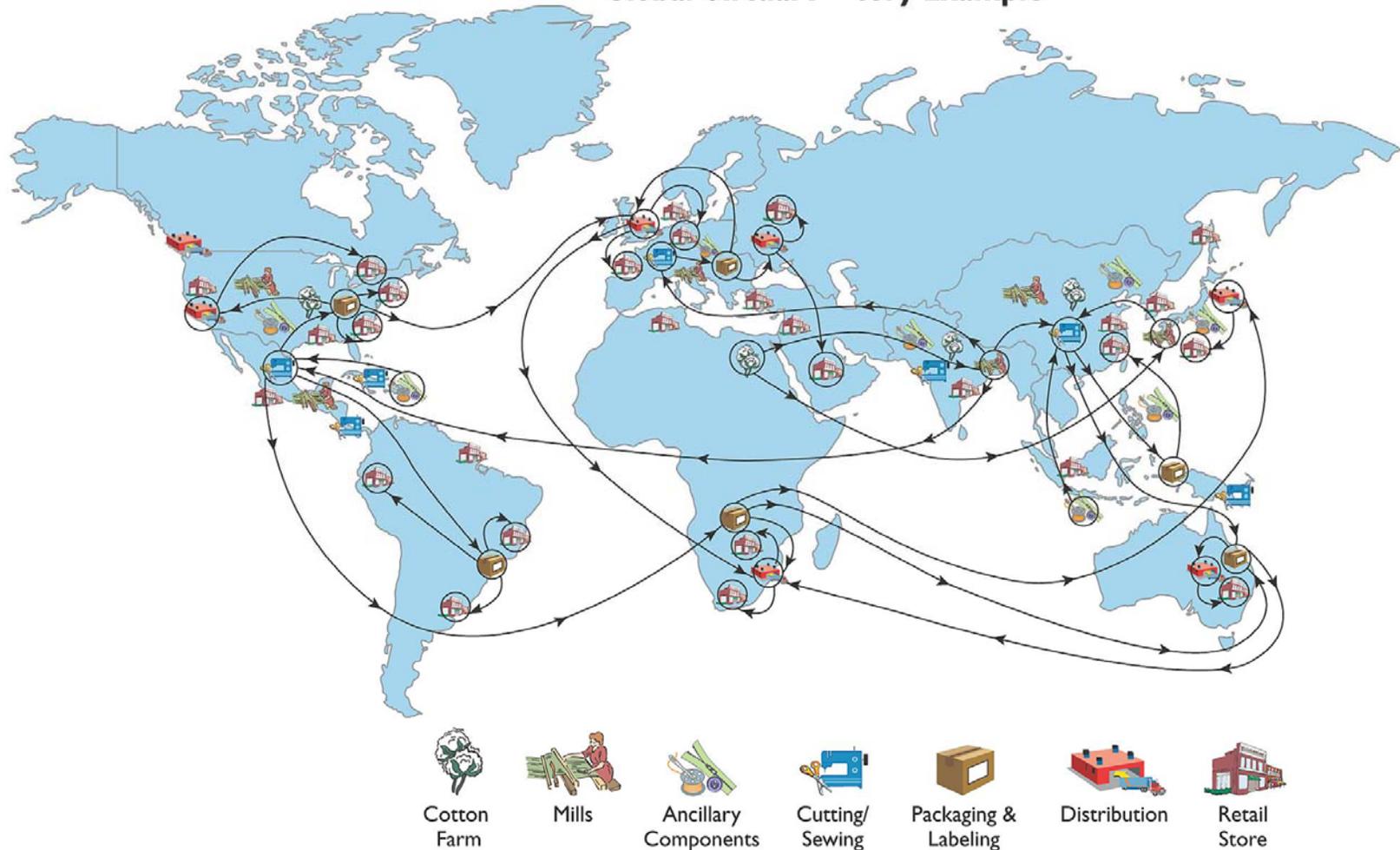
These traditional supply chains amplify instability of demand at each stage



Why is this?

....And It Gets Even More Confusing When Companies Go Global

Global Virtual Factory Example



Source: ChainLink Research

The Problem

As customers expand worldwide, the supply chain requirements and capabilities expand.

- Lead times expand
- More costs are embedded into the enterprise
- Information flow is more complex and prone to error
- Working capital needs increase

As companies outsource, there are more and more touch points.

How Can Focusing on the Entire Supply Chain Help?

Supply Chain Management: The GOALS

1. WASTE ELIMINATION



2. TIME COMPRESSION



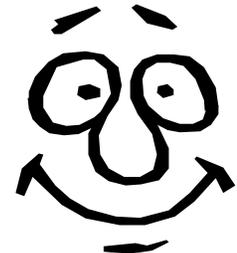
3. FLEXIBLE RESPONSE



4. UNIT COST REDUCTION



5. CUSTOMER SATISFACTION =
REVENUE GROWTH



Which is the most important?

What's the Big Deal?

What makes SCM so different from good old Transportation and Warehousing?

- ✓ It's much broader and more complicated – due to more 'players' and more functions.
- ✓ It involves precise coordination and lots of cooperation and collaboration among firms and functions.
- ✓ It requires an entirely new mindset of how to do things: focused on speed, quality, working together, sharing costs and savings.
- ✓ It requires that functional silos be torn down.

The Evolution Will Continue

“I really do believe that supply chain management will be the defining discipline in the 21st century.”

**--Ralph Drayer
Former P&G Logistics Officer**

Supply Chain Management Processes and Participants

Supply Chain Participants

*SCM is made up of many **participants** that must work together within the supply chain*

- **Suppliers.** Source of raw materials, component parts, semi-manufactured products, and other items that occur early in the supply chain - unfinished or non-consumable products.
- **Manufacturers.** Makers of products. Many consider them to be the heart of the supply chain.
- **Distributors.** Responsible for the packaging, storing, and handling of materials at receiving docks, warehouses, and retail outlets.
- **Retailers.** These are the manufacturer's customers - the stores that buy the actual products. Throughout this course, retailers will also be referred to simply as customers.
- **Consumers.** This is the ultimate user - the person who goes into a store and buys the product.

Who controls the supply chain?

Supply Chain Partners

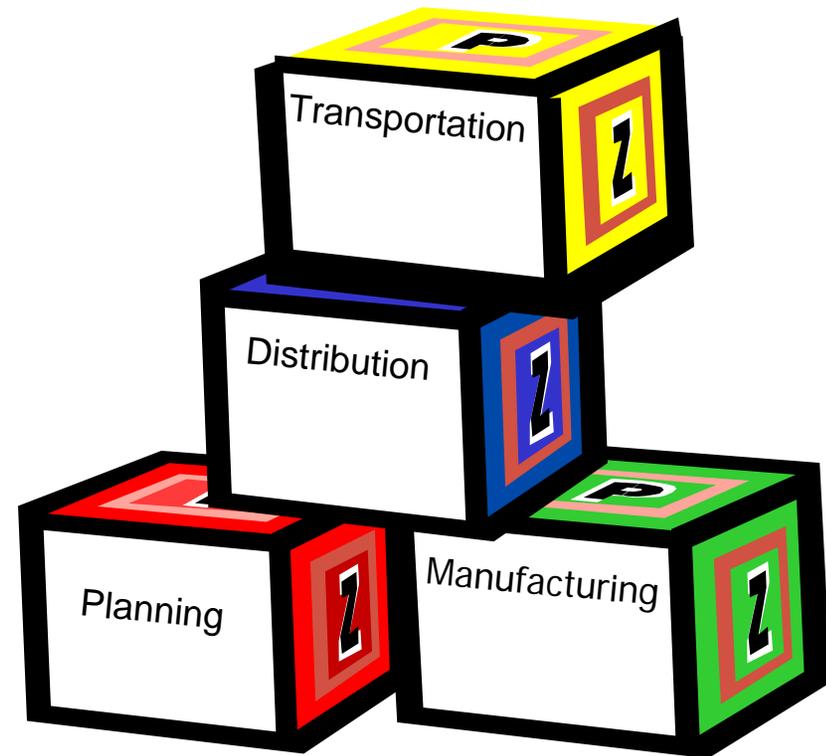
Partners help Participants by providing infrastructure, equipment and labor when needed.

- Freight Companies (local and national)
- Railroads
- Ocean Cargo Companies
- Package and Parcel Companies
- 3PL/4PLs
- Brokers/Forwarders/Consolidators
- Ports
- Inland Drayage Companies
- Air Cargo Companies

Supply Chain Processes

SCM is made up of many **processes** that must be performed within the supply chain. These form the foundational building blocks for the work to be done.

- Forecasting
- Purchasing
- Production Planning
- Inventory Control
- Warehousing
- Order Management
- Distribution
- Transportation



Supply Chain Processes - Defined

- **Forecasting:** The process of *estimating future demand* using various techniques and methods.
- **Purchasing:** The functions associated with *buying the goods and services* required by the firm.
- **Production Planning:** The process that creates *detailed plans and schedules* to produce product, taking into account resource, material, and dependency constraints to meet deadlines.

Supply Chain Processes - Defined

- ***Inventory Control:*** The process of ensuring the availability of products through ***inventory administration*** (accuracy, strategy & optimization).
- ***Warehousing:*** The ***storing of goods*** and warehouse activities (receiving, put-away, picking, shipping, and inventory control).
- ***Order Management:*** The planning, directing, monitoring, and controlling of the ***processes related to customer orders***, manufacturing orders, and purchase orders.
- ***Distribution: Outbound logistics,*** from the end of the production line ***to the end user***. It includes all activities related to physical distribution, as well as the return of goods to the manufacturer.

Supply Chain Processes - Defined

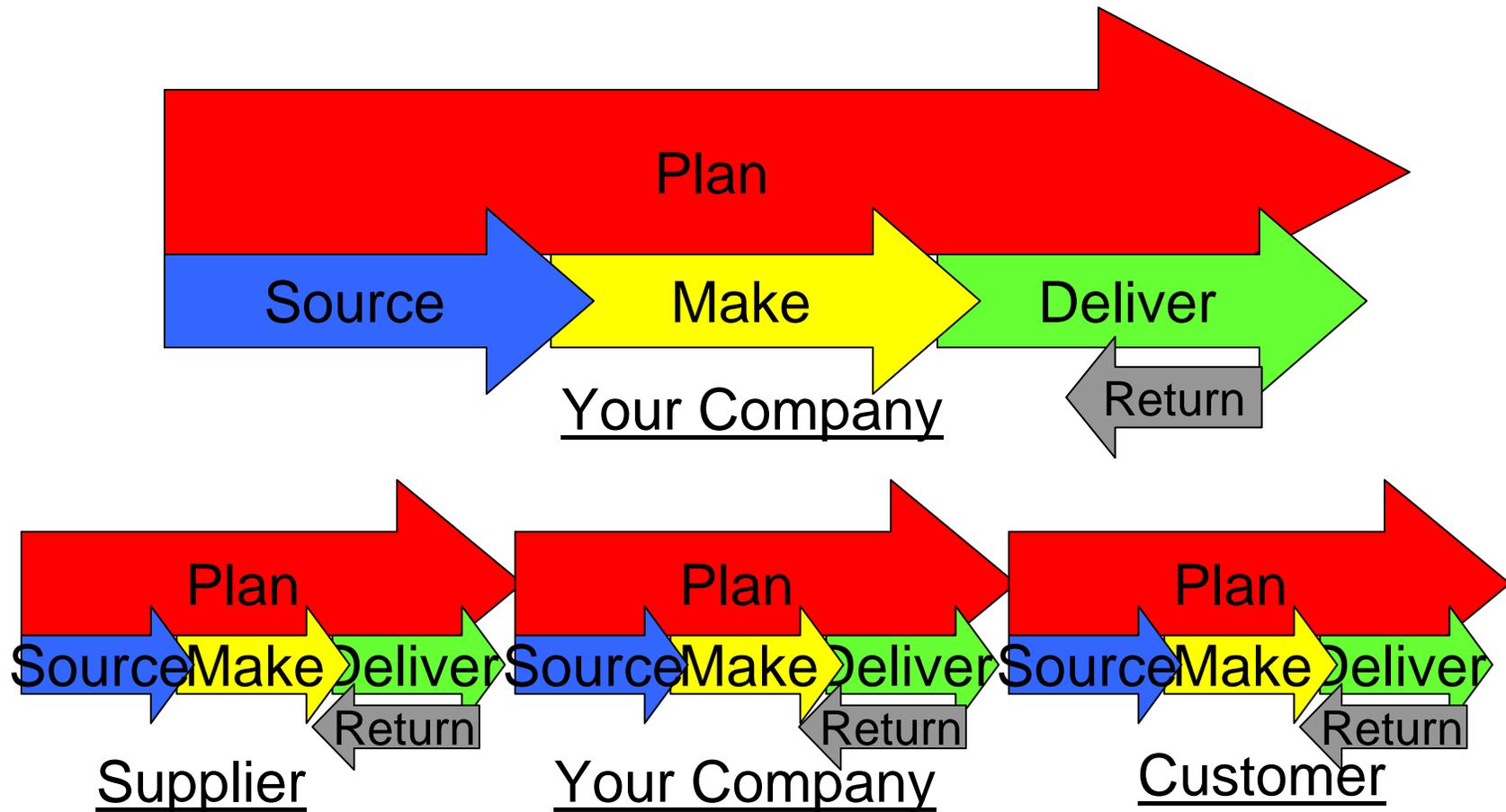
- **Transportation:** The *movement of goods* by land, sea, or air shipment. Activities, including managing shipment scheduling through inbound, out-bound, intra-company shipments, documentation management, and third party logistics management.



Photo Source: Google

**The Key is Figuring Out the Best Way
That Participants and Processes
Should Work Together**

Sample Framework: SCOR Model Linking Processes and Participants



Source: Supply Chain Council

Session Topics

Introduction to Supply Chain Management

Case Study: Washington State DOT

Example Supply Chains

Interactive Working Session

Why Does Washington State Need a Strategic Plan for Freight Systems?

- **There are investment constraints: political, financial and economic.**
- **Washington State's freight systems strategic plan must:**
 - **Balance the cost of investments with resulting economic output;**
 - **Direct limited resources to their most productive use; and**
 - **Set clear priorities linked to the growth of jobs and the state's economy.**

The Goal of Washington State's Freight Systems Strategic Plan Is to Support Broad Industry Sectors

I. Global Gateways

International and National Trade Flows Through Washington



II. Made in Washington

Regional Economies Rely on the Freight System



III. Delivering Goods To You

Washington's Retail and Wholesale Distribution System



Full report available at: www.wsdot.wa.gov/freight/images/WTP_FreightUpdate.pdf

Washington is a Global Gateway

Goal:

- Increase import/export volumes.

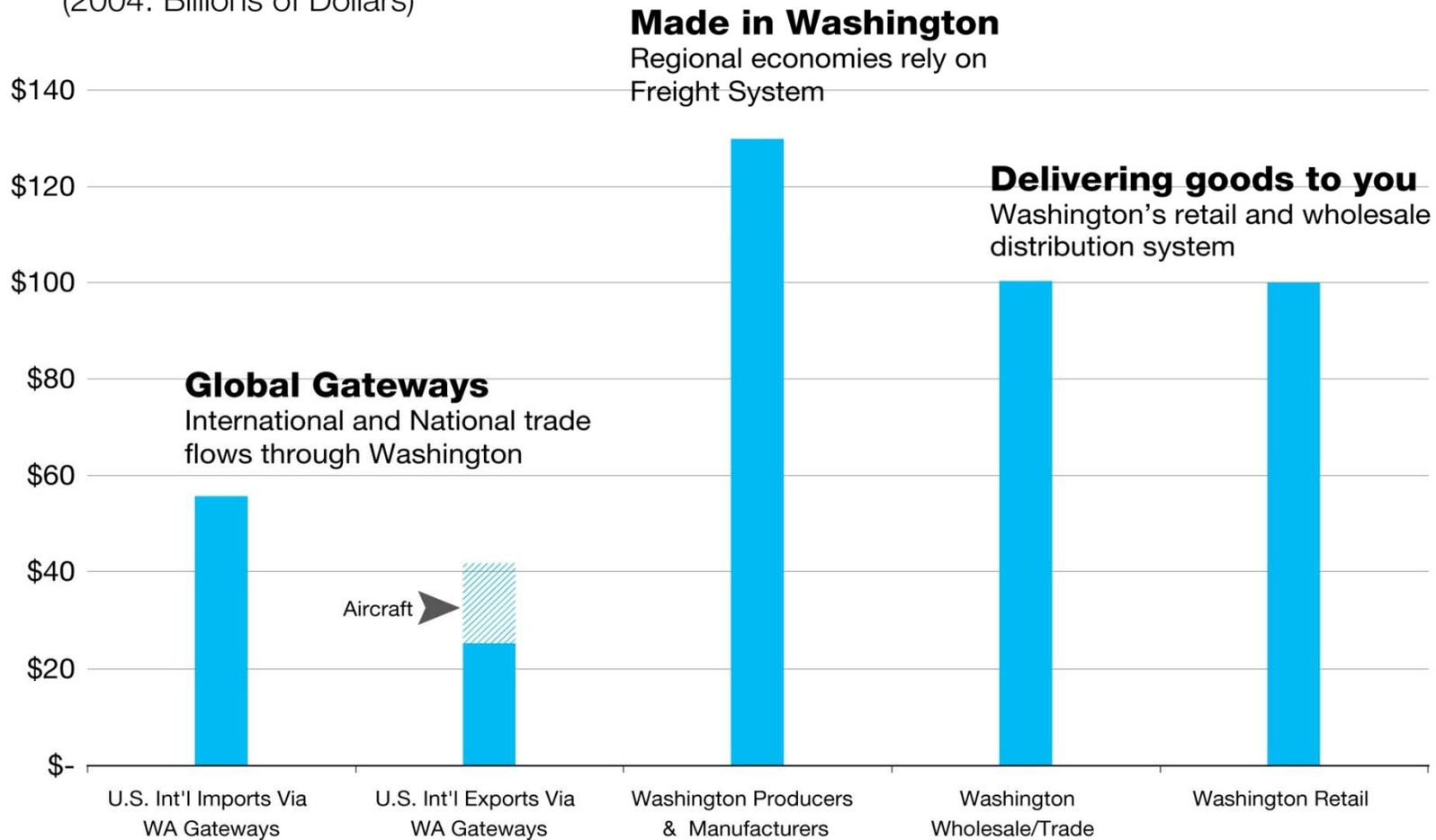
Requirements:

- Port infrastructure that pulls from other west coast port options.
- Access to ports with the least amount of delay.
- Highways that are not congested or restricted.
- Regulation and weigh stations that minimize delay.
- Rail access into and out of state.
- Available land and facilities to support operations.
- Northern border crossings that are not congested.

What is Being Shipped?

Washington State Value of Freight Shipments

(2004: Billions of Dollars)



Source: U.S. Customs Bureau; WA State Dept. of Revenue.

Fast Facts: Washington is a Global Gateway

Import volume at Seattle and Tacoma ports has grown by 32 percent since 2003.

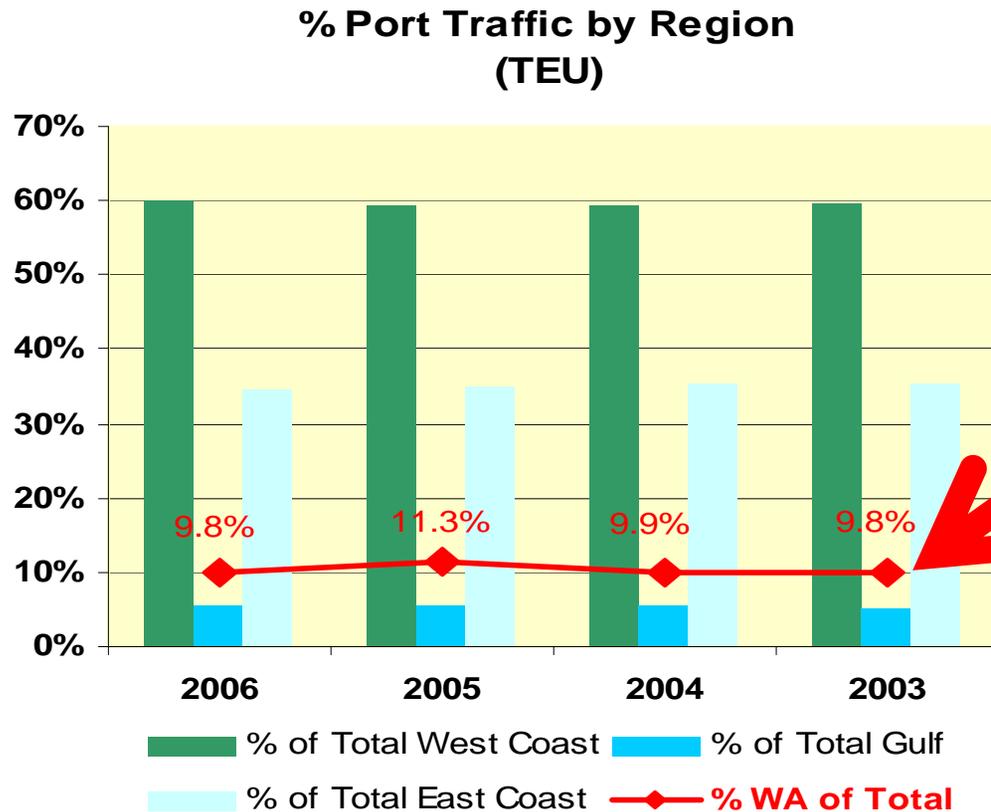


Ports	2006	2005	2004	2003
Los Angeles	5,719,497	4,867,073	4,897,346	4,709,339
Long Beach	4,792,722	4,395,942	3,716,775	3,114,221
New York	3,672,643	3,390,308	3,146,569	2,819,407
Savannah	1,602,339	1,482,728	1,287,550	1,130,581
Charleston, SC	1,510,869	1,511,935	1,401,522	1,252,674
Norfolk	1,419,327	1,318,831	1,200,244	1,095,579
Oakland	1,410,533	1,372,231	1,192,487	1,070,474
Houston	1,289,841	1,231,186	1,090,571	943,459
Seattle	1,223,266	1,339,641	1,044,270	818,684
Tacoma	1,095,316	1,154,350	937,202	936,951
All U.S. Ports	28,555,590	26,444,652	24,187,570	21,853,267

Source: Journal of Commerce PIERS Database

TEU = Twenty-foot Equivalent Units

Fast Facts: Washington is a Global Gateway



While import volume on the west coast is growing, Washington State's share of total port traffic over the past four years has remained flat.

Should Washington State try to increase its share of west coast import traffic?

If so, what significant infrastructure changes should you plan for?

Container Port Growth is Driving the Need for More Warehouse Space

- In the PNW, every 10,000 TEUs shipped creates a need for an additional 1M SF of warehouse space according to CB Richard Ellis Brokerage. That's a ratio of 1:100
- The ports of Seattle and Tacoma:
 - Handled about 4M TEUs in 2005.
 - Both ports plan rapid growth in the next 5-10 years.
 - Typically, 30 percent of inbound containers are trucked to warehouses along the I-5 corridor and about 70 percent are directly transferred to intermodal rail.
 - Port growth could create a demand for an additional 150M sf of warehouse space along the I-5 corridor.

How will this impact WSDOT's plans?

Made In Washington

Goal:

- Increase manufacturing and agricultural volumes and lower operating costs.

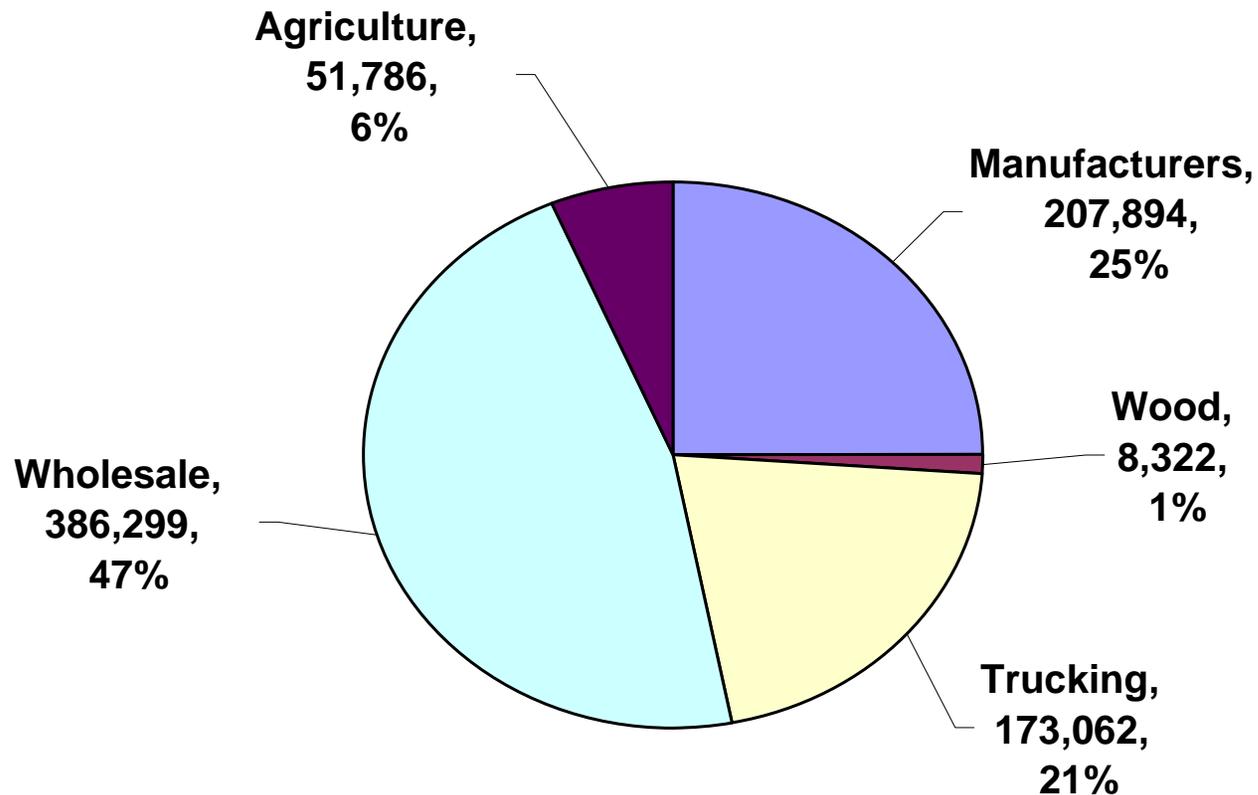
Requirements:

- Reliability and access throughout the road system.
- Rural roads that are all-weather accessible.
- Rail access into and out of the state.
- Inland waterways and ports to handle growing volumes.
- Low-cost freight options (rail, water).
- Regulations and weigh stations that minimize delay.

Fast Facts: Made in Washington

What are Washington State Industries Shipping?

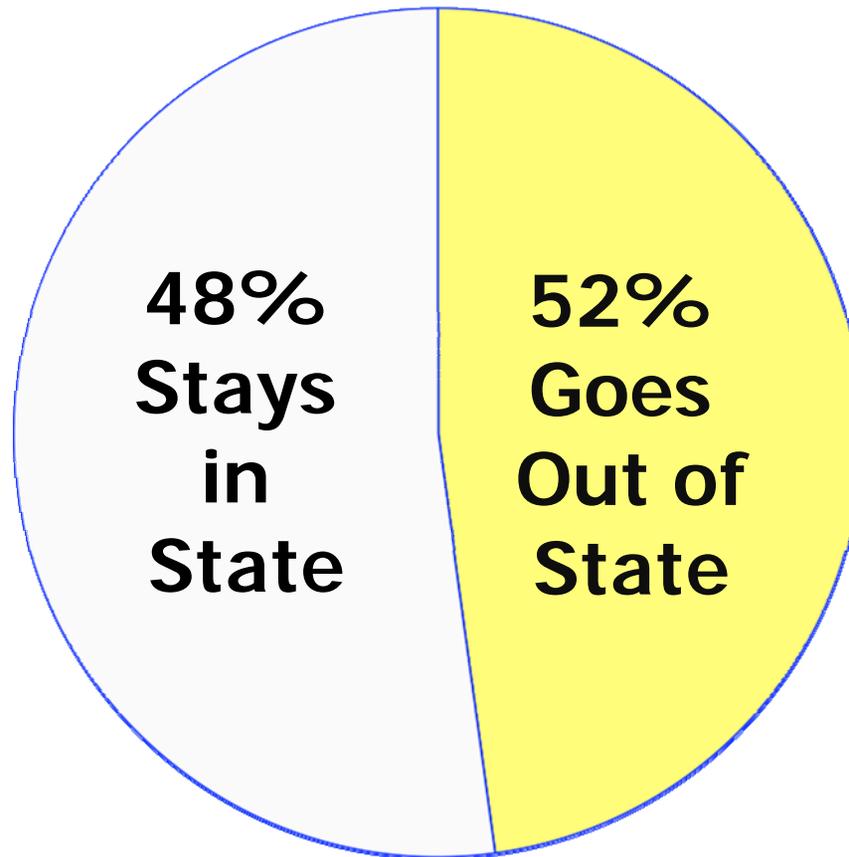
Monthly Loads by Industry Sector



Source: WSDOT, Freight Customer Study Summary Report May 2007

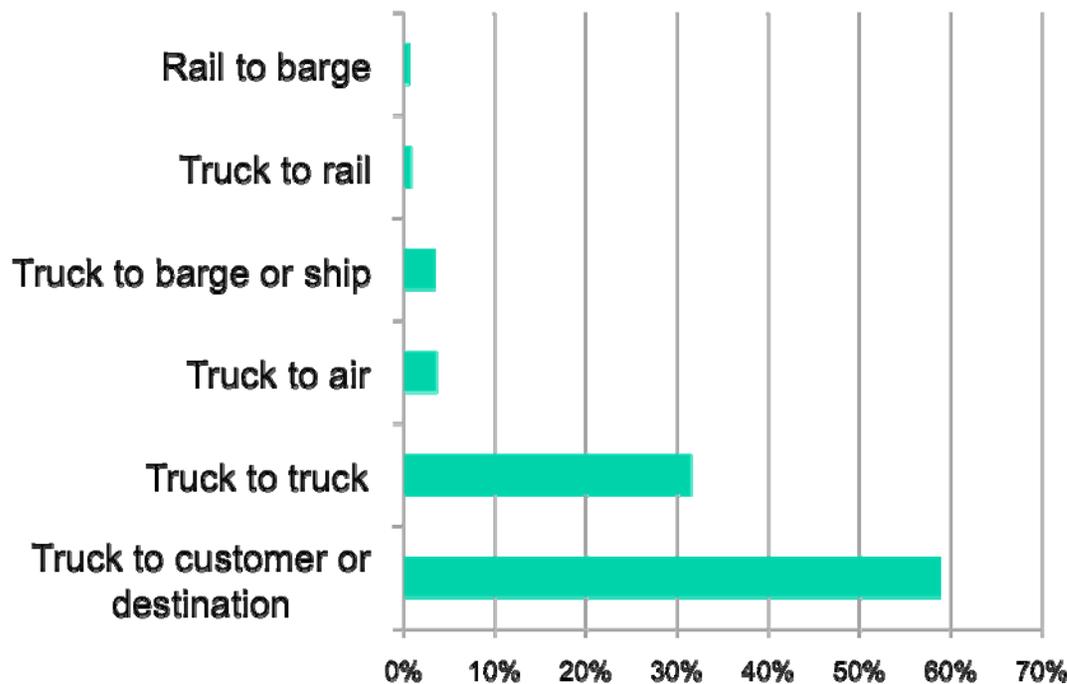
Fast Facts: Made in Washington

Where are Washington-made products going?



Fast Facts: Made in Washington

Snapshot of Eastside Wholesalers (largest freight segment by # of shipments)



- 205,279 average loads per month (25% of the total surveyed)
- Ships via every type of shipping method
- 50%/50% split in state vs out of state shipments

*What do you think are the profiles of the other segments?
Why is knowing the profile important.?*

Delivering Goods To You

Goal:

- Ease of local truck delivery.

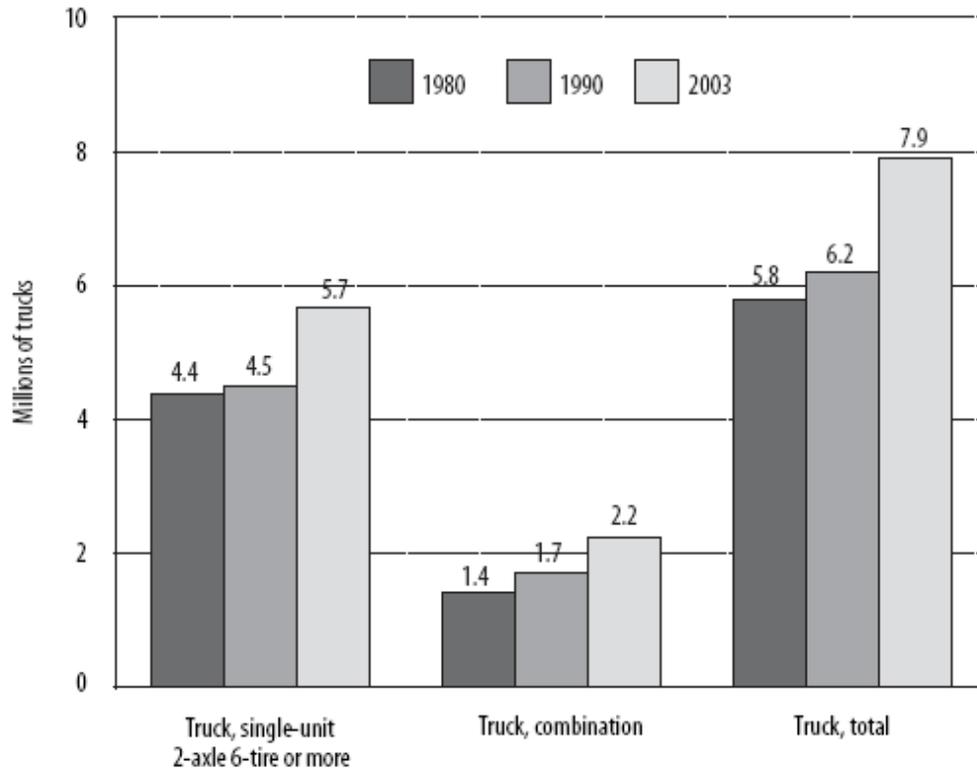
Requirements:

- Reliability and access throughout the road system.
- Regulations and weigh stations that minimize delay.

Fast Facts: Delivering the Goods to You

The highways are getting more congested...

Number of Commercial Trucks on U.S. Highways: 1980, 1990, 2003



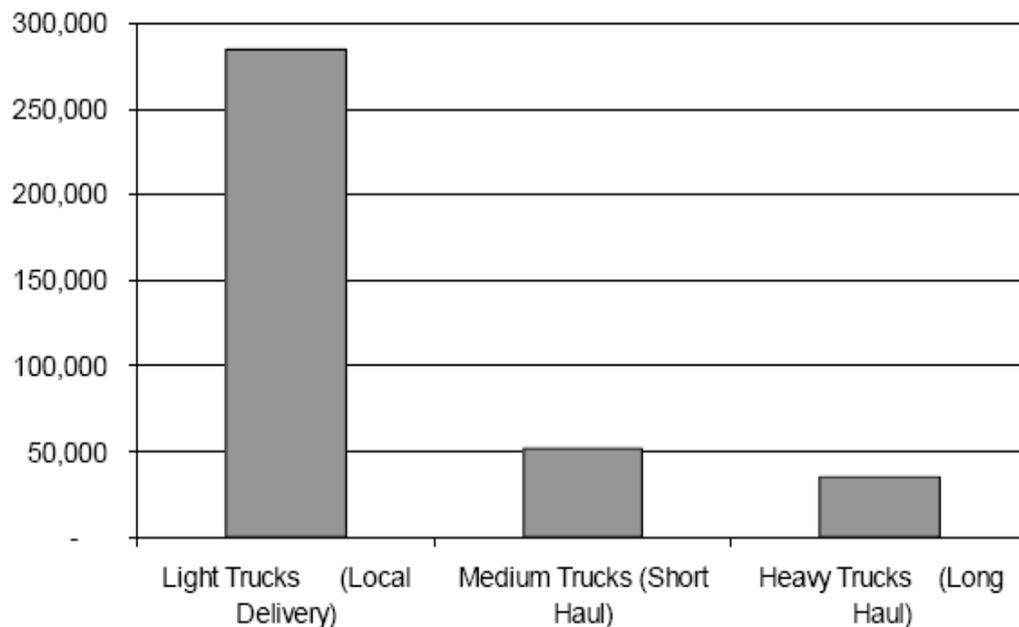
Source: US Department of Transportation

The number of trucks on US highways has grown by 27 percent over the last 23 years.

Fast Facts: Delivering the Goods to You

However, most truck trips in Washington are from smaller trucks delivering goods to local markets.

Licensed Commercial Trucks in WA State: 2005



- In 2005, almost ten times more light and medium trucks than heavy trucks were licensed in Washington State.
- Up to 80 percent of truck trips operate in the local distribution system.

Source: WSDOT

Defining Delivery

...and these delivery trucks are being held to tighter and tighter delivery windows.

Customer Defined Measure of “On Time Delivery”	%
On or before appointment time	13.3
+ 15 minutes from the appointment time	4.1
+ 30 minutes from the appointment time	8.5
+ 1 hour from the appointment time	8.9
-1 hr to +0 hours from the appointment	.9
On the requested day	40.5
On the agreed upon day	23.7

Almost 40% of shippers say their customers define on-time delivery to within a pre-defined window

Source: 2007 Warehouse Education Research Council Benchmarking Study

Why is more precise delivery becoming the norm?

Session Topics

Introduction to Supply Chain Management

Case Study: Washington State DOT

Example Supply Chains

Interactive Working Session

Supply Chain Management: The GOALS

1. WASTE ELIMINATION



2. TIME COMPRESSION



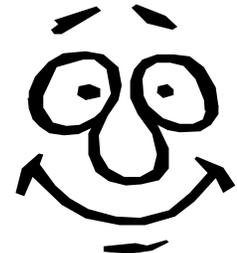
3. FLEXIBLE RESPONSE



4. UNIT COST REDUCTION



5. CUSTOMER SATISFACTION =
REVENUE GROWTH



Which is the most important?

Which SCM Goal Does Each of These Companies Rank as #1?

I. Global Gateways



Gap Inc.

Gap
Banana Republic
Old Navy
FORTH & TOWNE

II. Made in Washington



Microsoft®



III. Delivering Goods To You



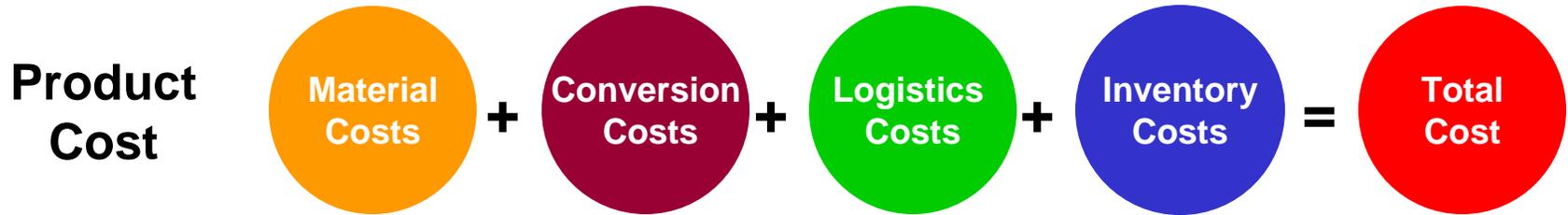
Total Cost Concept

Supply chain managers evaluate product costs as ***Total Costs***

- Products incur cost as they flow through the supply chain.
- Product costs are made up of material costs, conversion costs transportation costs and inventory costs.
- A Total Cost Analysis is a decision-making approach that considers minimization of total costs and recognizes the interrelationship among system variables such as transportation, warehousing, inventory, and customer service

The goal is to deliver product to customers at the lowest total cost... so each supply chain decision is important.

Example of Total Cost



Supplier 1 US Based	\$1.00	\$1.00	\$0.20	\$0.10	\$2.30
Supplier 2 Asia Based	\$0.70	\$0.50	\$0.80	\$0.20	\$2.20
Difference	(\$0.30)	(\$0.50)	\$0.60	\$0.10	(\$0.10)
Reason	<ul style="list-style-type: none"> ➤ Lower raw material cost 	<ul style="list-style-type: none"> ➤ Lower Labor Cost ➤ Longer production runs 	<ul style="list-style-type: none"> ➤ Higher Transportation cost ➤ Longer lead time 	<ul style="list-style-type: none"> ➤ Higher inventory carrying cost ➤ Higher on-hand balances 	<ul style="list-style-type: none"> ➤ Net savings is less than expected ➤ Longer lead-times ➤ Higher supplier risk

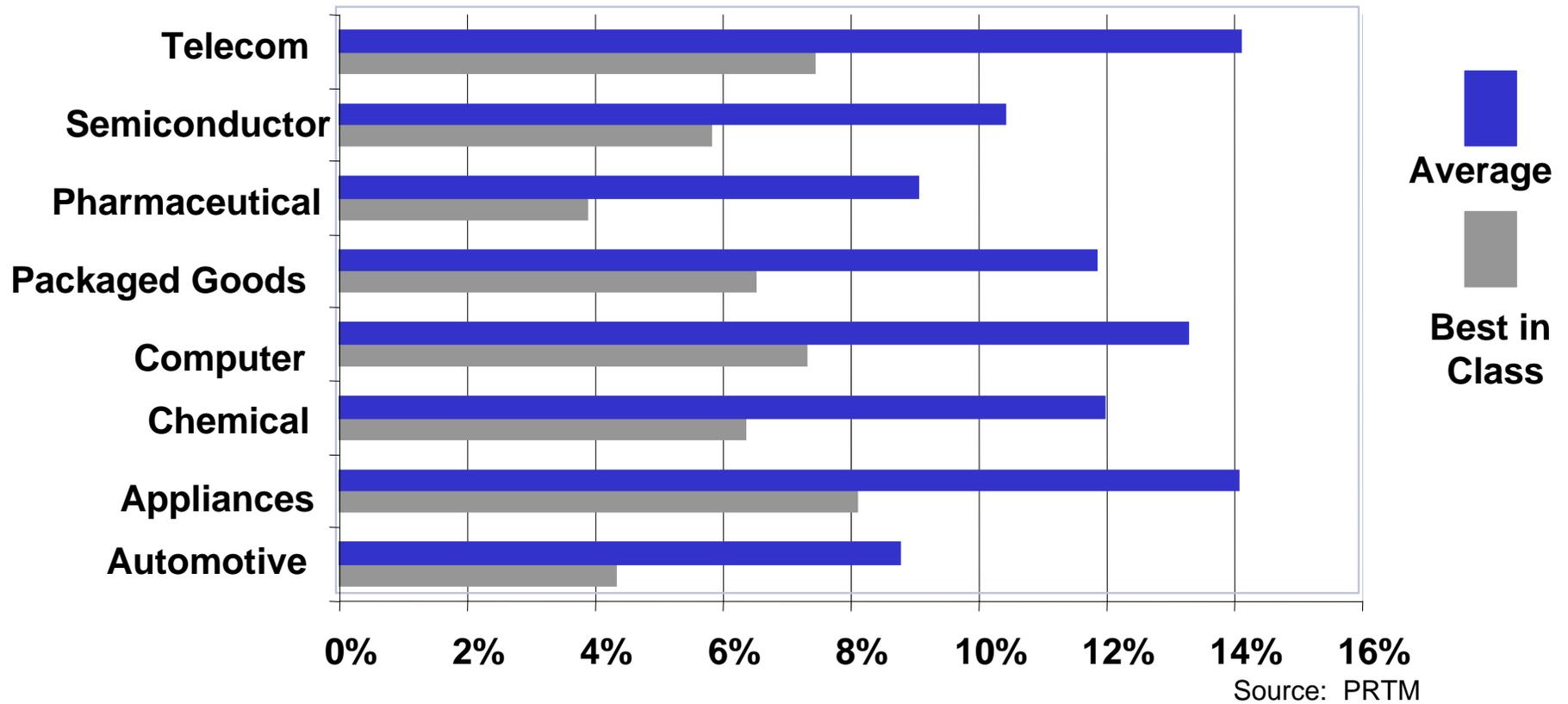
Component Difference = **(\$0.80)**

Supply Chain Difference = \$0.70

Net Difference = **(\$0.10)**

Companies Who Manage Total Supply Chain Costs Well Have a Real Advantage

Percentage of Company Revenue Spent on Supply-Chain Activities



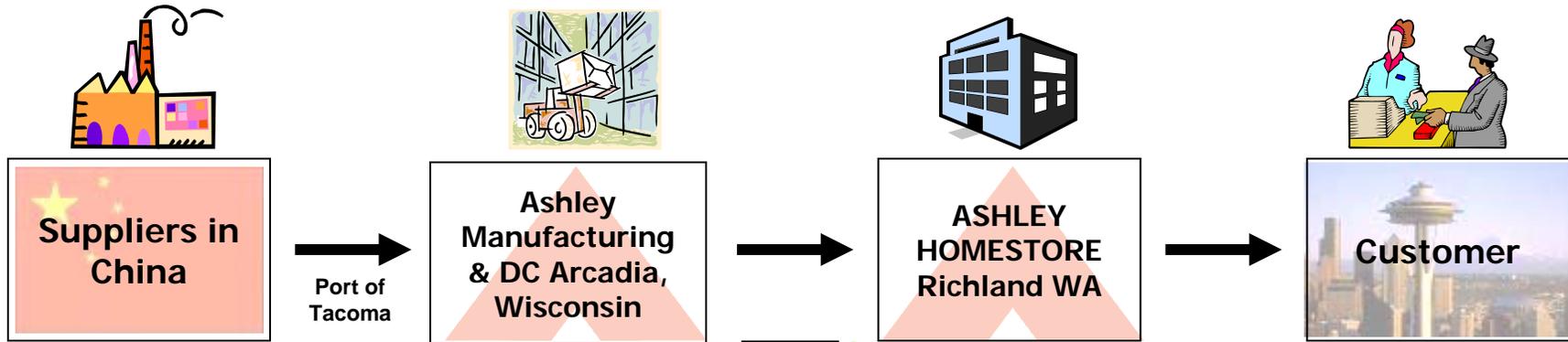
Efficient Supply Chains Increase Profit

Top supply chain risks, or the things that keep supply chain managers awake at night...

Top risks and concerns as cited by shippers and 3PLs in a trucking association survey were...

- **Managing transportation costs was the number one risk ...**
 - Rising **fuel costs** and potential fuel shortages
 - Rising **labor costs**
 - **Driver shortages** and restrictive work rules
- **Followed by infrastructure concerns...**
 - Deterioration of **highway infrastructure** and congestion
 - Changes to import/export **security regulations**
 - Overcrowded **ports** and lack of **infrastructure**
 - Rail shortages and deterioration of **rail infrastructure**
 - Shortages in **ocean freight carriers**

Ashley Furniture - Typical Retail Supply Chain



1. Short Haul Trucking to port in China
2. Broker/Consolidator
3. Load ship
4. Ocean Transport
5. Broker/Consolidator
6. Port Load/Un-Load in Tacoma
7. Intermodal Rail to Arcadia, Wisconsin
8. Short Haul Trucking from Rail Terminal to DC

1. Long Haul Trucking to Retail Store
2. Short Haul to Retail Store

1. Local Delivery

Discussion Topics

- Which WSDOT strategy is impacted by Ashley Furniture's supply chain decisions?
- Why would Ashley (and other companies) import through the Port of Tacoma?

P&G's Distribution Reinvention



	2006	By 2009
Number of warehouses	450	225, likely to consolidate outsource providers
Product Mix on Pallets	Mostly full pallet or partial pallet	More mixed pallets with multiple products and focus on increasing velocity
Transportation	Less Than Truck Load and Truck Load short hauls	Mostly Truck Load/ longer hauls
Frequency of Delivery	Same	Same to More
Inventory	\$6.9 Billion	Reduced

Companies such as P&G are using network optimization tools to drive lower network costs and improve efficiencies.

Source: Cleaning Up on Distribution, Traffic World, Jan 15 2007

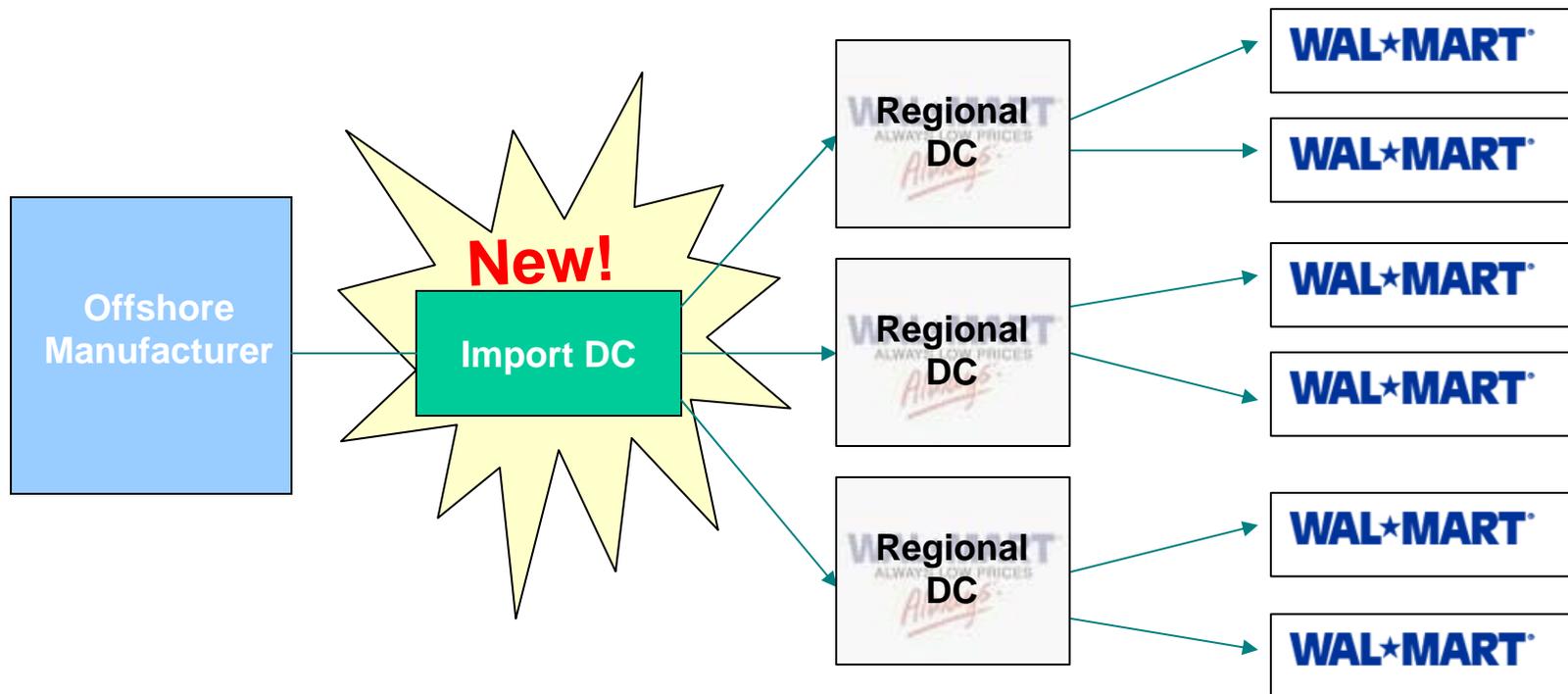
Discussion Topics

- How does P&G's reinvention of its distribution strategy impact Washington State's transportation system?
- What is inventory velocity and why is it important?
- How will gas prices impact P&G's strategy?

Wal-Mart's Import Center



Wal-Mart created a flow-through import center in Houston



Wal-Mart's New Import-Focused Warehouse

Wal-Mart's 4 Million Square Feet Warehouse
in Bay Port (Houston), Texas



Photo courtesy of Cliff Lynch

Discussion Topics

- Why would a Houston-based import center be more efficient for Wal-Mart than a West-Coast-based facility?
- What if all of the top 20 national retailers did the same thing as Wal-Mart? What would be the impact to the WSDOT? What about the impact to the state's economy?

Boeing's Original 737 Manufacturing Plant



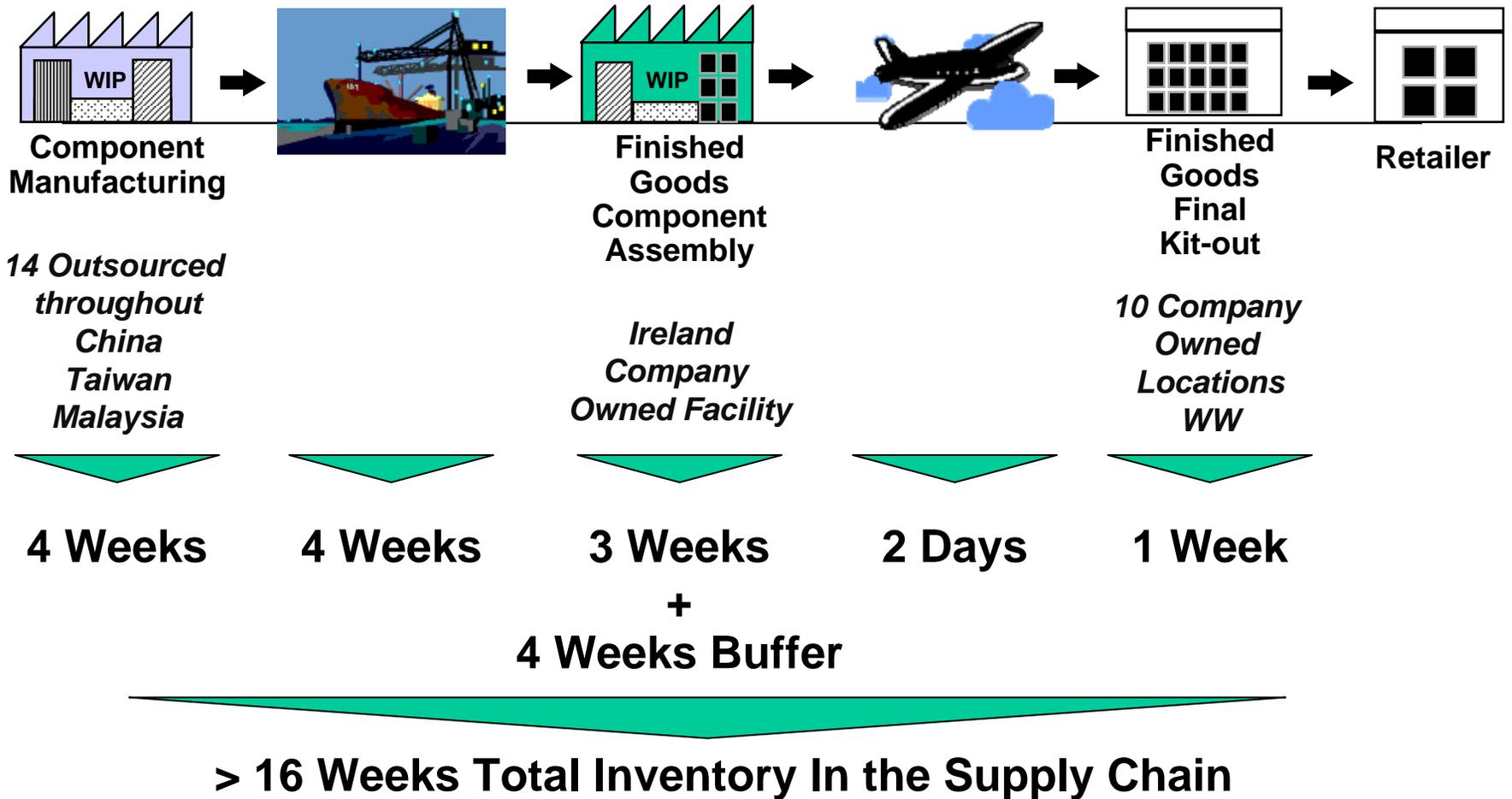
Boeing's Lean 737 Manufacturing Plant



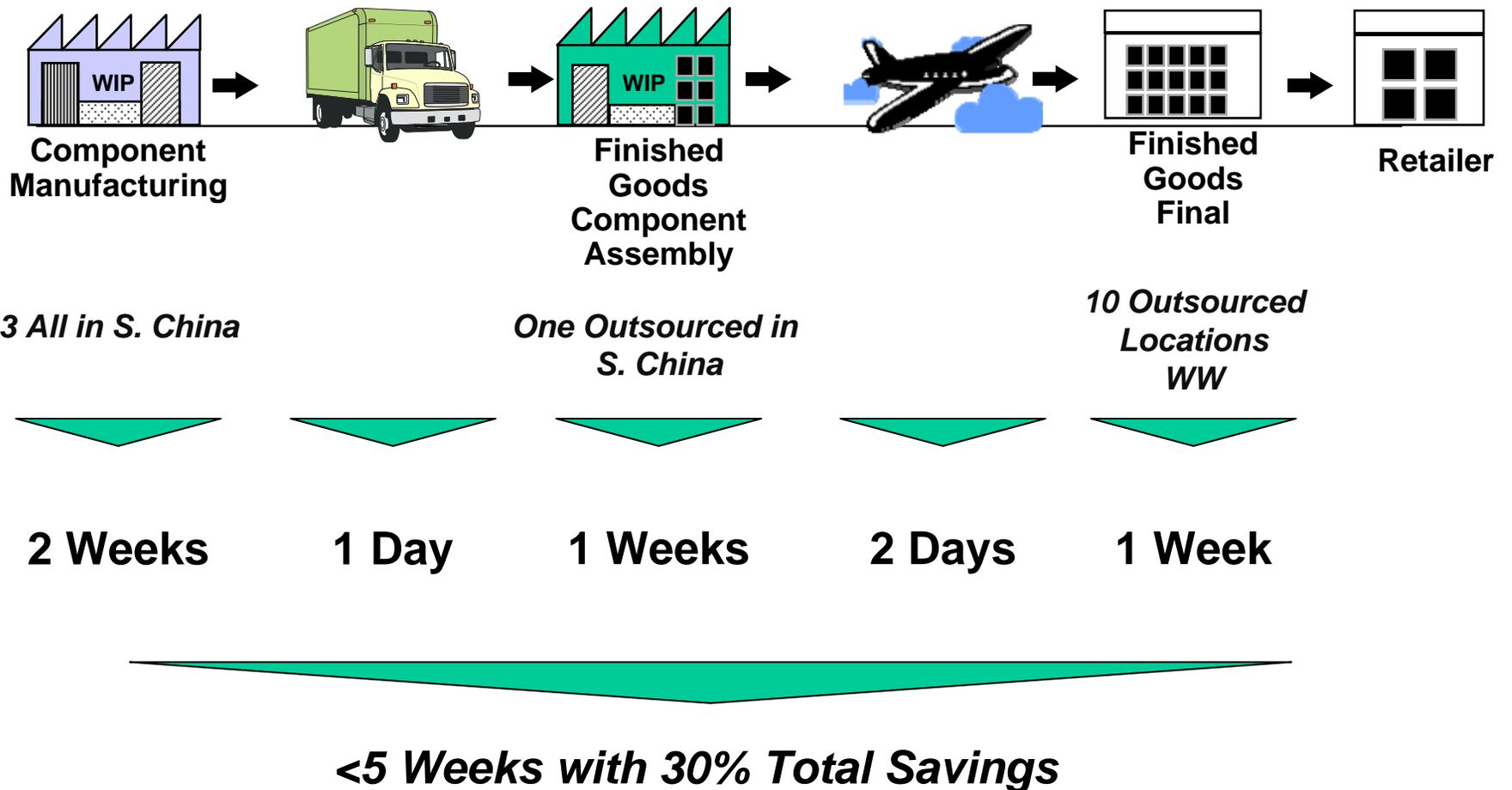
Discussion Topics

- What are the major impacts for Boeing to have their suppliers ship product “Just-In-Time” (smaller and more frequent shipments) to the plant with “Kits” ready to be assembled on the plane?
- How do these smaller and more frequent shipments affect WSDOT?
- What percent of Boeing’s inbound parts shipments are sent via air shipment?
- How does this impact Boeing outbound shipments?

High Tech Manufacturer's Original Supply Chain



High Tech Manufacturer's New Lean Supply Chain



Microsoft's Outsourced Supply Chain

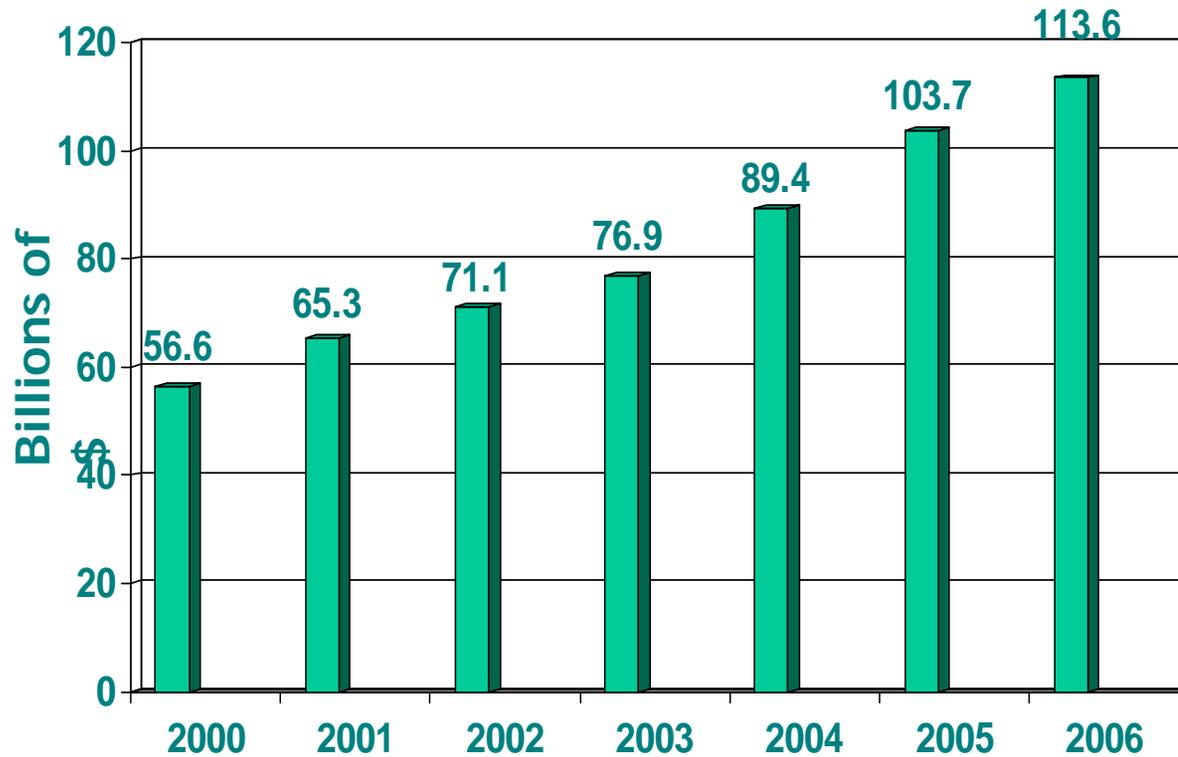


Supply Chain Process	In-source	Outsource
Forecasting	X	
Purchasing	X	X
Production Planning		X
Inventory Control		X
Warehousing		X
Order Management		X
Distribution		X
Transportation		X

Managing out costs and working capital

More and more companies like Microsoft are looking to Third Party Logistics Providers (3PLs).

3PL revenue has almost doubled since 2000.



Source: Armstrong & Associates

***How
Does More
Outsourcing
Impact
WSDOT's
decisions?***

WSDOT Freight Highway Systems Strategic Planning: Seven Steps

Step 1: Quantify freight customer requirements

Step 2: Identify existing performance gaps

Step 3: Get good data

Step 4: Predict future freight demand

Step 5: Estimate additional economic output created by meeting demand

Step 6: Develop solution proposals

Step 7: Prioritize solutions based on their ability to meet the state's goals

Session Topics

Introduction to Supply Chain Management

Key Drivers of Supply Chain Management

Example Supply Chains

Case Study: Washington State DOT

Interactive Working Session

Interactive Learning Session

- Break into groups
- What were the three most important takeaways for you?
- If you had a magic wand – what do you think should be done
- What are the biggest constraints?
- Please select a spokesperson to present your team's answers

Thank You!

Kate Vitasek

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