Introduction to Operations Management
运营管理概论

9- Warehousing Transportation

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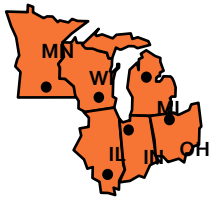
Scales of location decision

Country Decision

Key Success Factors

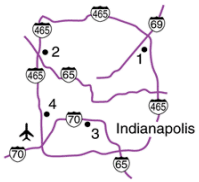
1. Political risks, government rules, attitudes, incentives
2. Cultural and economic issues
3. Location of markets
4. Labor talent, attitudes, productivity, costs
5. Availability of supplies, communications, energy
6. Exchange rates and currency risks



Region/ Community Decision

Key Success Factors

1. Corporate desires
2. Attractiveness of region
3. Labor availability and costs
4. Costs and availability of utilities
5. Environmental regulations
6. Government incentives and fiscal policies
7. Proximity to raw materials and customers
8. Land/construction costs



Site Decision

Key Success Factors

1. Site size and cost
2. Air, rail, highway, and waterway systems
3. Zoning restrictions
4. Proximity of services/ supplies needed
5. Environmental impact issues

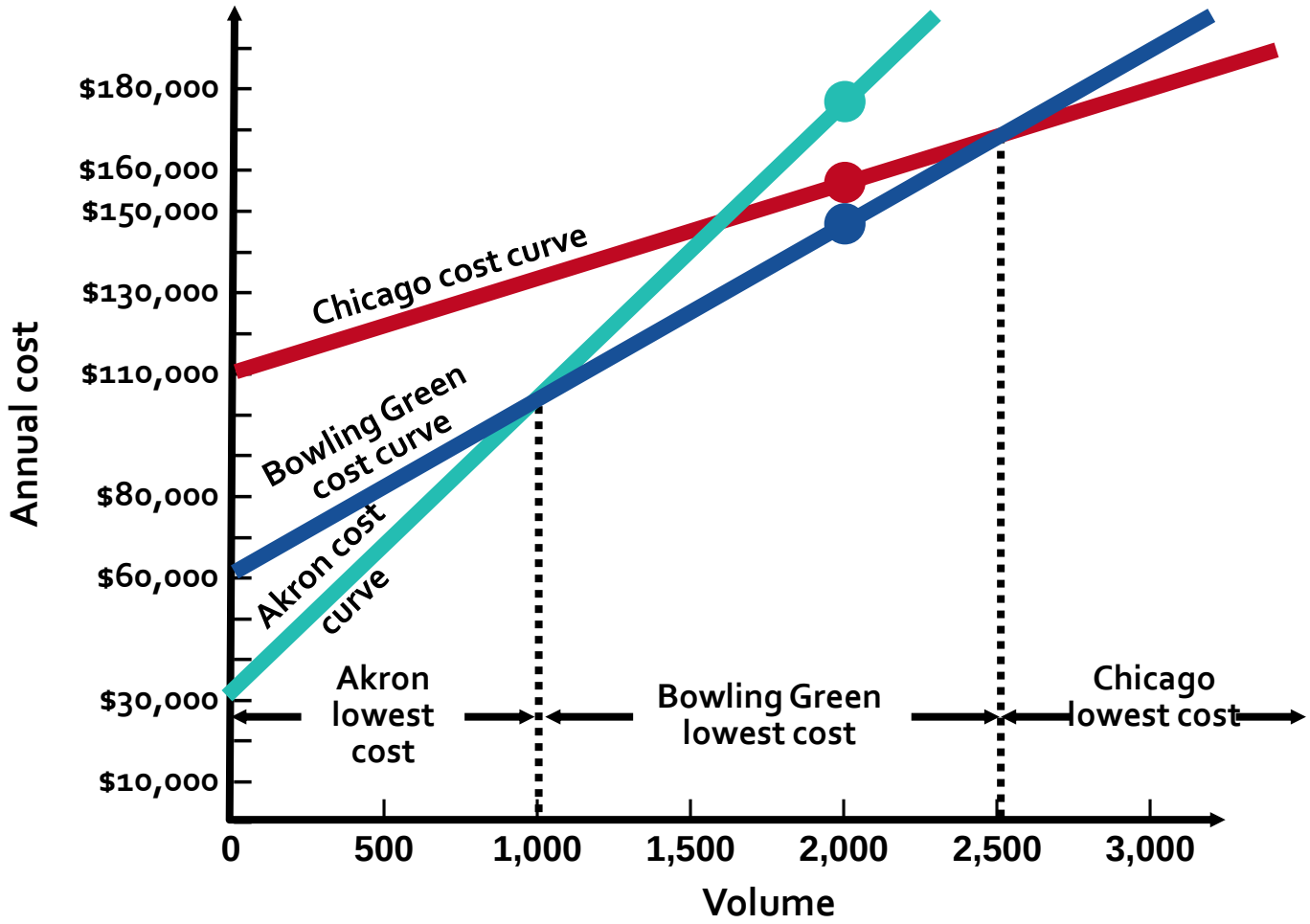
Factors That Affect Location Decisions

- **Labor productivity**
  - Wage rates are not the only cost
  - Lower productivity may increase total cost
- **Exchange rates and currency risks**
  - Can have a significant impact on costs
  - Rates change over time
- **Costs**
  - Tangible - easily measured costs such as utilities, labor, materials, taxes
  - Intangible - less easy to quantify and include education, public transportation, community, quality-of-life
- **Exchange rates and currency risks**
  - Can have a significant impact on cost structure
  - Rates change over time
- **Costs**
  - Tangible - easily measured costs such as utilities, labor, materials, taxes
  - Intangible - less easy to quantify and include education, public transportation, community, quality-of-life

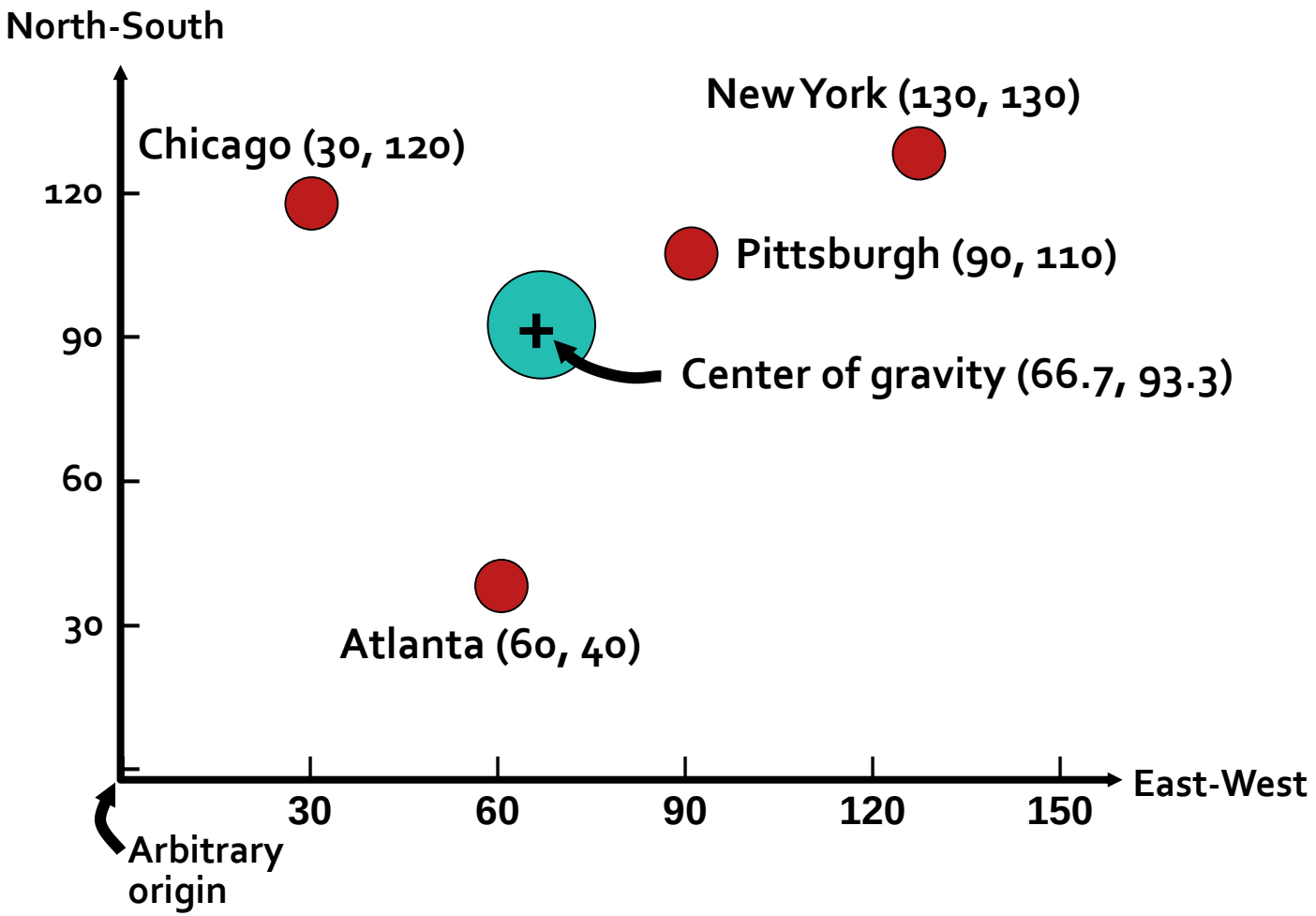
Factors That Affect Location Decisions

- **Political risk, values, and culture**
  - National, state, local governments attitudes toward private and intellectual property, zoning, pollution, employment stability may be in flux
  - Worker attitudes towards turnover, unions, absenteeism
  - Globally cultures have different attitudes towards punctuality, legal, and ethical issues
- **Proximity to markets**
  - Very important to services
  - JIT systems or high transportation costs may make it important to manufacturers
- **Proximity to suppliers**
  - Perishable goods, high transportation costs, bulky products
- **Proximity to competitors**
  - Called clustering
  - Often driven by resources such as natural, information, capital, talent
  - Found in both manufacturing and service industries

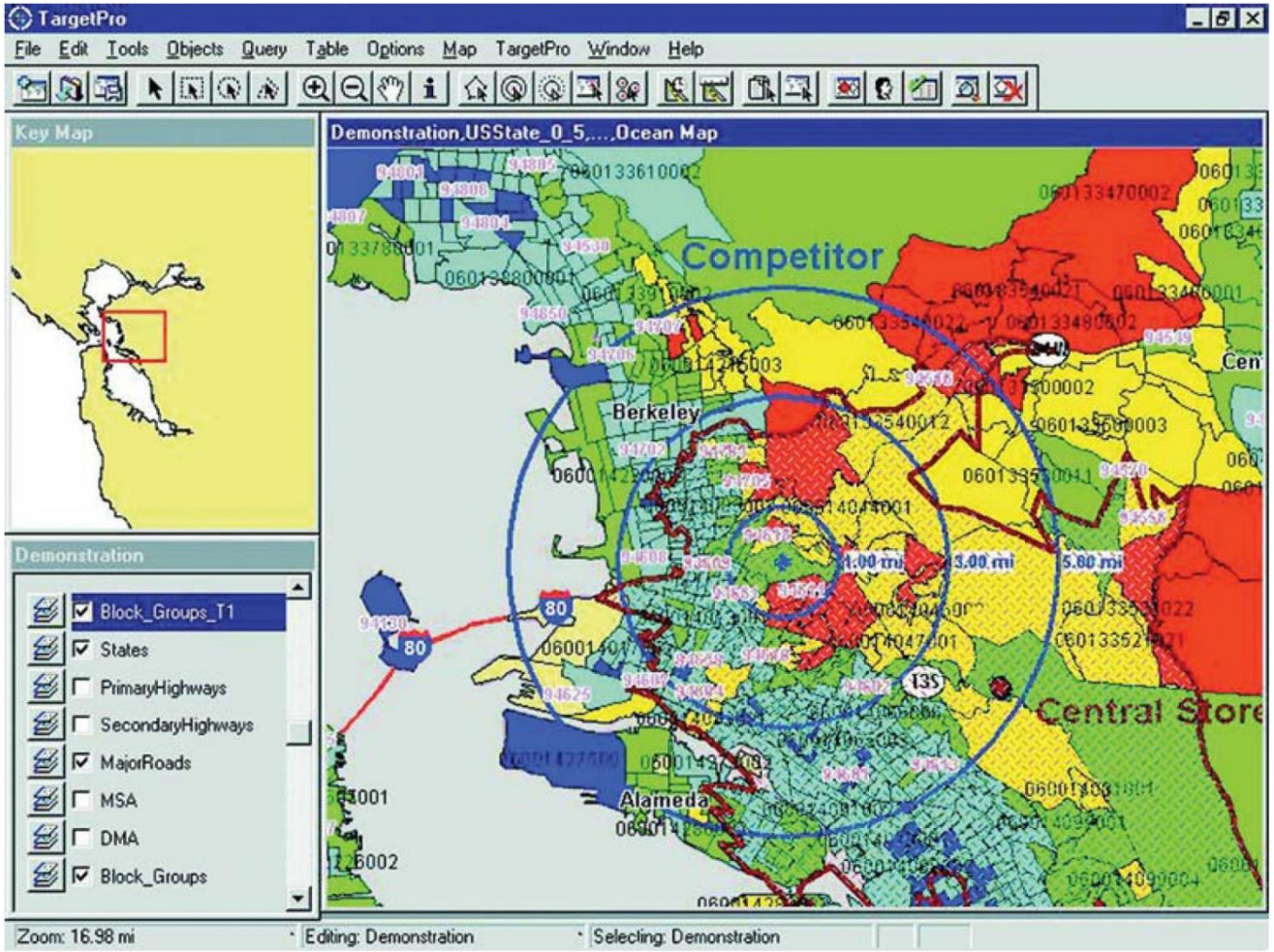
Locational Break-Even Analysis Example



Center-of-Gravity Method



(Not so new) means, but underused: Geographic Information Systems (GIS)



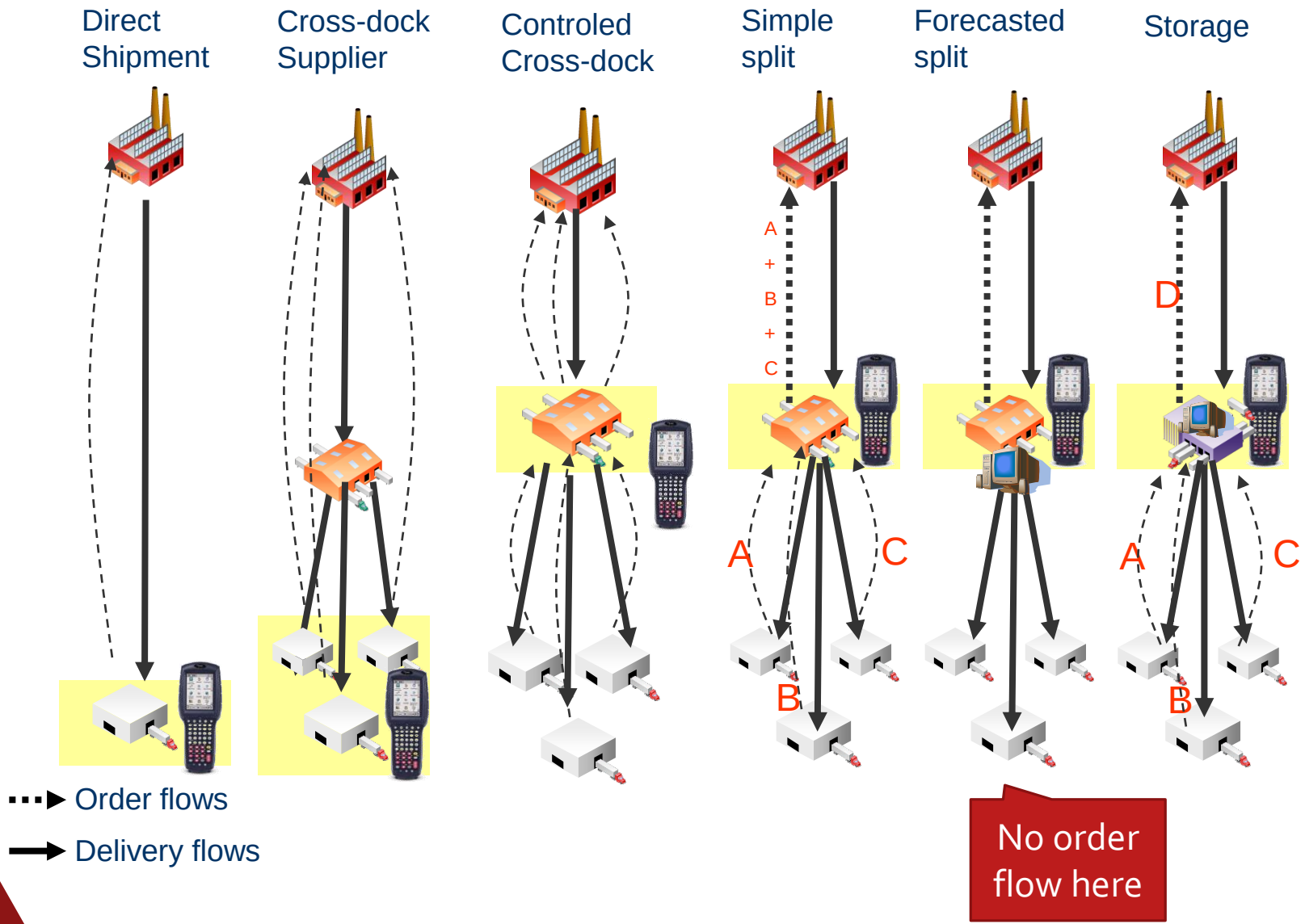
Network design is mainly driven but the required service level (speed, distance, ….)

Number of distribution centers gives Amazon a significant advantage in average distance shipped versus other players

1 Assumes demand distribution mirrors US population distribution

SOURCE: US Census Bureau

Once location are chosed, using the right flows and information between them



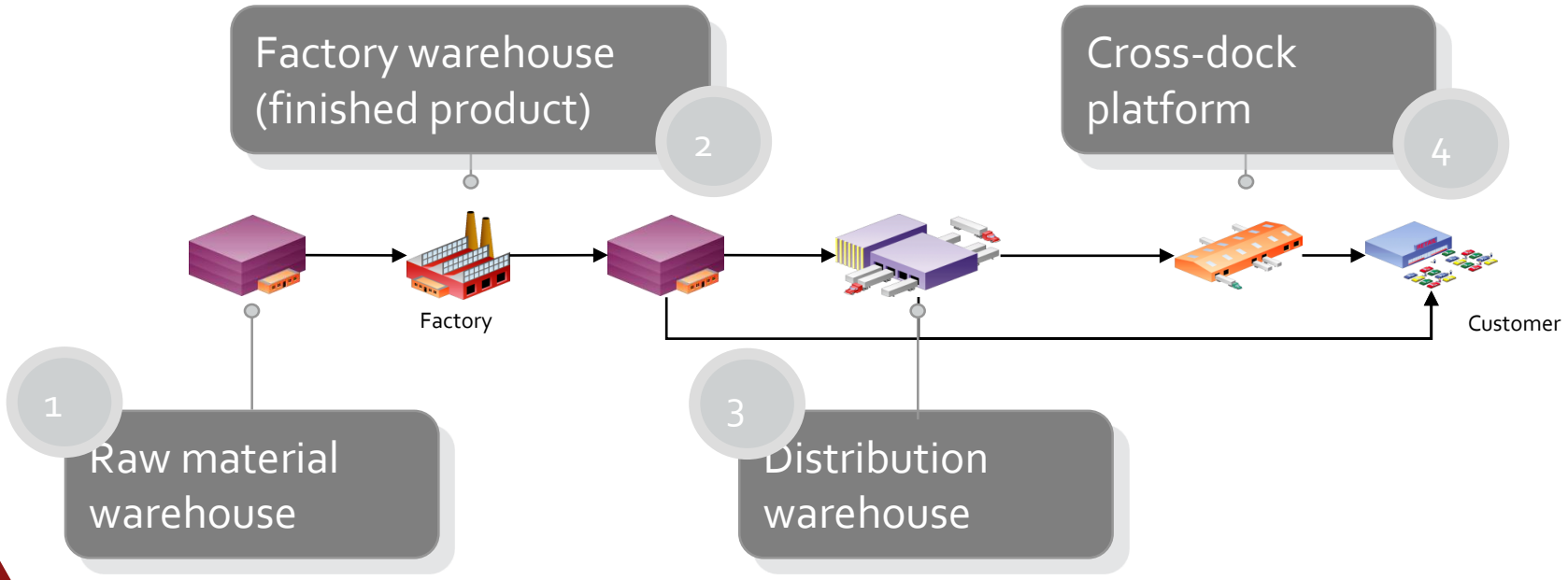
The warehouse : the forgotten industry of the supply chain

- Warehousing activities may not seem 'sexy'…
  - Few advanced concept, do not need advanced skills
  - Usually very far from top management priorities
  - Does not seem complex to optimize
-
- But :
  - **When the warehouse stops, the business stops**
    - Forecasting tools is down, you manage
    - WMS down, you don't deliver the customers
  - Warehouse is the last step of the customer service
  - Technical issues are complex : this is the 'real time' world
    - A 10' lead-time for an IT request sent to an operator could be crippling
  - There are real optimization levers
    - Picking path, order priorities….

Different types of warehouse, different types of problems

Every warehouse is different and stakes may vary (product constraints, suppliers constraints, customer constraints…)

A standard classification can already be done



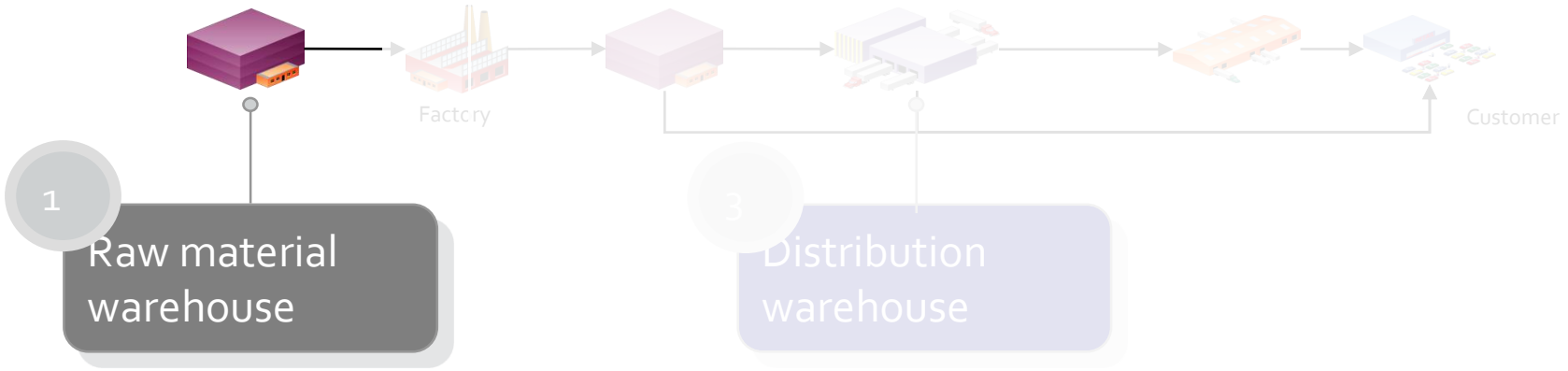
The raw material warehouse

They feed the production units with raw materials or components

Many sourcing origins (from overseas to local suppliers)

They deliver usually few clients

Their challenge is to supply the production units on a regular bases (takt time) and not to stop production !

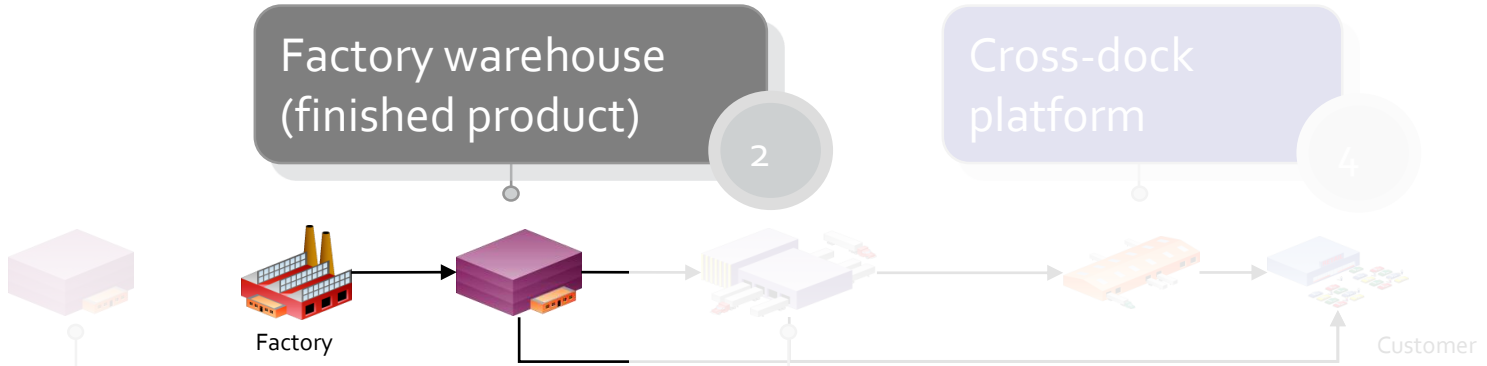


The factory warehouse

They store temporarily the finished product from the production unit

They have one supply source (inbound flows)

They deliver few clients (distribution warehouse)



They focus on not blocking the production unit (outbound flows) and deliver the distribution warehouse or network without creating shortage !

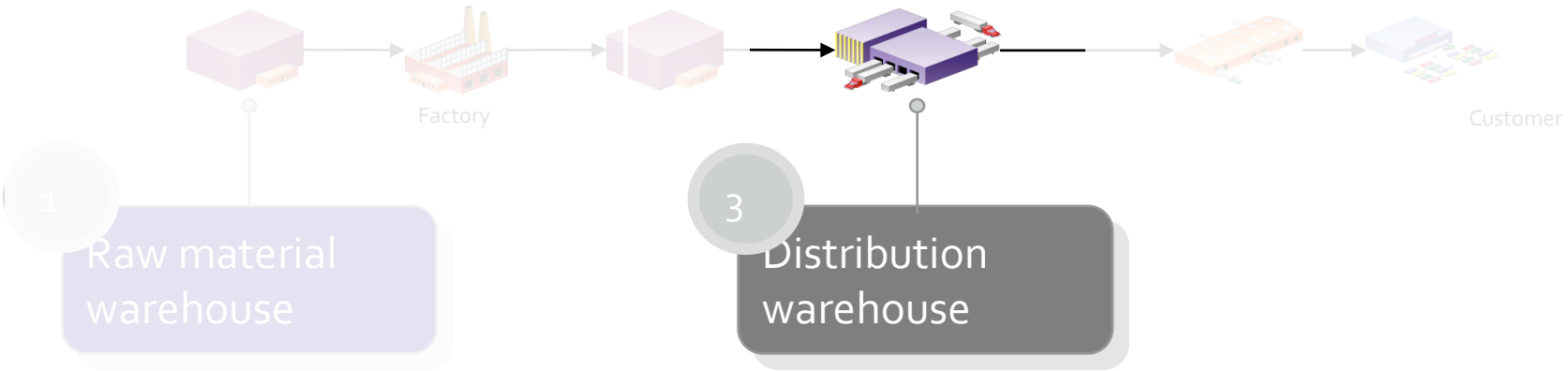
The Distribution Warehouse

They feed the customers with finished products

They may have various sourcing (from overseas to local suppliers)

They deliver many clients

Their challenge is to lower picking cost and manage preparation leadtime and workload balancing with a huge amount of orders

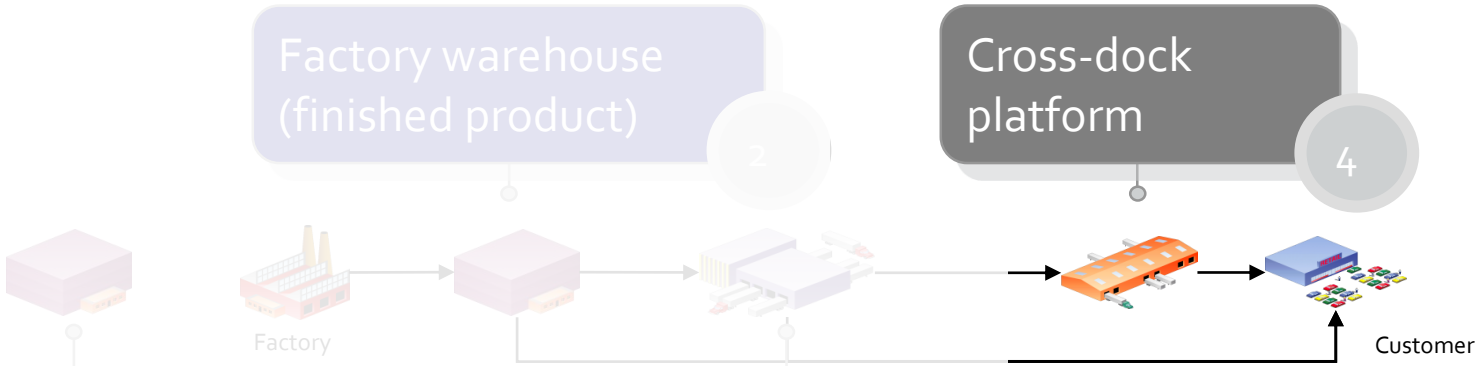


The Cross-dock Platform

They are a link or a hub between different transport legs

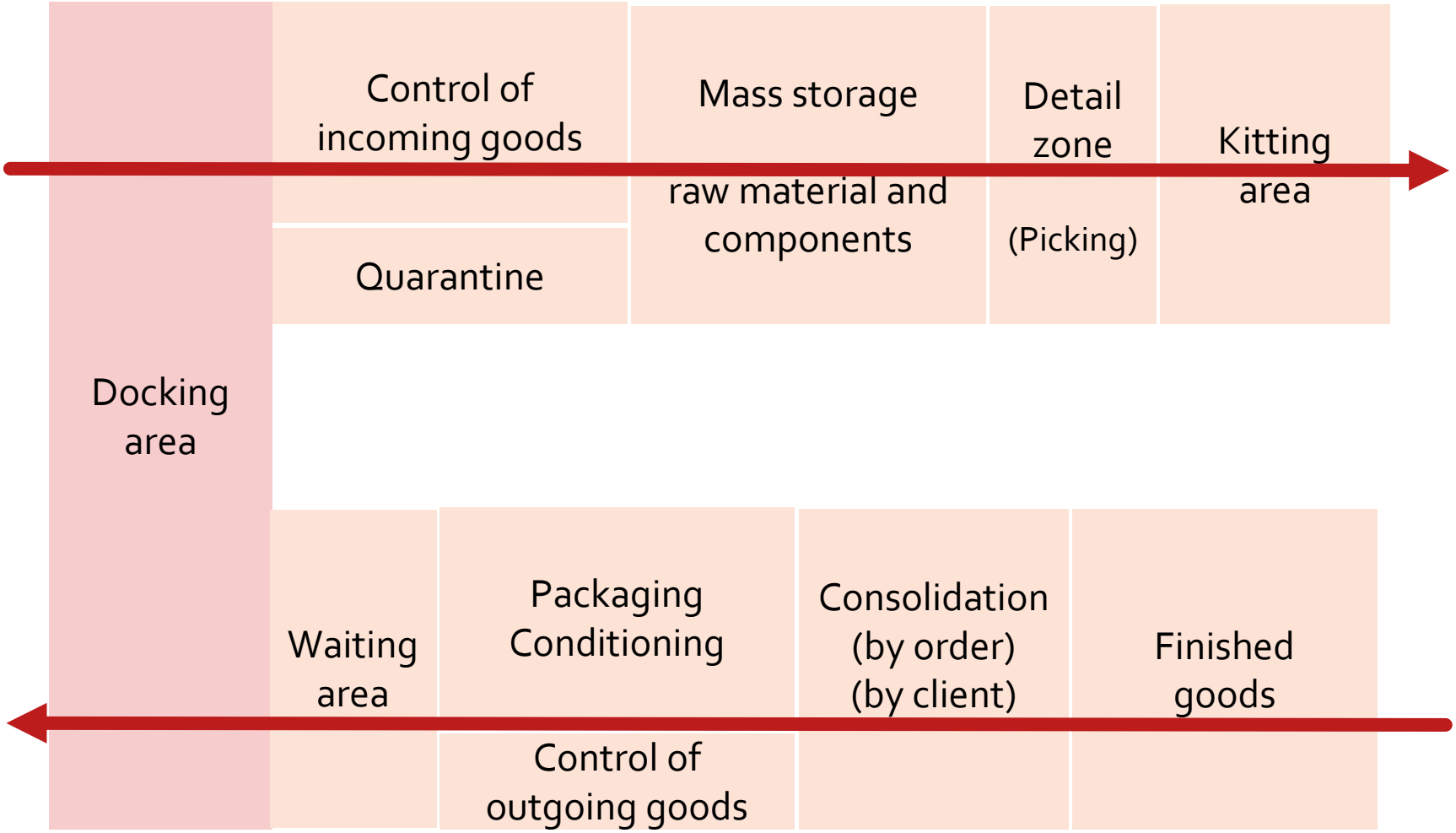
They have many supply source (inbound flows)

They deliver many clients (distribution warehouse)



They focus on processing operations as quickly as possible to deliver in time (cut-off time), they have no stock !

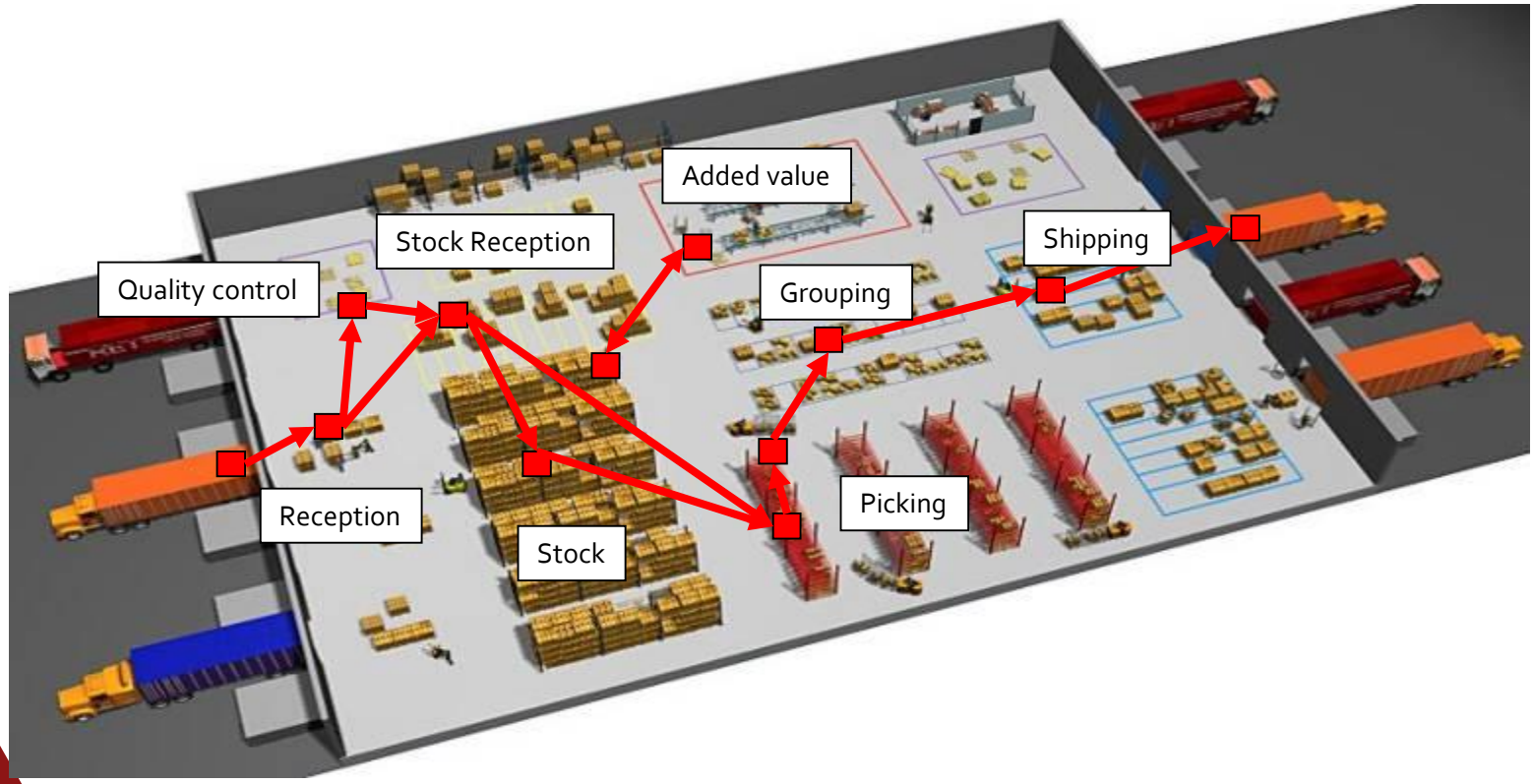
Flows in a warehouse (in a factory)



Overview of the inside (other types)

A warehouse is made of many different areas, corresponding to different activities

Each areas has its own characteristics and constraints

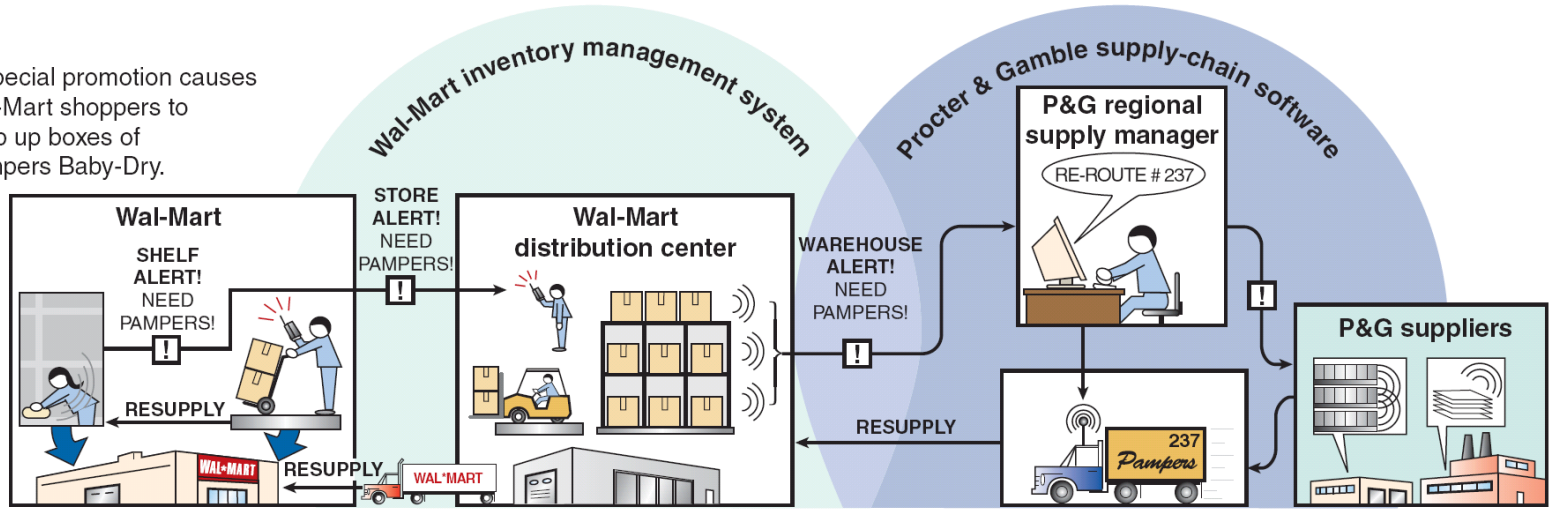


Example: use of Radio Frequency Tags in warehouses for Supply Chain planning

Radio Frequency Tags: Keeping the Shelves Stocked

Supply chains work smoothly when sales are steady, but often break down when confronted by a sudden surge in demand. Radio frequency ID (or RFID) tags can change that by providing real-time information about what's happening on store shelves. Here's how the system works for Proctor & Gamble's Pampers.

1. A special promotion causes Wal-Mart shoppers to snap up boxes of Pampers Baby-Dry.



2. Each box of Pampers has an RFID tag. Shelf-mounted scanners alert the stockroom of urgent need for restock.

3. Wal-Mart's inventory management system tracks and links its in-store stock and its warehouse stock, prompting quicker replenishment and providing accurate real-time data.

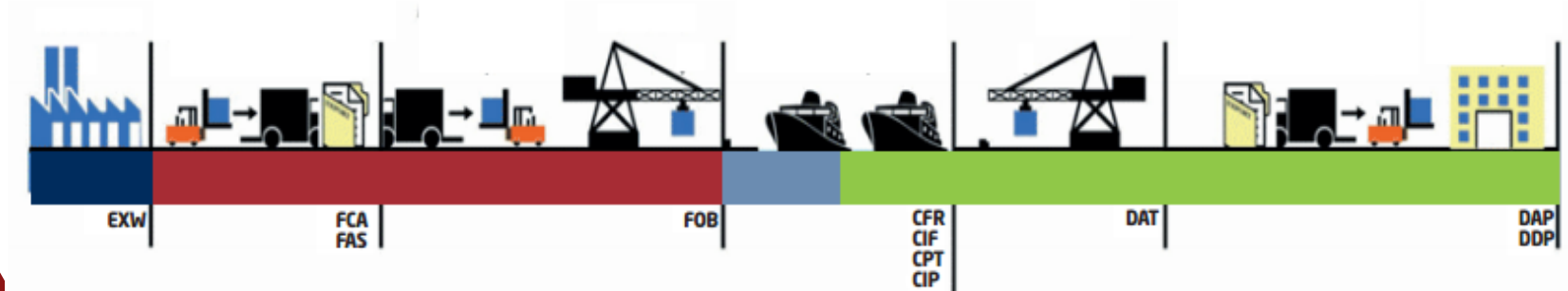
4. Wal-Mart's systems are linked to the P&G supply-chain management system. Demand spikes reported by RFID tags are immediately visible throughout the supply chain.

5. P&G's logistics software tracks its trucks with GPS locators, and tracks their contents with RFID tag readers. Regional managers can reroute trucks to fill urgent needs.

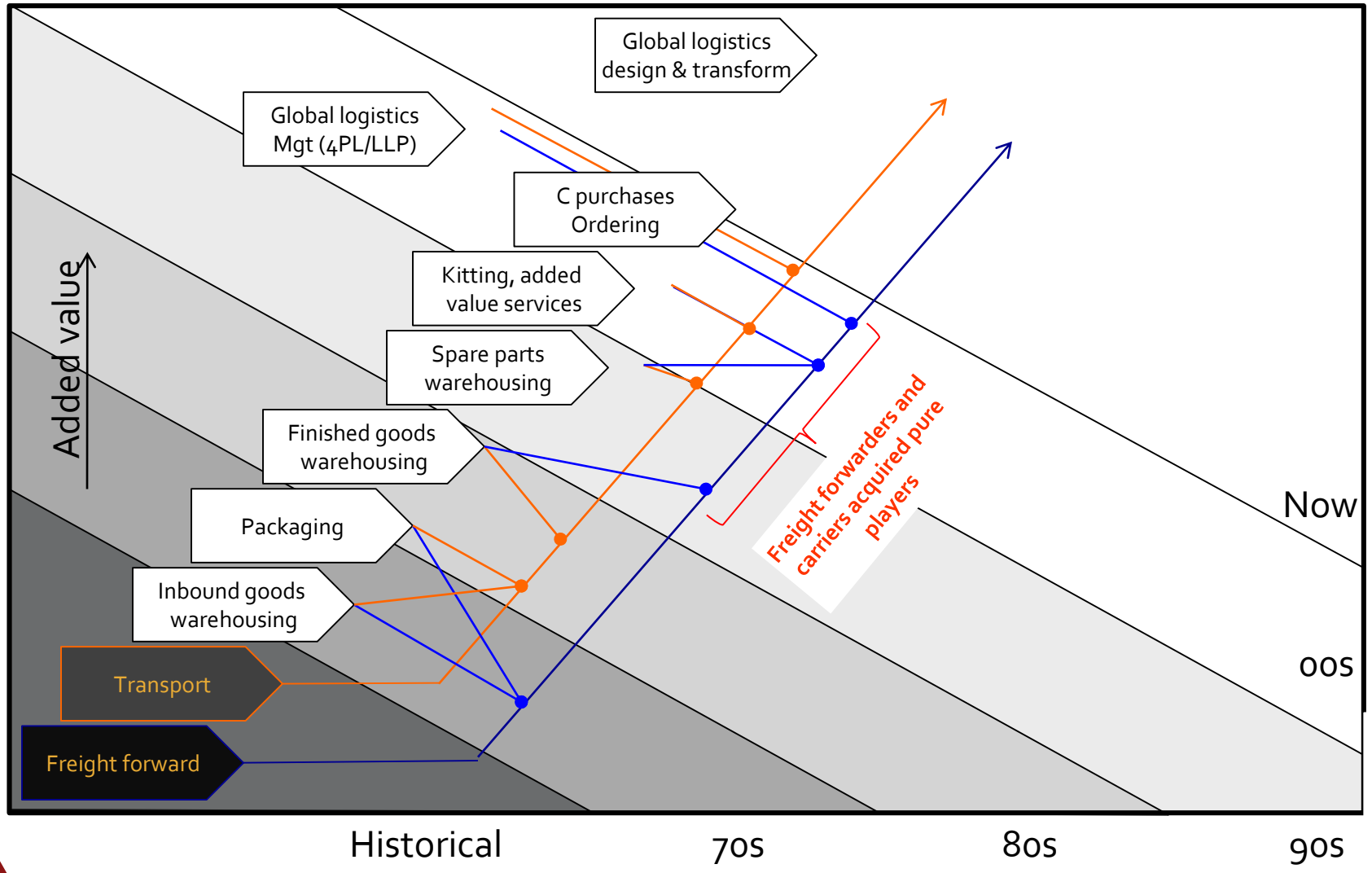
6. P&G suppliers also use RFID tags and readers on their raw materials, giving P&G visibility several tiers down the supply chain, and giving suppliers the ability to accurately forecast demand and production.

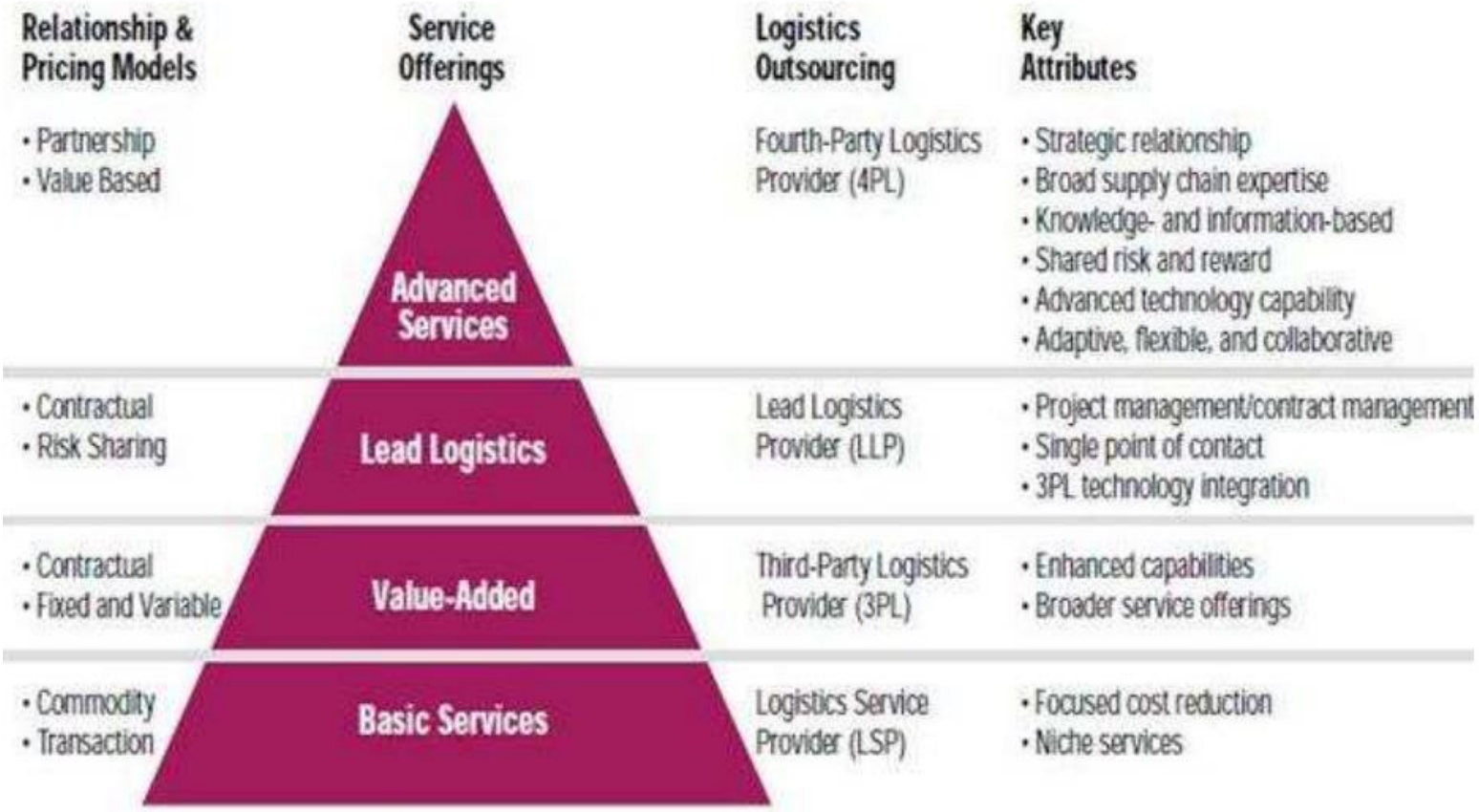
- Incoterms means **IN**ternational **CO**mmercial **TERMS**
- The incoterms are a set of rules defining the risks and costs transfer in an international sale of goods and they mainly focus on delivery aspects. They are defined and updated by The International Chamber of Commerce every ten years, most recently in 2010
- The incoterms are designated by 3 letters and must always be accompanied by a "named place" including city, province/state and country.
- **NB**: Incoterms do not define the aspects of transfer of ownership, which is covered by the standard conditions of sale.

	E		F		C				D		
INCOTERMS	EXW	FCA	FAS	FOB	CFR	CIF	CPT	CIP	DAT	DAP	DDP
☐ Seller ■ Buyer	Ex Works (Place)	Free Carrier (Place)	Free alongside ship (Port) (Port)	Free on board (Port)	Cost and freight (Port)	Cost of insurance & freight (Port) (Port)	Carriage paid to (Place)	Carriage & insurance paid to (Place)	Delivered at Terminal (Place/Port)	Delivered at Place (Place)	Delivered Duty Paid (Place)
Warehouse Services	—	—	—	—	—	—	—	—	—	—	—
Export Packing	—	—	—	—	—	—	—	—	—	—	—
Loading at Point of Origin	■	—	—	—	—	—	—	—	—	—	—
Inland Freight	■	—	—	—	—	—	—	—	—	—	—
Port Receiving Charges	■	—	—	—	—	—	—	—	—	—	—
Forwarder Fees	■	—	—	—	—	—	—	—	—	—	—
Ocean / Air Freight	■	■	■	■	—	—	—	—	—	—	—
Charges in Foreign Port	■	■	■	■	■	■	■	■	—	—	—
Custom Clearance	■	■	■	■	■	■	■	■	■	■	—
Customs Duties	■	■	■	■	■	■	■	■	■	■	—
Delivery Charges to Final Destination	■	■	■	■	■	■	■	■	■	—	—
AMT: Any mode of transport including Multimodal O=Ocean	AMT	AMT	O	O	O	O	AMT	AMT	AMT	AMT	AMT



Logistics provided keep adding value added services




Relationship & Pricing Models
Service Offerings
Logistics Outsourcing
Key Attributes
• Partnership
• Value Based
Advanced Services
Fourth-Party Logistics Provider (4PL)
• Strategic relationship
• Broad supply chain expertise
• Knowledge- and information-based
• Shared risk and reward
• Advanced technology capability
• Adaptive, flexible, and collaborative
• Contractual
• Risk Sharing
Lead Logistics
Lead Logistics Provider (LLP)
• Project management/contract management
• Single point of contact
• 3PL technology integration
• Contractual
• Fixed and Variable
Value-Added
Third-Party Logistics Provider (3PL)
• Enhanced capabilities
• Broader service offerings
• Commodity
• Transaction
Basic Services
Logistics Service Provider (LSP)
• Focused cost reduction
• Niche services

Global players have large size compared to industries.

Company	Revenue (in M USD)	Employee
UPS	54,000	400,000
FEDEX	43,000	
DHL	32,500	
KUEHNE+NAGEL	22,000	63,000
DB SCHENKER	20,000	65,000
GEODIS	10,000	32,000
CEVA	9,500	49,000
PANALPINA	7,000	
RYDER	6,300	
CON-WAY (MENLO)	5,600	
EADS Group	73,000	133,000
Airbus & Airbus Military	50,000	60,000
Eurocopter	8,100	22,000
Astrium	7,500	18,000
Cassidian	7,500	28,000