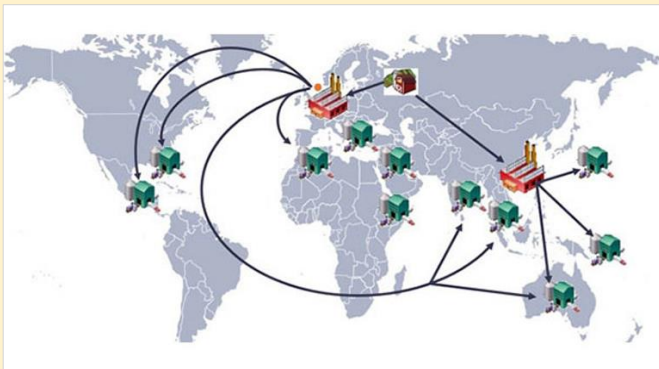
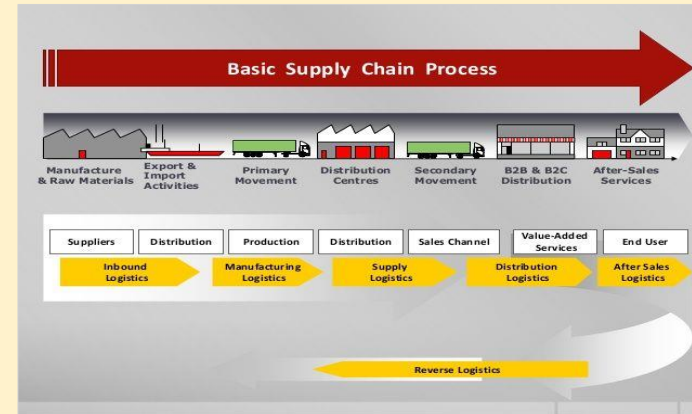


Lecture 8- Global Supply Chain and SC Processes



Recap

The Foundations of Agility (Christopher, 2016)

Synchronize

- Synchronize activities through shared information

Work

- Work smarter, not harder

Partner

- Partner with suppliers to reduce in-bound lead times

Seek

- Seek to reduce complexity

Postpone

- Postpone the final configuration/assembly/distribution of products

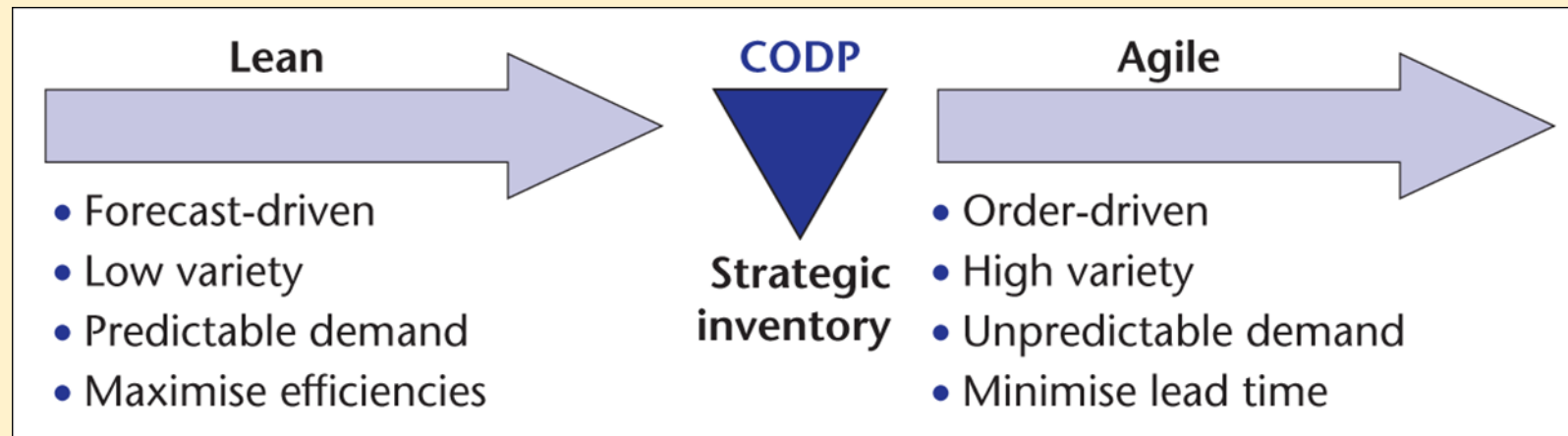
Manage

- Manage processes, not functions

Utilize

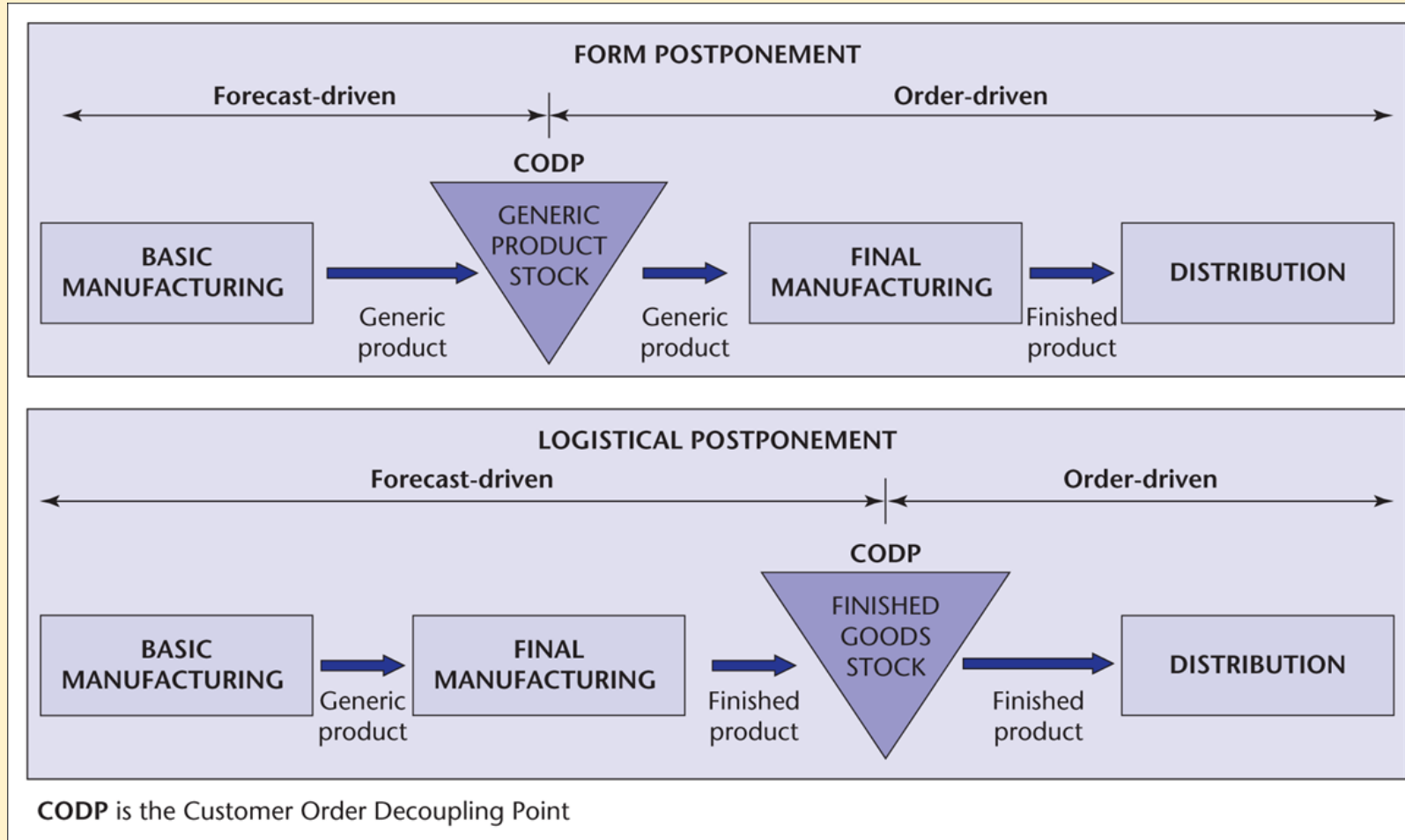
- Utilize appropriate performance metrics

Combination of lean and agile using a customer order decoupling point (CODP)



Harrison et al (2015)

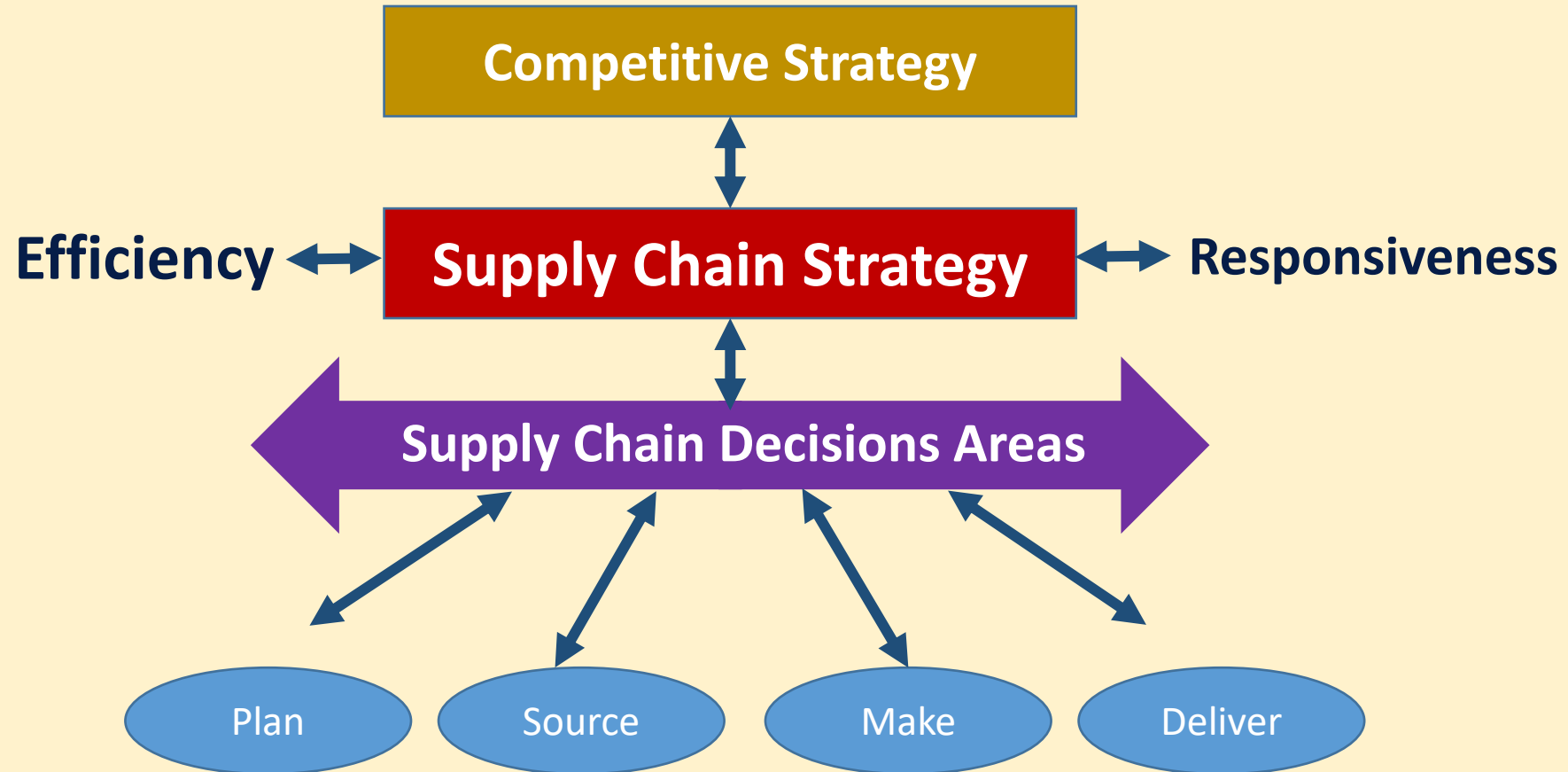
Form and Logistical Postponement



Harrison et al (2015)

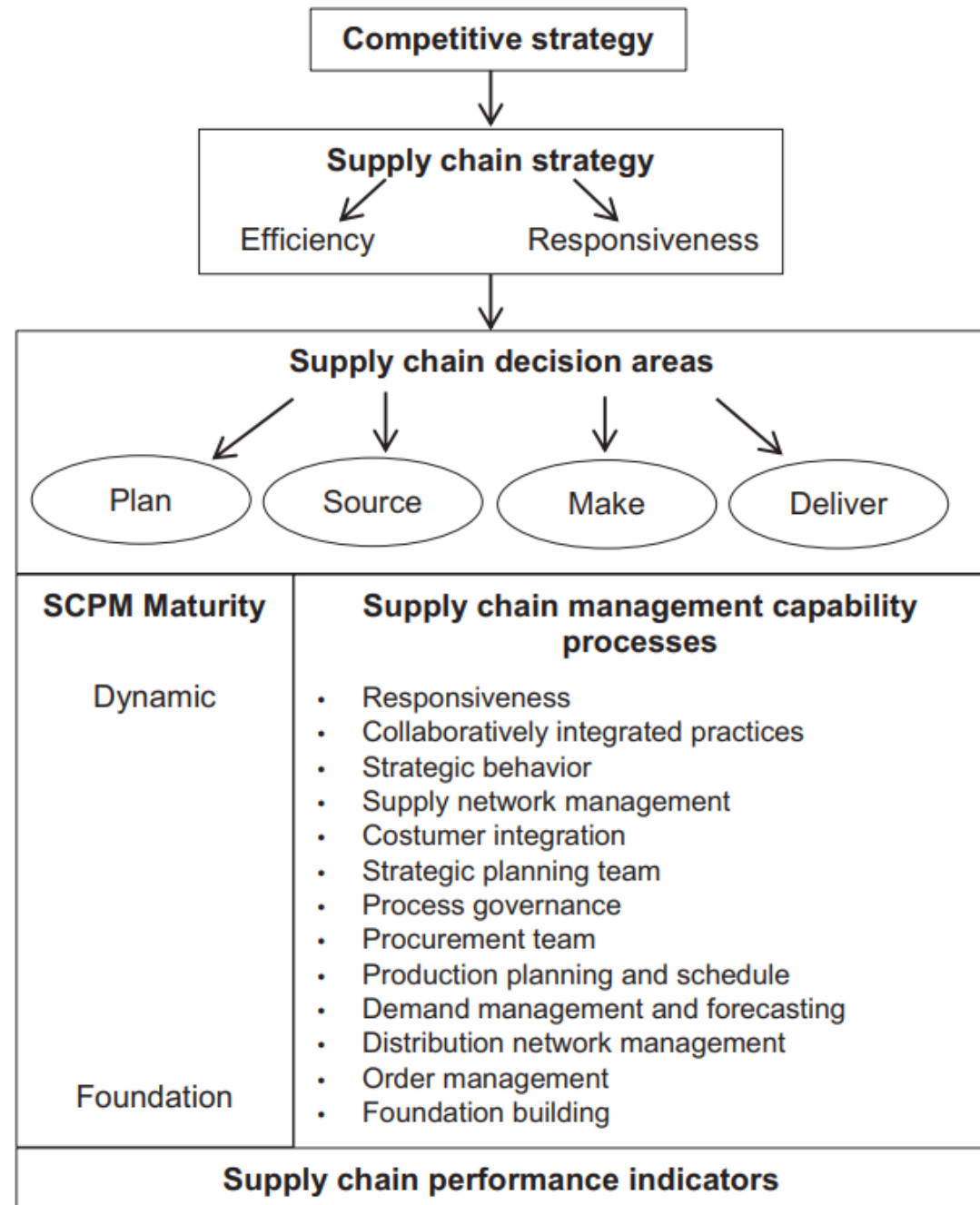
Strategic SC Framework

[Adapted from Santos et al \(2021\)](#)



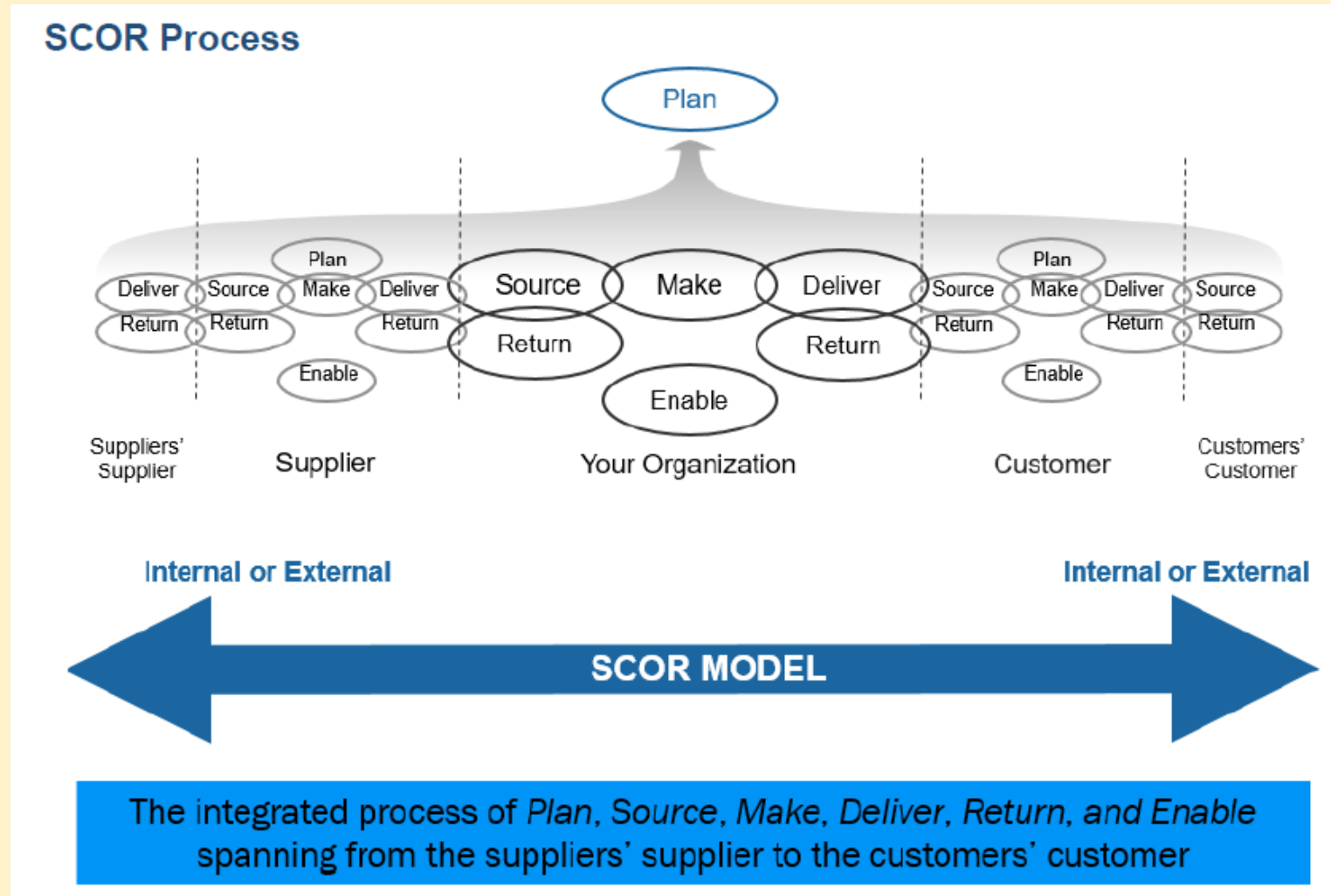
Strategic SC Framework

[Adapted from Santos et al \(2021\)](#)



Supply Chain Processes

Supply Chain Operations Reference- SCOR 12.0 Model



Purpose of SCOR

- **SCOR processes provide the building blocks**, the model that can be used to describe supply chains that are very simple or very complex
- It also provides a basis for the **focal firm** to **understand their supply chain performance** and **identify opportunities for improvements**




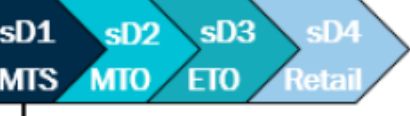

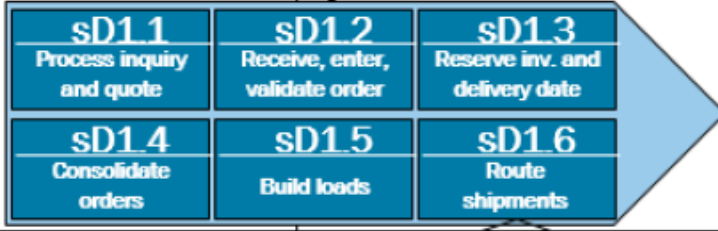

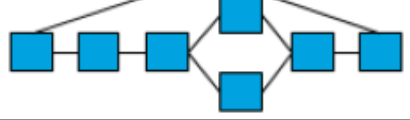
SCOR Management Processes

- The SCOR model has been developed to describe the **business activities associated with all phases of satisfying customer demand**
- Six primary management processes:



SCOR Process Hierarchy

- For each level-1 process, three or more differentiating level-2 processes exist.
- Each level-2 process contains level-3 process elements.

Level	Description	Schematic	Comments
1 	Major processes		Defines the scope, content, and performance targets of the supply chain
2 	Process categories		Defines the operations strategy; process capabilities are set
3 	Process elements		Defines the configuration of individual processes. The ability to execute is set. Focus is on processes, inputs/outputs, skills, performance, best practices, and capabilities
4 	Improvement tools/activities		Use of kaizen, lean, TQM, six sigma, benchmarking

Level 3 SCOR Processes

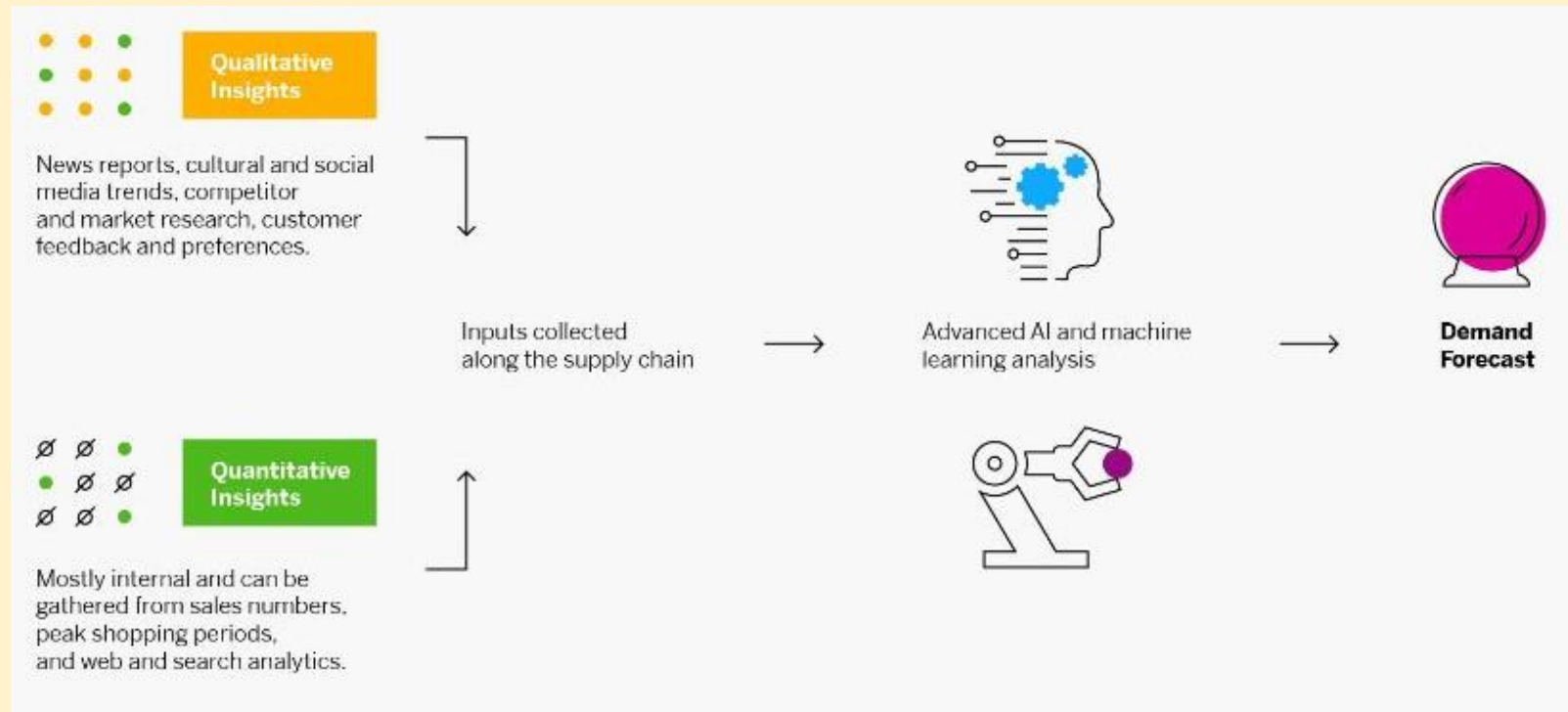
sP - Plan					sS - Source			sM - Make			sD - Deliver			
sP1 Plan Supply Chain	sP2 Plan Source	sP3 Plan Make	sP4 Plan Deliver	sP5 Plan Return	sS1 Source Stocked Product	sS2 Source Make-to-Order Product	sS3 Source Engineer-to-Order Product	sM1 Make-to-Stock	sM2 Make-to-Order	sM3 Engineer-to-Order	sD1 Deliver Stocked Product	sD2 Deliver Make-to-Order Product	sD3 Deliver Engineer-to-Order Product	sD4 Deliver Retail Product
<p>sP1.1: Identify, Prioritize and Aggregate Supply Chain Requirements</p> <p>sP1.2: Identify, Prioritize and Aggregate Supply Chain Resources</p> <p>sP1.3: Balance Supply Chain Resources with SC Requirements</p> <p>sP1.4: Establish and Communicate Supply Chain Plans</p>	<p>sP2.1: Identify, Prioritize and Aggregate Product Requirements</p> <p>sP2.2: Identify, Assess and Aggregate Product Resources</p> <p>sP2.3: Balance Product Resources with Product Requirements</p> <p>sP2.4: Establish Sourcing Plans</p>	<p>sP3.1: Identify, Prioritize and Aggregate Production Requirements</p> <p>sP3.2: Identify, Assess and Aggregate Production Resources</p> <p>sP3.3: Balance Production Resources with Production Requirements</p> <p>sP3.4: Establish Production Plans</p>	<p>sP4.1: Identify, Prioritize and Aggregate Delivery Requirements</p> <p>sP4.2: Identify, Assess and Aggregate Delivery Resources</p> <p>sP4.3: Balance Delivery Resources and Capabilities with Delivery Requirements</p> <p>sP4.4: Establish Delivery Plans</p>	<p>sP5.1: Assess and Aggregate Return Requirements</p> <p>sP5.2: Identify, Assess and Aggregate Return Resources</p> <p>sP5.3: Balance Return Resources with Return Requirements</p> <p>sP5.4: Establish and Communicate Return Plans</p>	<p>sS1.1: Schedule Product Deliveries</p> <p>sS1.2: Receive Product</p> <p>sS1.3: Verify Product</p> <p>sS1.4: Transfer Product</p> <p>sS1.5: Authorize Supplier Payment</p>	<p>sS2.1: Schedule Product Deliveries</p> <p>sS2.2: Receive Product</p> <p>sS2.3: Verify Product</p> <p>sS2.4: Transfer Product</p> <p>sS2.5: Authorize Supplier Payment</p>	<p>sS3.1: Identify Sources of Supply</p> <p>sS3.2: Select Final Supplier and Negotiate</p> <p>sS3.3: Schedule Product Deliveries</p> <p>sS3.4: Receive Product</p> <p>sS3.5: Verify Product</p> <p>sS3.6: Transfer Product</p> <p>sS3.7: Authorize Supplier Payment</p>	<p>sM1.1: Schedule Production Activities</p> <p>sM1.2: Issue Material</p> <p>sM1.3: Produce and Test</p> <p>sM1.4: Package</p> <p>sM1.5: Stage Product</p> <p>sM1.6: Release Product to Deliver</p> <p>sM1.7: Waste Disposal</p>	<p>sM2.1: Schedule Production Activities</p> <p>sM2.2: Issue Sourced/In-Process Product</p> <p>sM2.3: Produce and Test</p> <p>sM2.4: Package</p> <p>sM2.5: Stage Finished Product</p> <p>sM2.6: Release Finished Product to Deliver</p> <p>sM2.7: Waste Disposal</p>	<p>sM3.1: Finalize Production Engineering</p> <p>sM3.2: Schedule Production Activities</p> <p>sM3.3: Issue Sourced/In-Process Product</p> <p>sM3.4: Produce and Test</p> <p>sM3.5: Package</p> <p>sM3.6: Stage Finished Product</p> <p>sM3.7: Release Product to Deliver</p> <p>sM3.8: Waste Disposal</p>	<p>sD1.1: Process Inquiry and Quote</p> <p>sD1.2: Receive, Enter, and Validate Order</p> <p>sD1.3: Reserve Inventory and Determine Delivery Date</p> <p>sD1.4: Consolidate Orders</p> <p>sD1.5: Build Loads</p> <p>sD1.6: Route Shipments</p> <p>sD1.7: Select Carriers and Rate Shipments</p> <p>sD1.8: Receive Product from Source or Make</p> <p>sD1.9: Pick Product</p> <p>sD1.10: Pack Product</p> <p>sD1.11: Load Vehicle & Generate Shipping Docs</p> <p>sD1.12: Ship Product</p> <p>sD1.13: Receive and Verify Product by Customer</p> <p>sD1.14: Install Product</p> <p>sD1.15: Invoice</p>	<p>sD2.1: Process Inquiry and Quote</p> <p>sD2.2: Receive, Configure, Enter and Validate Order</p> <p>sD2.3: Reserve Inventory and Determine Delivery Date</p> <p>sD2.4: Consolidate Orders</p> <p>sD2.5: Build Loads</p> <p>sD2.6: Route Shipments</p> <p>sD2.7: Select Carriers and Rate Shipments</p> <p>sD2.8: Receive Product from Source or Make</p> <p>sD2.9: Pick Product</p> <p>sD2.10: Pack Product</p> <p>sD2.11: Load Product & Generate Shipping Docs</p> <p>sD2.12: Ship Product</p> <p>sD2.13: Receive and Verify Product by Customer</p> <p>sD2.14: Install Product</p> <p>sD2.15: Invoice</p>	<p>sD3.1: Obtain and Respond to RFP/ RFQ</p> <p>sD3.2: Negotiate and Receive Contract</p> <p>sD3.3: Enter Order, Commit Resources & Launch Program</p> <p>sD3.4: Schedule Installation</p> <p>sD3.5: Build Loads</p> <p>sD3.6: Route Shipments</p> <p>sD3.7: Select Carriers & Rate Shipments</p> <p>sD3.8: Receive Product from Source or Make</p> <p>sD3.9: Pick Product</p> <p>sD3.10: Pack Product</p> <p>sD3.11: Load Product & Generate Shipping Docs</p> <p>sD3.12: Ship Product</p> <p>sD3.13: Receive and Verify Product by Customer</p> <p>sD3.14: Install Product</p> <p>sD3.15: Invoice</p>	<p>sD4.1: Generate Stocking Schedule</p> <p>sD4.2: Receive Product at Store</p> <p>sD4.3: Pick Product from backroom</p> <p>sD4.4: Stock Shelf</p> <p>sD4.5: Fill Shopping Cart</p> <p>sD4.6: Checkout</p> <p>sD4.7: Deliver and/or Install</p>

Planning

Plan

- Processes that balances aggregate demand and supply
- Describe the activities associated with developing plans to operate the supply chain.
- These include:
 - Determining requirements, gathering information about available resources,
 - Balancing requirements and resources to determine planned capabilities and gaps in demand or resources, and
 - Identifying actions to correct these gaps

Demand Planning

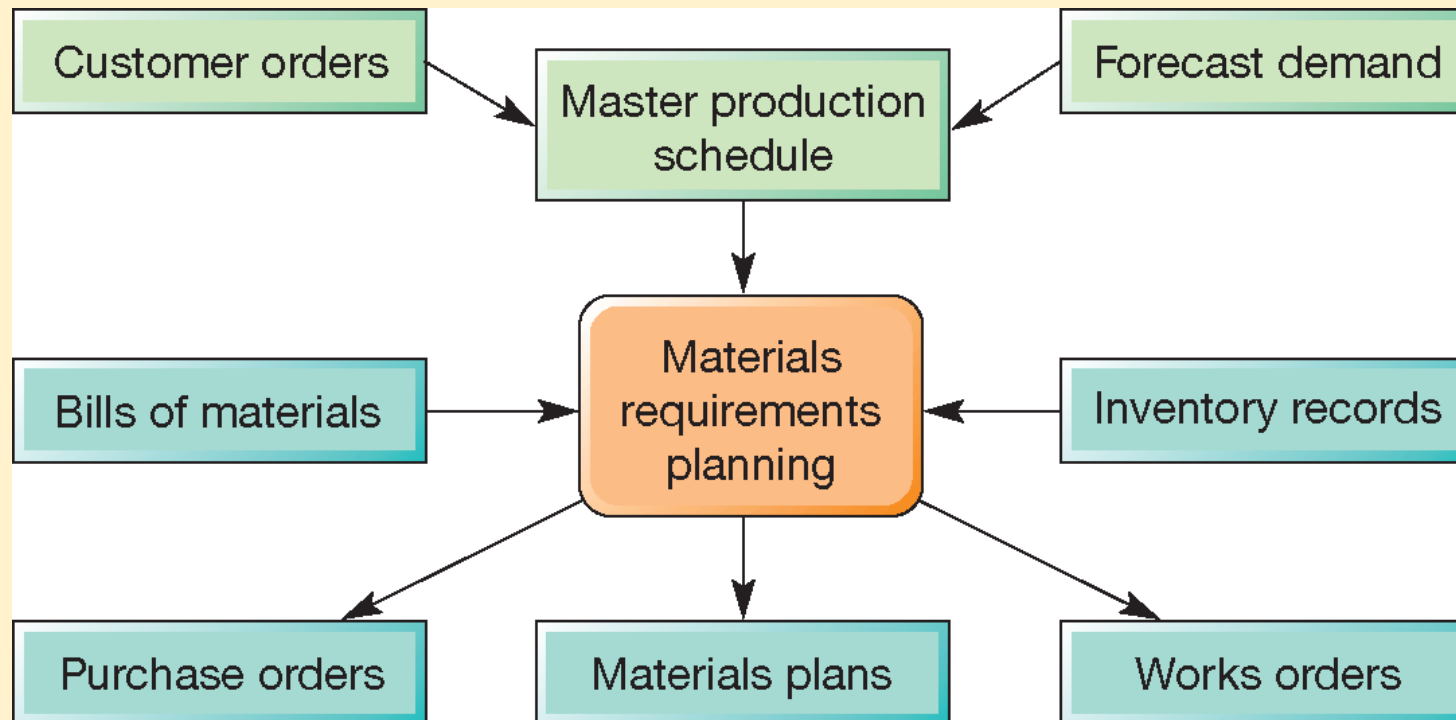


Materials Requirement Planning

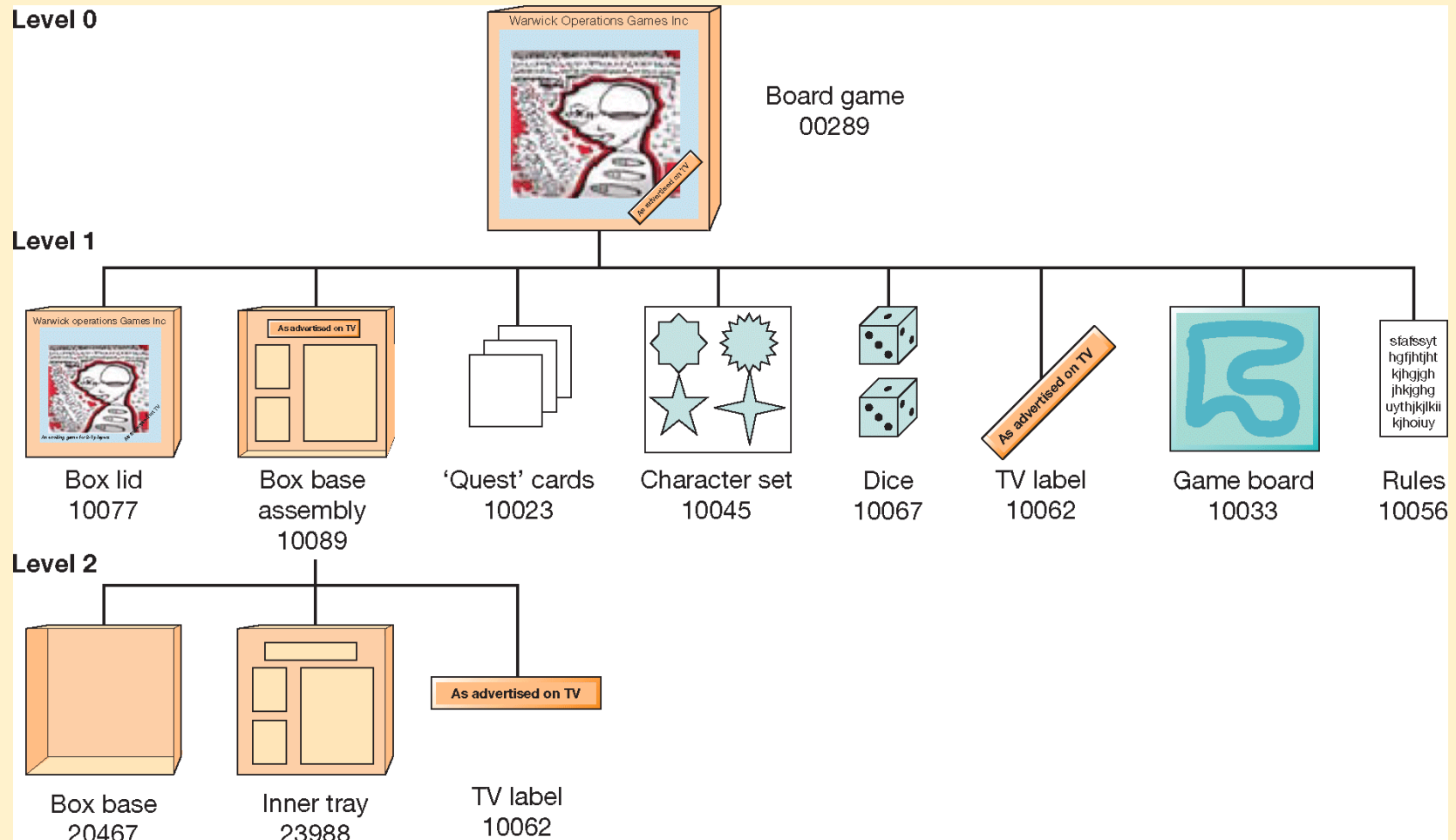
- **Materials requirements planning (MRP)** is an approach to calculating how many parts or materials of particular types are required and what times they are required
- Inputs to MRP are customer orders and forecast demand, which is used to develop the **Master Production Schedule (MPS)**

Materials requirements planning (MRP) schematic

- From the master schedule, MRP calculates the required volume and timing of assemblies, sub-assemblies and materials.
- To do this it needs information on what parts are required for each product. This is called the 'bill of materials'.

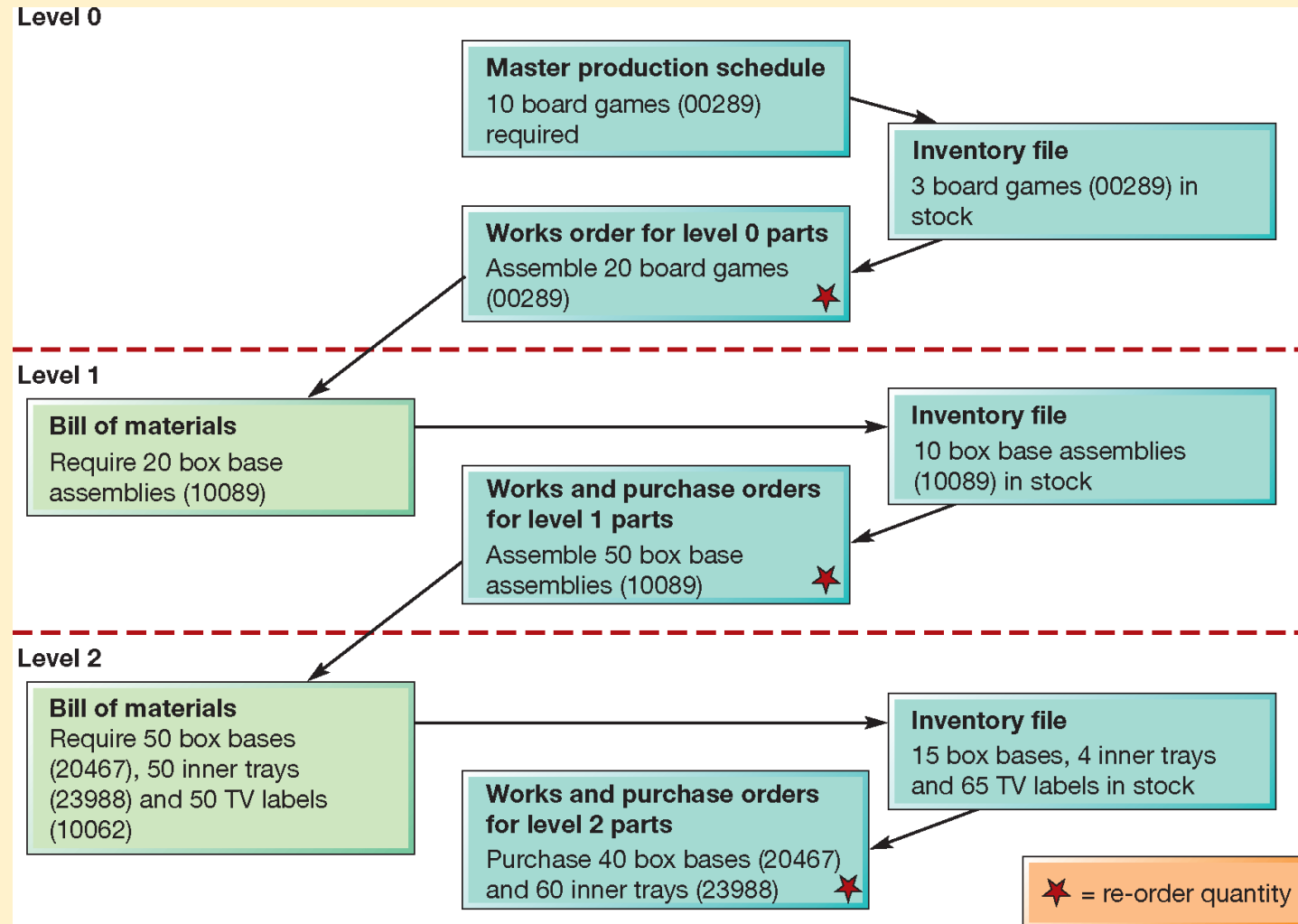


Bill of Materials (BOM)



Product structure for the Treasure Hunt game

Example of the MRP netting process for the board game



Family of Bicycles (Verma and Boyer 2010)



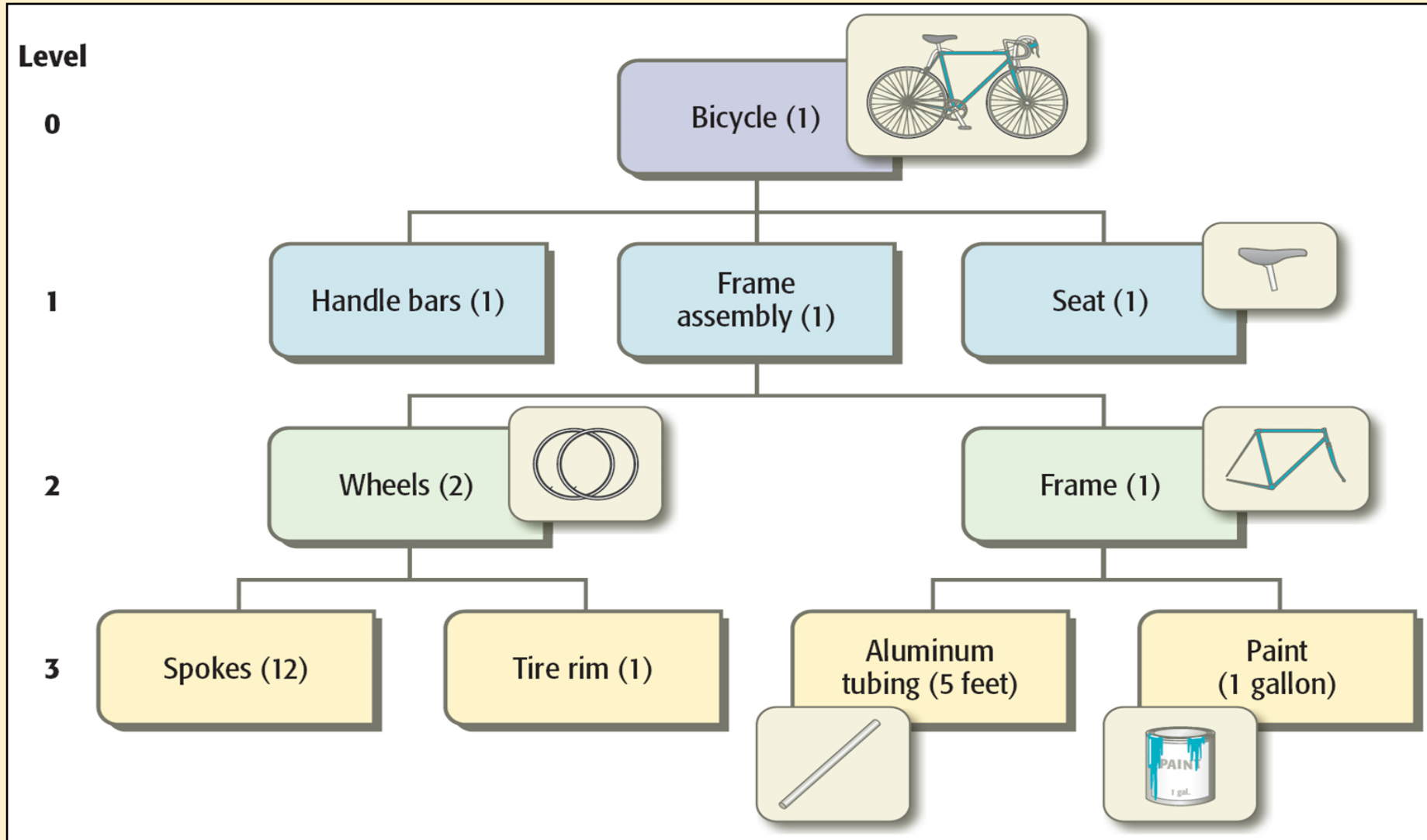
BOM to support manufacturing

Variant	Paint	Wheels	Seats	Brakes	Package
Mountain bike	Green	Thick	Light	Carbon fibre	Mid box
Road bike	Black	Thin	Heavily	Carbon fibre	Mid box
Tandon bike	Red	Thin	Light (x2)	Carbon fibre	Big box

- Some parts are common across the bike variants
- Volumes will drive the amount of component ordering
- Consider not just the product, all the associated components i.e. packaging



Partial Bill of Materials for a Bicycle (Verma and Boyer, 2010)



Supplier & supply chain complexity

Supplier base



Different lead time



Master Production Schedule for a Family of Bicycles

(Verma and Boyer 2010)

	February				March			
	Feb. 1	Feb. 8	Feb. 15	Feb. 22	Mar. 1	Mar. 8	Mar. 15	Mar. 22
Aggregate production plan for bicycle family	600				500			
Mountain bike	200		100			80		80
Road bike		50		100	100		100	
Tandem bike		75		75		70		70

MRP Calculations

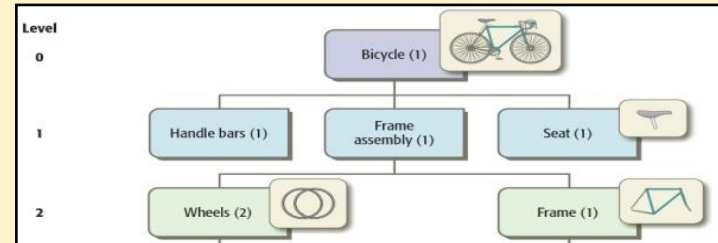
The Bill of Materials for each product on the Master Schedule is “exploded” i.e. all the different parts/ components required to make the different numbers

It uses the Master Schedule to determine the quantities of bicycles to make.

	February				March			
	Feb. 1	Feb. 8	Feb. 15	Feb. 22	Mar. 1	Mar. 8	Mar. 15	Mar. 22
Aggregate production plan for bicycle family	600				500			
Mountain bike	200		100			80		80
Road bike		50		100	100		100	

2. The Master Schedule

Balances capacity



1. The Bill of Materials

It then works out how much stock is on-hand (available) and how much needs to be ordered depending on the rules for lot size; lead time and safety stock in the inventory record.

The orders can then be made for the parts and components and also for production to manufacture the end products.

3. Inventory Records

Information on quantity; timing and ordering for products /parts/components

Sourcing

Source

- Processes the procure goods and services to meet planned or actual demand
- Describe the activities associated with ordering, delivery, receipt and transfer of raw material items, subassemblies, products or services.
- These include:
 - Issuing purchase orders, scheduling deliveries, receiving orders, validating orders,
 - Storing goods and accepting suppliers' invoices.

Strategic Sourcing

- Systematic and comprehensive process of acquiring inputs
- **managing supplier relations** in a manner that **achieves value in obtaining the organization's long-term objectives**

Supply Strategy

- A company's need for a supply strategy depends on two factors:
 1. the **strategic importance of purchasing** in terms of the value added by product line, the percentage of raw materials in total costs and their impact on profitability
 2. the **complexity of the supply market** gauged by supply scarcity, pace of technology and/or materials substitution, entry barriers, logistics cost or complexity, and monopoly or oligopoly conditions

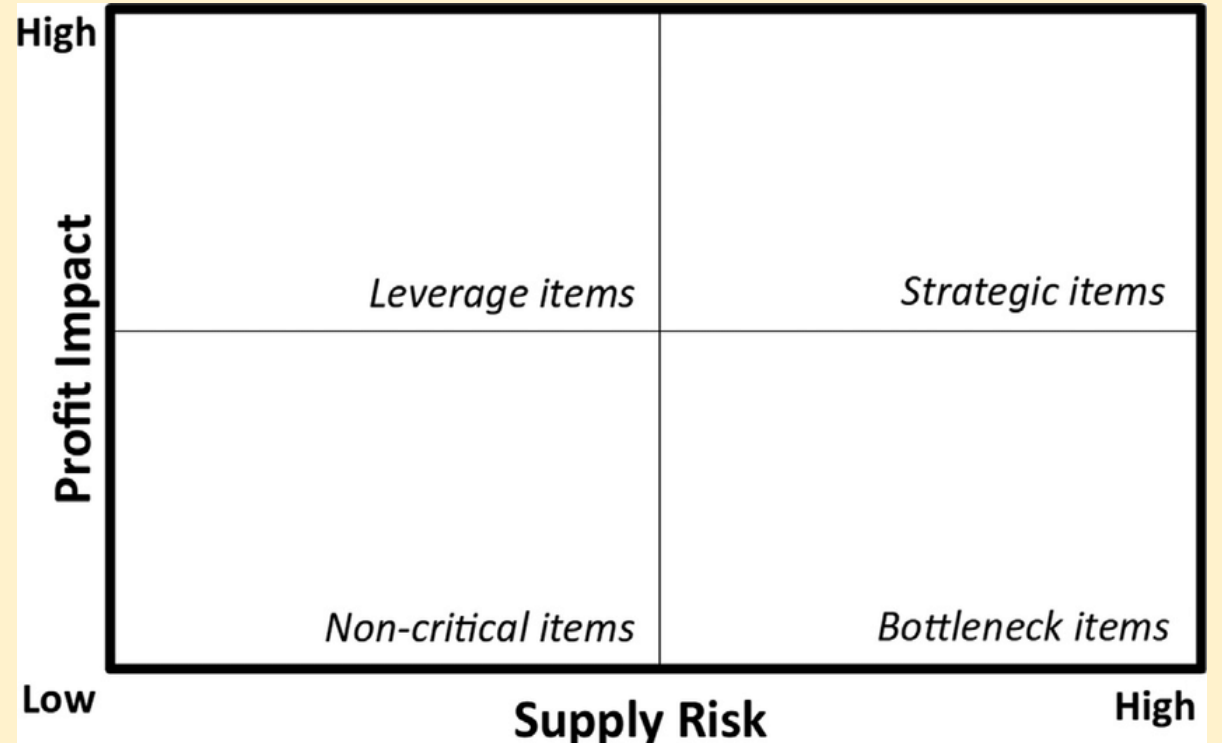
Kraljic Matrix (1983)

- Provides a means to **segment the supplier base**
- Supply items should be mapped against two key dimensions:
 - **Supply risk**- likelihood for an unexpected event in the supply chains to disrupt operations
 - **Profitability Impact**- Profitability describes the impact of a supply item upon the bottom line



Activity- Plot Items Required onto the Matrix

Component	Volume
Microcontroller	500
Power Supply Unit	300
Memory (Flash and RAM)	1000
Analog-to-Digital Converter	200
Digital-to-Analog Converter	150
Communication Interface	400
Input/Output (I/O) Pins	600
Clock Generator	250
Voltage Regulator	350
Capacitors	1200
Resistors	800
Inductors	100
Diodes	400
Transistors	500
Voltage Reference	100
Crystal Oscillator	150
PCB (Printed Circuit Board)	700
Connectors	600
Heat Sink	200
Enclosure/Casing	300



Summary of Supply Strategy



Supply Strategy

Non-Critical Items

- These items are low risk and have a low impact upon organizational profitability
- focus on efficiency
- reducing administrative burden

Leverage items

- These items have a high profitability impact, but a low risk factor
- buyers possess the power to
 - exploit suppliers to lower prices
 - unlock the innovative potential of their suppliers
- Suppliers can be easily substituted

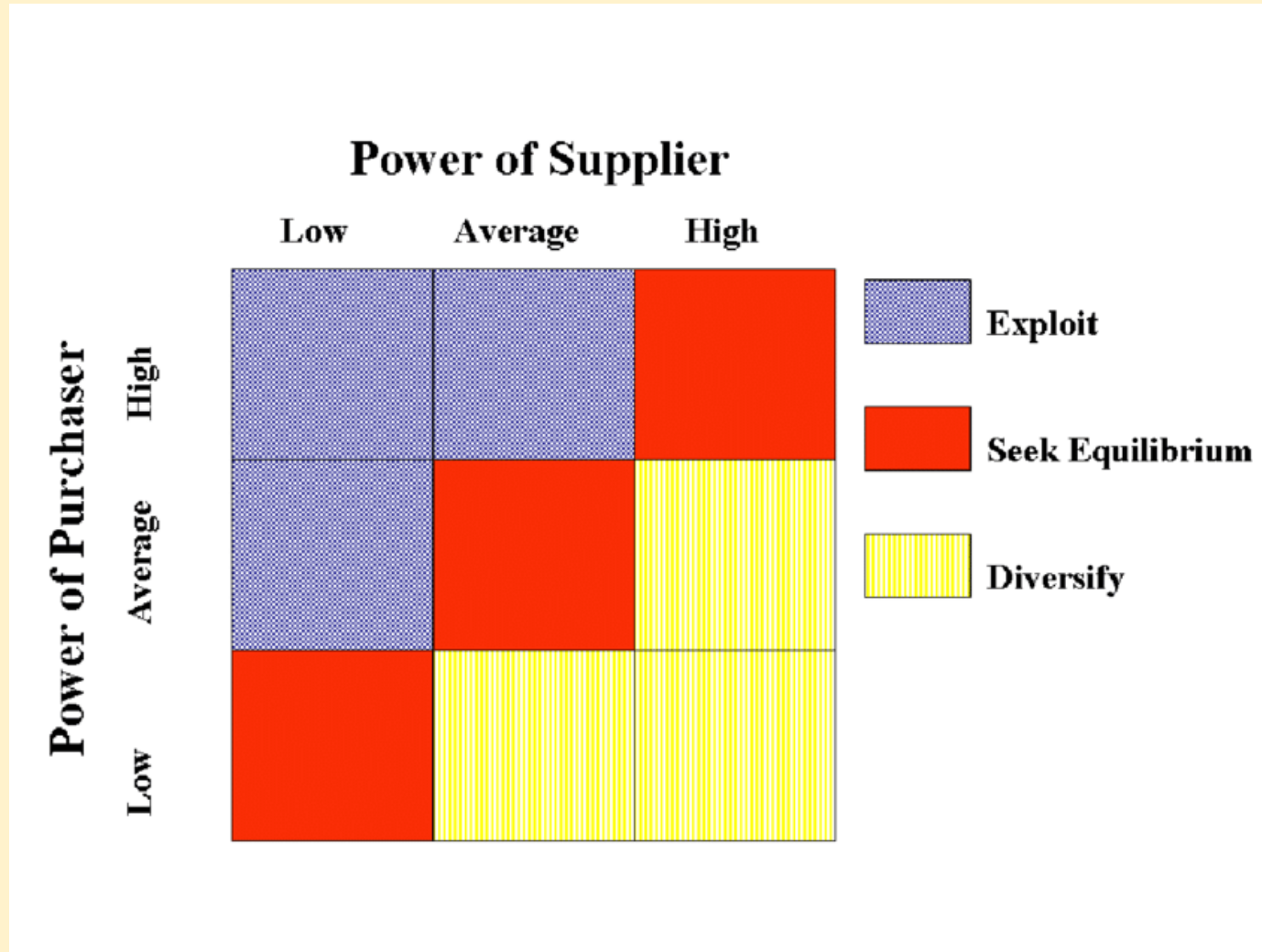
Bottleneck items

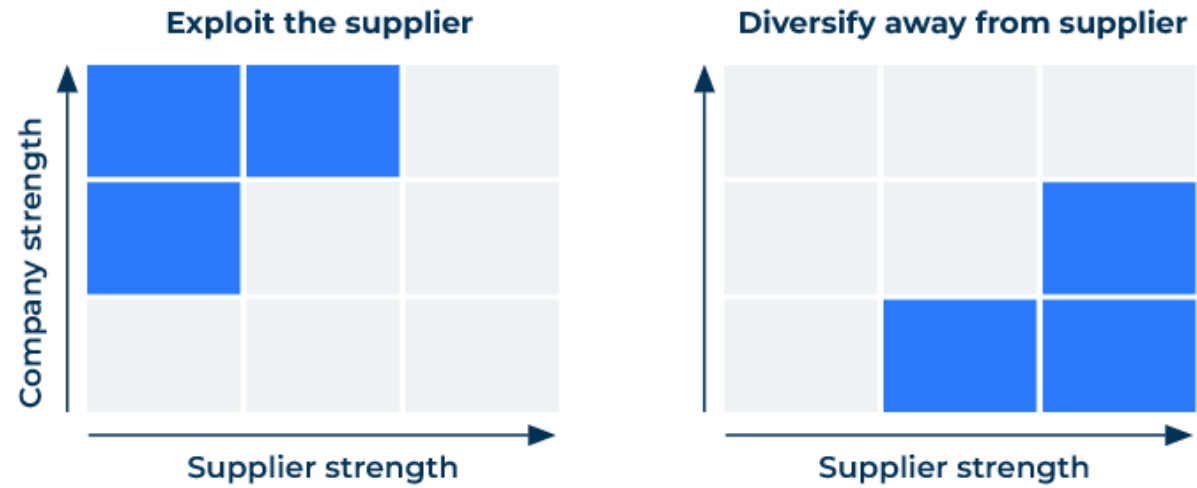
- The flip side of leverage: risk is high, but profitability is low
- strength is in the hands of the supplier
- market consists of few suppliers
- supplier relationship is demanding
- strategy rests upon **damage limitation**
 - buyers will seek to **alter the terms of trade**
- **redevelop product requirements such that the material can be replaced with another** and preferably sourced from a leverage supplier

Strategic items

- high supplier risk and high profit impact
- These are critical to the business
- a handful of suppliers
- ensuring an **effective and predictable supplier relationship** is key
- each contract is unique and focuses upon the shared gains
- look to **innovative product**
- **long-term commitment**

The Purchasing Portfolio Matrix (Kraljic 1983)





Potential actions

Price	Press for reductions	Get what you can
Contracts	Buy spot	Secure contracts
Own production	Don't enter	Consider own production
Logistics	Low inventories, minimise costs	Secure sufficient stocks

- In the short term, for strategic items where the supplier's strength outweighs the company's and the indicated strategy is diversification, the company should consolidate its supply position by concentrating fragmented purchased volumes in a single supplier, accept high prices, and cover the full volume requirements through supply contracts. To reduce the long-term risk of dependence on a single source, however, the company should also search for alternative suppliers or materials or even consider backward integration to permit in-house production. On the other hand, if the company is stronger than the suppliers, it can spread volume over several suppliers, exploit price advantages, increase spot purchases, and reduce inventory levels

Activity- Supplier Selection

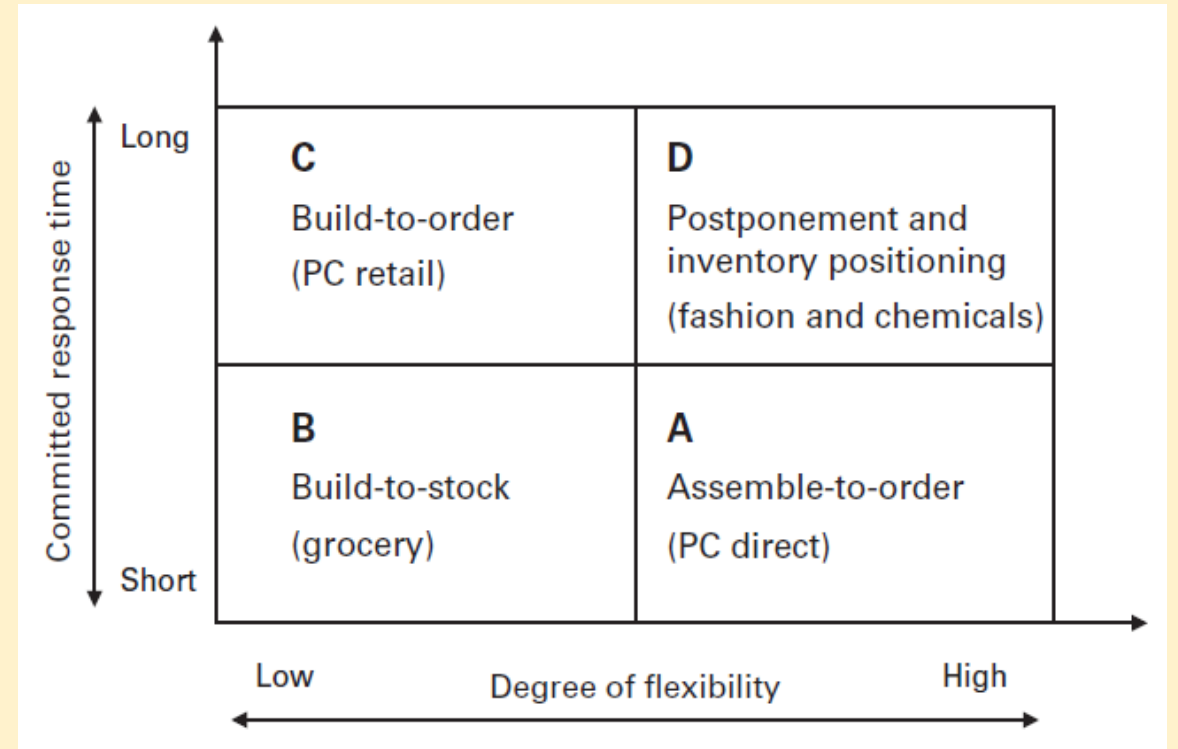
- [Lecture 8 Practice Discussion Supplier Choice.docx](#)

Make

- Processes that transform goods to a finished state to meet demand
- Describe the activities associated with the conversion of materials or the creation of content for services.
- These include:
 - Assembly, chemical processing, maintenance, repair, overhaul, recycling, refurbishment, manufacturing and other common types of material-conversion processes.

Flexibility and the manufacturing strategy

- **Build-to-stock strategy-**
 - inventory is built based on forecast-
 - Push strategy.
 - Focus on cost reduction and effective forecast
- **Assemble-to-order strategy-**
 - individual products are assembled based on customer configuration
 - Pull strategy
- **Build-to-order strategy-**
 - Pull-Push strategy
 - lot sizes are produced after receiving a customer order
 - focuses on efficiency or cost reduction through economies of scale



Simchi-Levi (2010)

Deliver

- Processes associated with the creation, maintenance and fulfillment of customer orders.
- These include:
 - Receiving, validating and creating customer orders;
 - Scheduling order deliveries;
 - Picking, packing and shipping; and invoicing customers.



TRUCKS



TRAINS



AEROPLANES

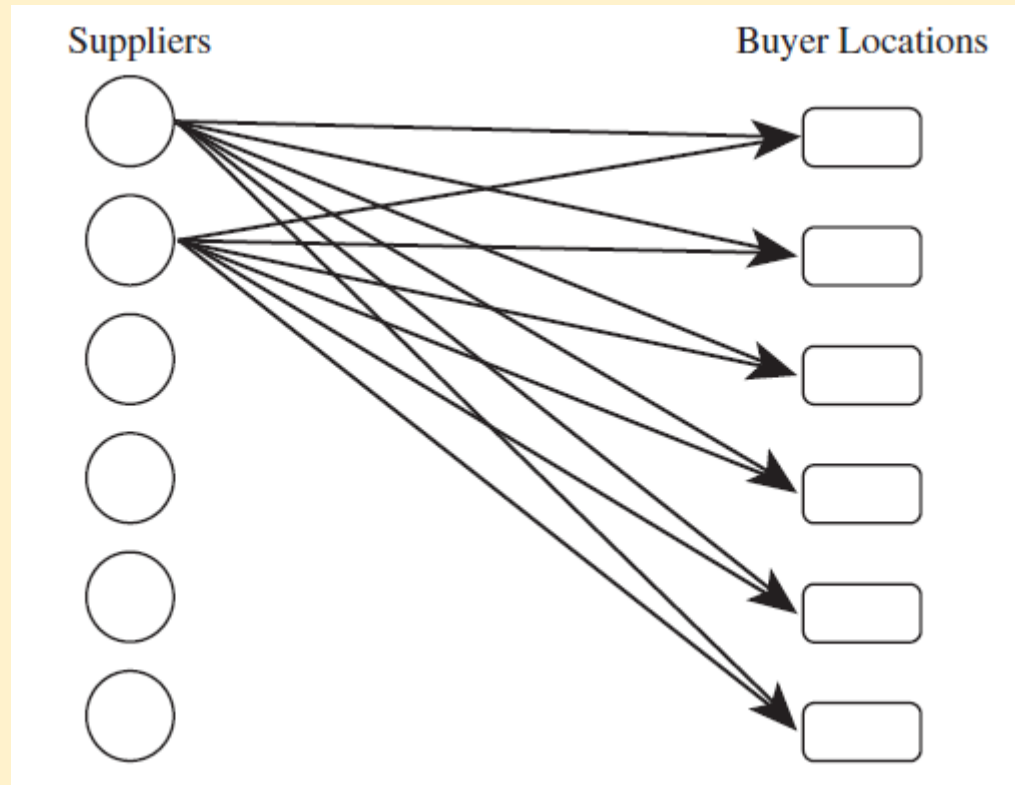


CARS

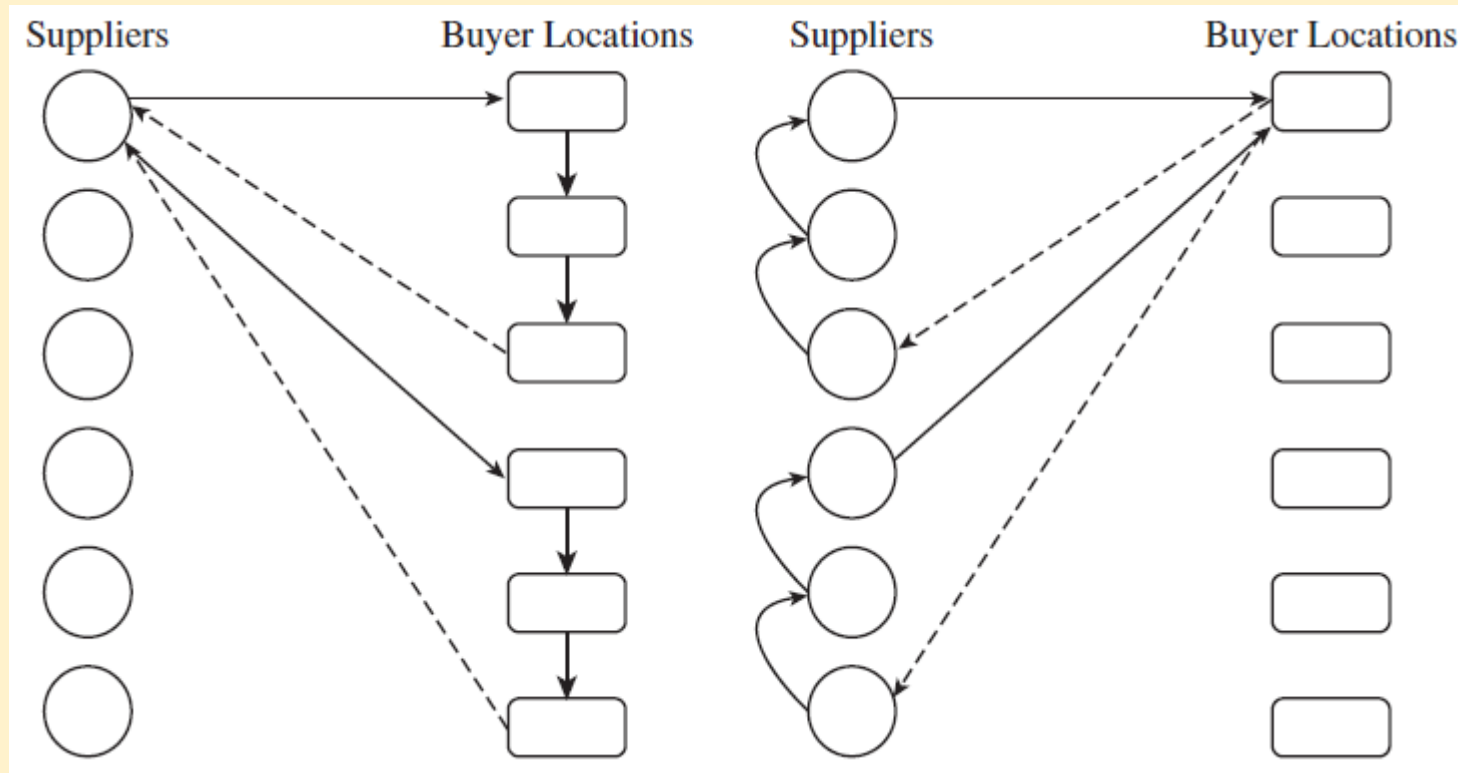
Modes of transportation

- Supply chains use a combination of the following
 - Air
 - Package carriers
 - Truck
 - Rail
 - Water
 - Pipeline
 - Intermodal

Direct Shipment Network to Single Destination

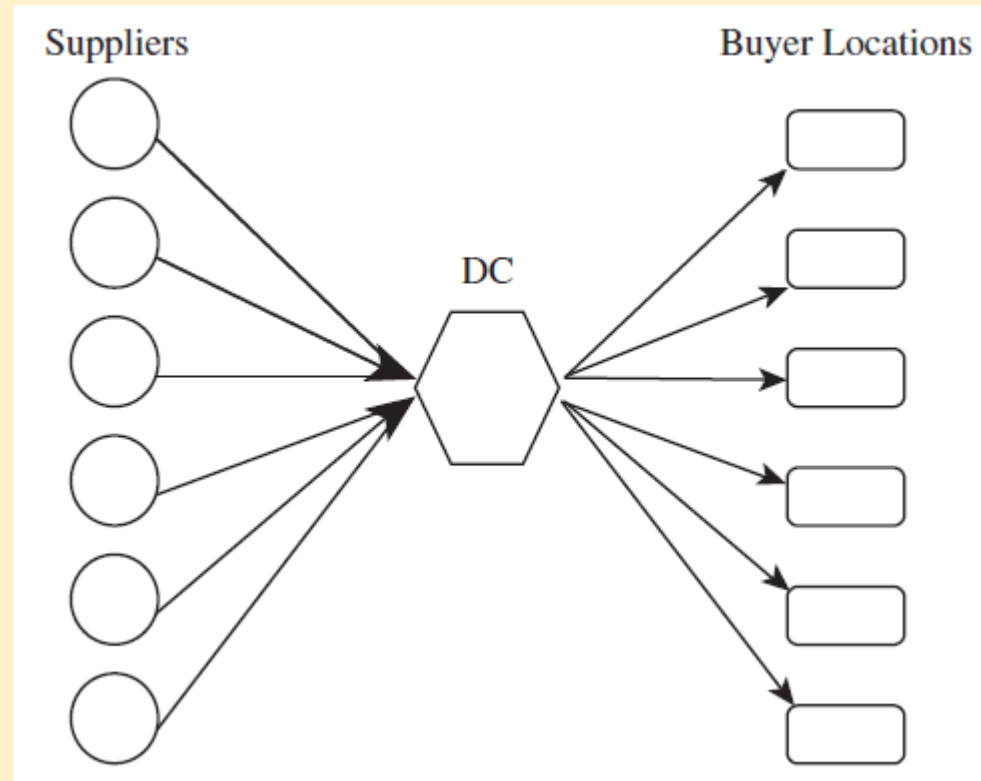


Direct Shipping with Milk Runs

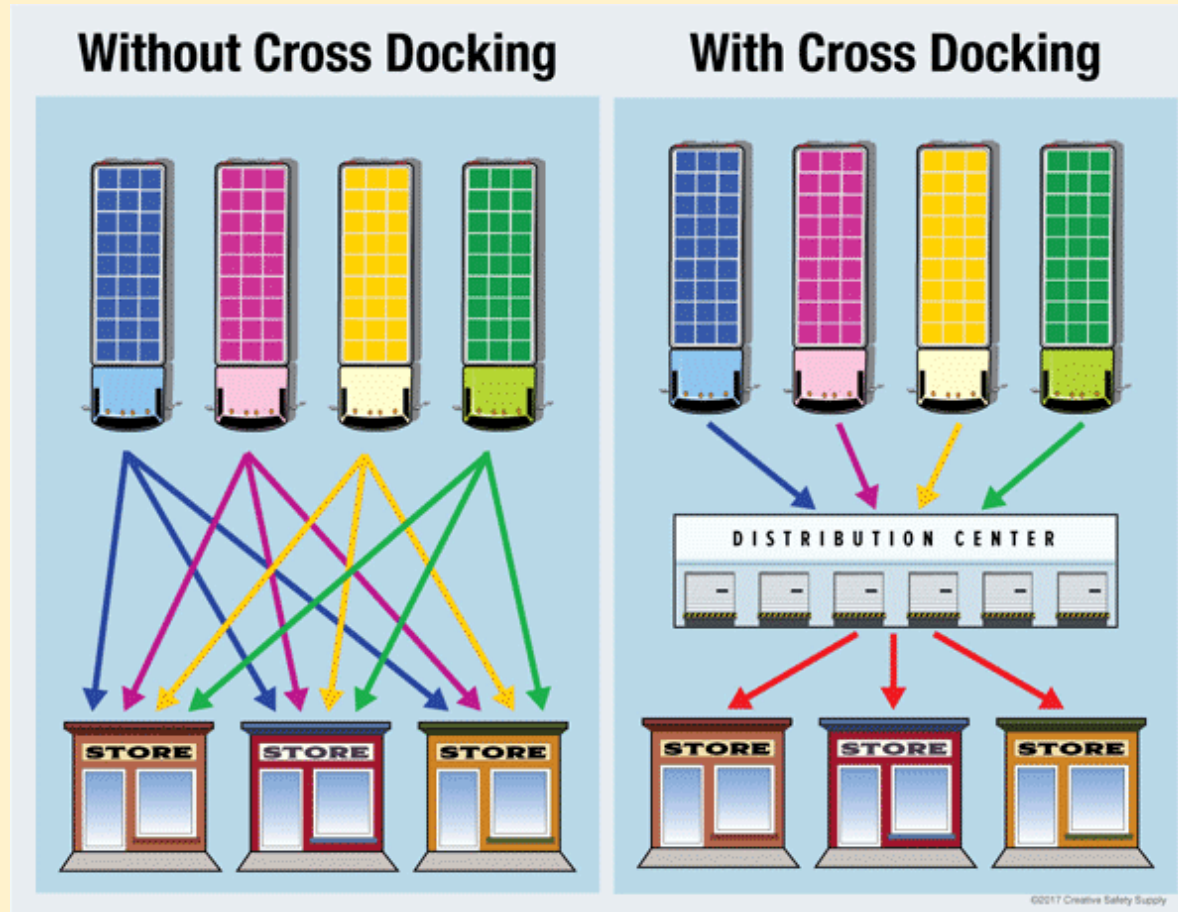


Supplier delivers directly to multiple buyer locations on a truck or a truck picks up deliveries destined for the same buyer location from many suppliers

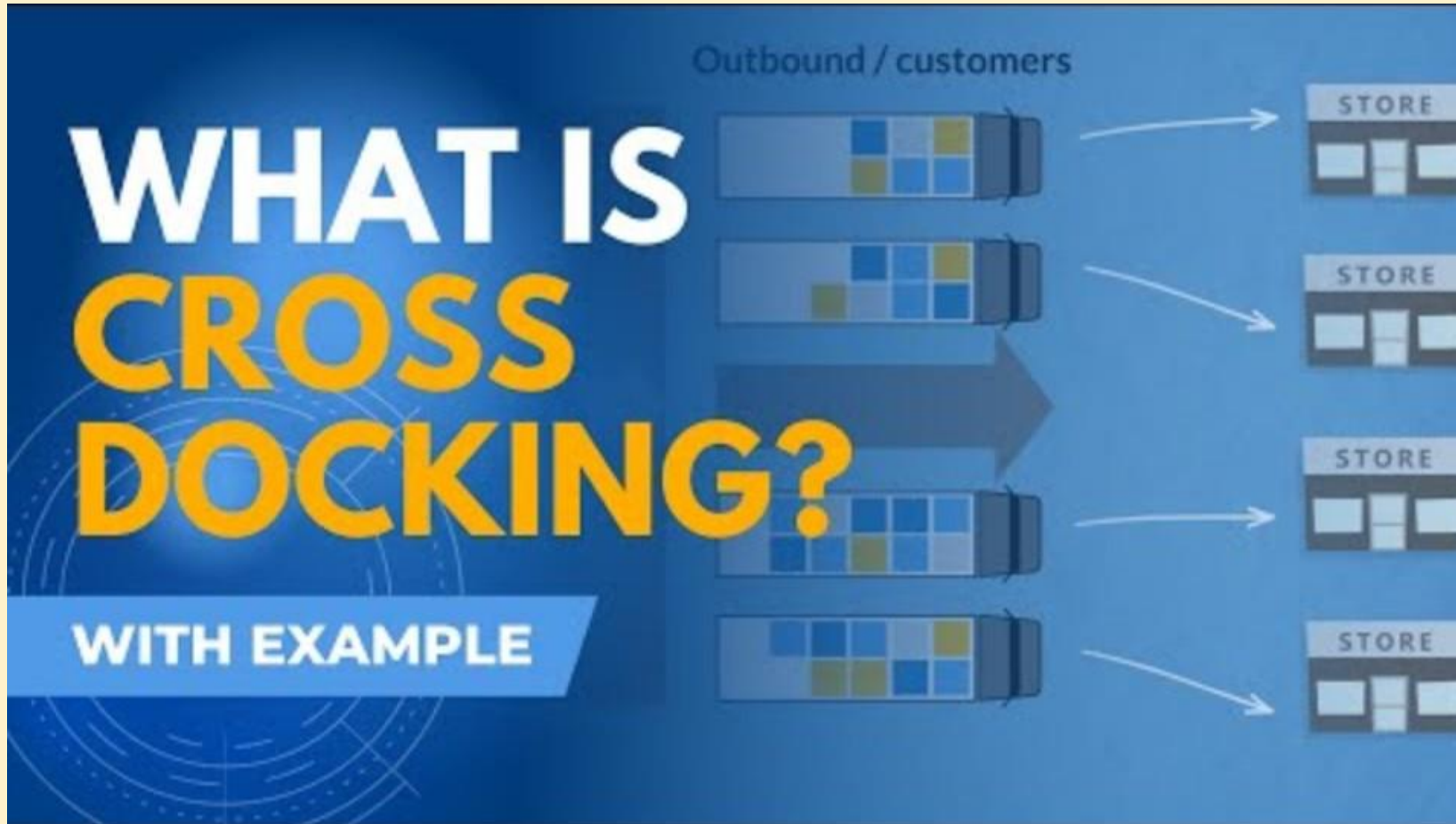
All Shipments via Intermediate Distribution Center with Storage



Cross Docking



What is Cross Docking?



<https://www.youtube.com/watch?v=pITW1nAq0U0>

Pros and Cons of Different Transportation Networks

Network Structure	Pros	Cons
Direct shipping	No intermediate warehouse Simple to coordinate	High inventories (due to large lot size) Significant receiving expense
Direct shipping with milk runs	Lower transportation costs for small lots Lower inventories	Increased coordination complexity
All shipments via central DC with inventory storage	Lower inbound transportation cost through consolidation	Increased inventory cost Increased handling at DC
All shipments via central DC with cross-dock	Low inventory requirement Lower transportation cost through consolidation	Increased coordination complexity
Shipping via DC using milk runs	Lower outbound transportation cost for small lots	Further increase in coordination complexity
Tailored network	Transportation choice best matches needs of individual product and store	Highest coordination complexity

Return

- Processes associated with the reverse flow of goods.
- These include:
 - Identifying items that need to be returned,
 - Deciding on the proper method of disposition,
 - Scheduling the return, and shipping and receiving returned goods.
 - Repair, recycling, refurbishment and remanufacturing processes are not described using Return process elements. Instead, see Make.

Enable

- Describe the activities associated with the management of the supply chain.
- These include:
 - Business rules management,
 - Performance management, data management,
 - Resource management, facilities management,
 - Contract management,
 - Supply chain network management,
 - Regulatory compliance management,
 - Risk management and supply chain procurement.

Global Supply Chain

The Firm cannot become 'world class' by itself!

What does it mean?- Internationalization

- International sourcing of component parts
- International markets for finished goods
- Worldwide marketing of products under a common brand

FROM:

- localized focus, manufacturing and marketing its products in individual countries

TO:

- Source its materials and components in more than one country
- Global production and distribution
- Multiple assembly or manufacturing locations geographically dispersed

Apple International Suppliers

Location and number of Apple suppliers per country



Apple iPhone Global Supply Chain | CNBC



<https://www.youtube.com/watch?v=Cw3V2x5u54Y>

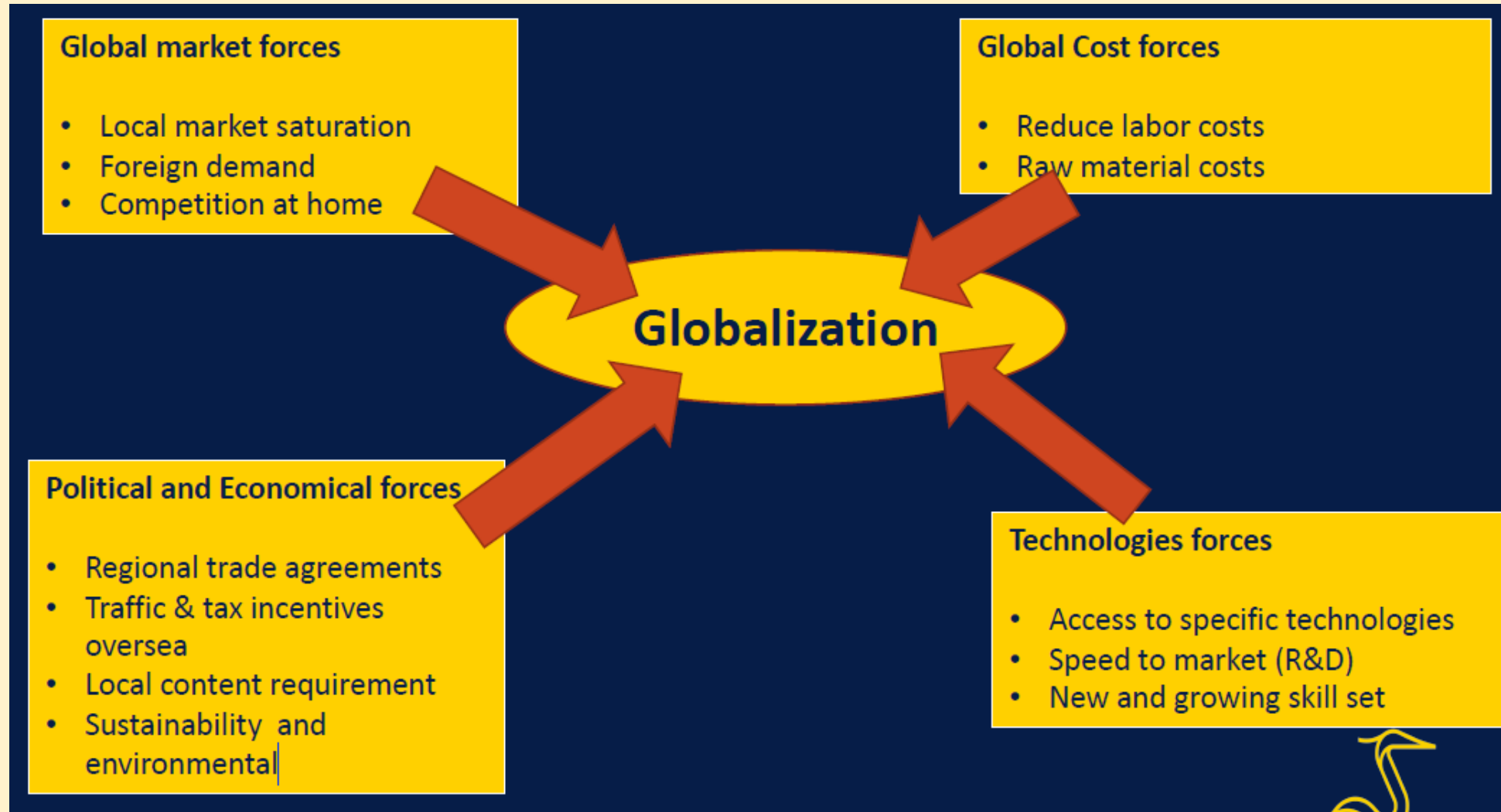


Nutella: The Miracle of WW2



<https://www.youtube.com/watch?v=falYReq6Vjc>

Why companies go global?

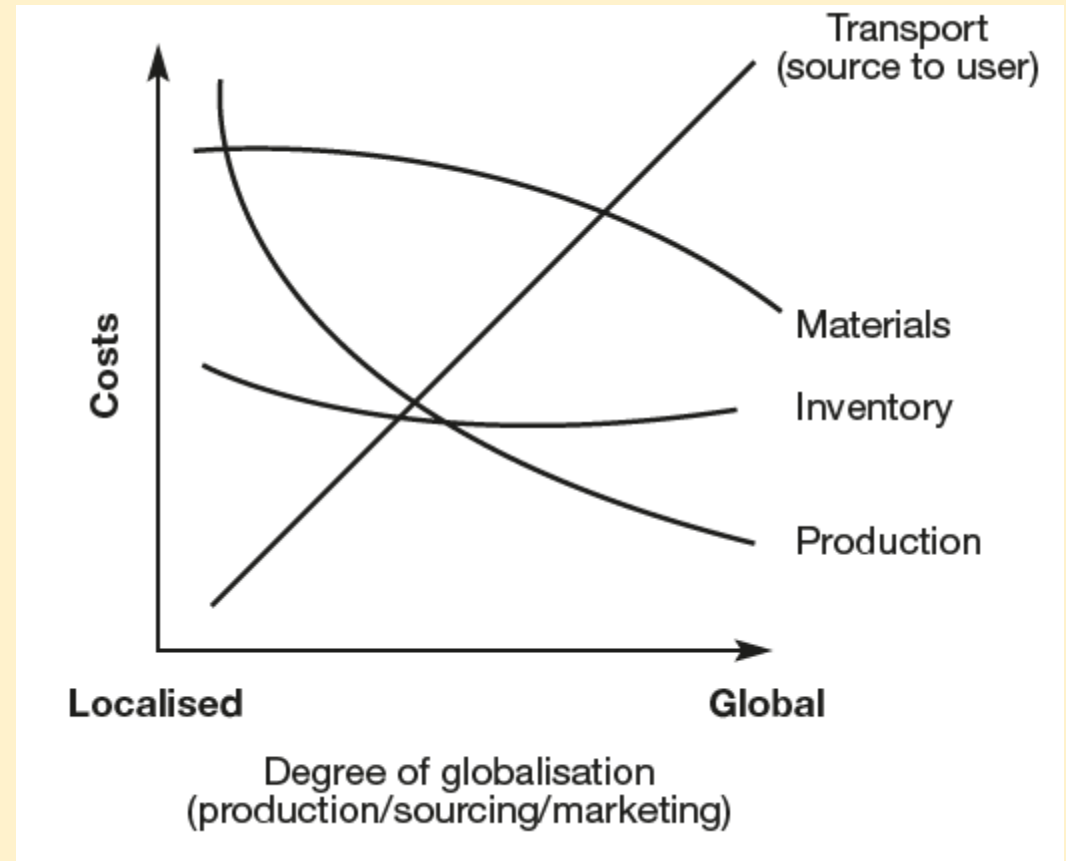


Generic drivers of internationalisation

- a search for low factor and supply costs (land, labour, materials)
- the need to follow customers internationally in order to be able to supply locally and fast
- a search for new geographical market areas
- a search for new learning opportunities and exposure to knowledge

Main Drivers of Internationalization

- Globalization offers companies opportunities to simultaneously **grow revenues** and **decrease costs**



Christopher (2013) Trade-offs in global logistics

Apple's Cost reduction

\$4

Extra cost if iPhones are assembled in the U.S. Apple's manufacturing strategy is motivated by scalability and supply chain risk rather than cost

\$600 Million

Additional labor cost for reshoring iPhone production in the US

35%

Tax on profits Apple would have to pay for US-made iPhones versus 2% on overseas profits

"If Apple brought iPhone manufacturing to the US it would cost them **\$4.2 Billion**"

- Tim Worstall, FORBES



US lacks labor capacity to ramp up production

Period to hire
8,700 engineers
to manage
200,000
factory workers



USA
9 months



CHINA
15 days

Main Risks

- Global supply chains are made **more complicated** by uncertainty and **difficulty of control**
- **Uncertainty arises** from longer lead times and lack of knowledge over risks and local market conditions
- **World markets are not homogeneous**, there is still a requirement for local variation in many product categories

'Supply chain challenges' hit revenues at Nike



posted by *Will Green*
in *Risk, Supply chain*

🕒 19 March 2021

Nike has said port congestion delayed inventory supply and held back the company's growth in North America.

The company said revenue dropped 10% in North America in the three months to 28 February 2021 due to “supply chain challenges”, which included global container shortages and US port congestion.

In an earnings call Matt Friend, executive vice president and CFO, said: “Disruption in the global supply chain due to container shortages, transportation delays, and port congestion has interrupted the flow of inventory supply.

“The result has been supply shortages relative to continued strong marketplace demand.

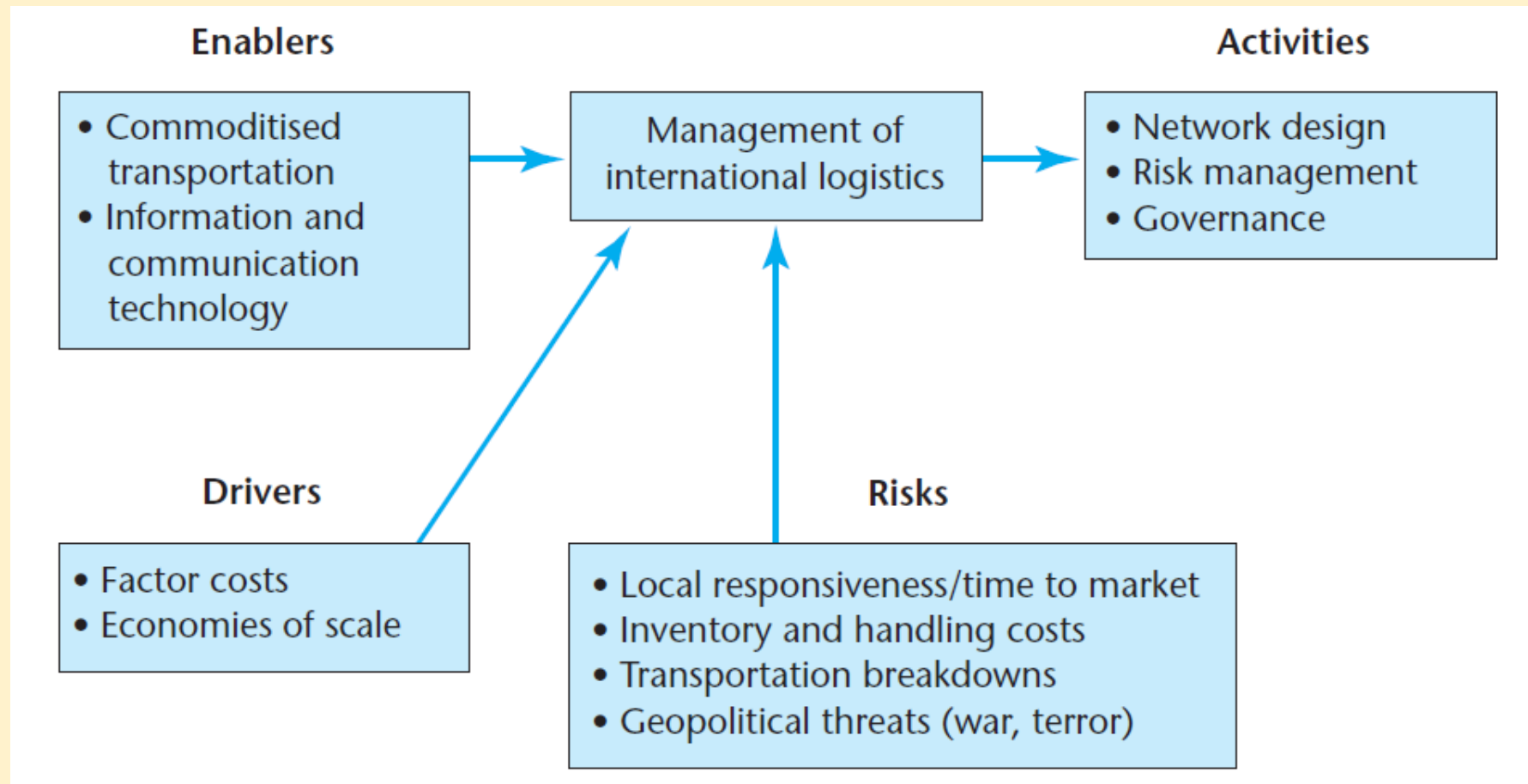
“In North America specifically, inventory supply was delayed by more than three weeks, impacting the timing of wholesale shipments and growth in the quarter.”

Nike said inventories were up 15% year-on-year to \$6.7bn, largely because of “higher in-transit inventory in North America due to US port congestion and temporary store closures in EMEA”.

Business Approach is not a Universal pattern

- Does internationalization imply a universal global approach of the supply chain?
- Does internationalization require a 'global' presence in every market?
 - 'McColonisation' and 'CocaColonisation'- abolished.
 - Move away from universal product, marketing, and production and distribution model
 - Procter & Gamble is doing the same
 - Unilever, however has decrease the number of brands, and has rationalized operations away from strict localization
 - **Regional variations in the application of international principles.**

Decision framework for international logistics



Implementing Global SC Strategies

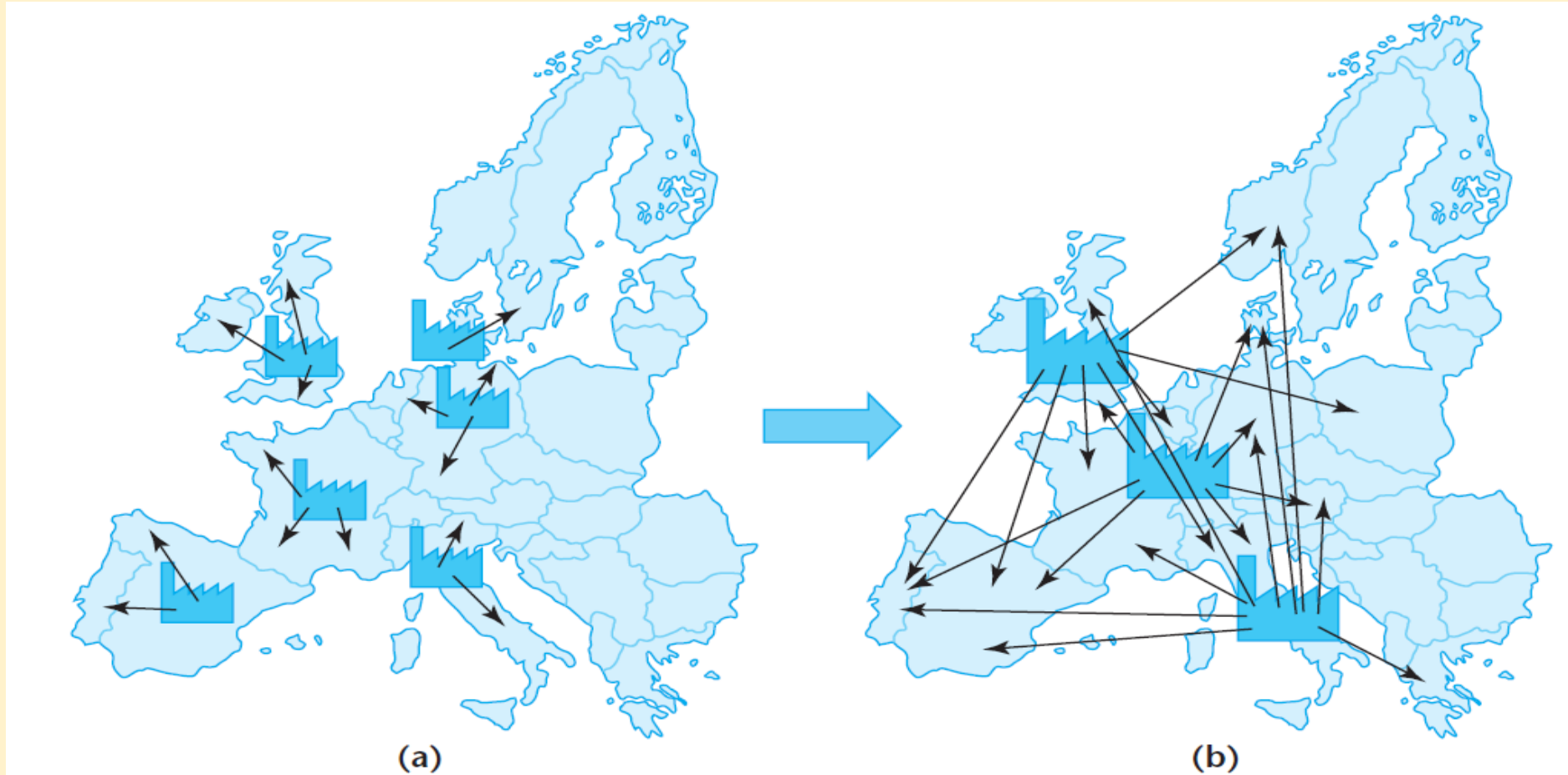
Global Logistics Strategies

- Focused Factories
- Centralized Inventory
- Postponement
- Location
- Layering and Tiering

Focused Factories

- Involves a company's consolidating production of products in specific factories.
- Each 'focused factory' supplies its products internationally to a wide market
- Focuses on a limited segment of the product assortment.
- **So, instead of "local-for-local" production, each location produces a few items world wide**
- **Rationalise production into fewer locations**

Focused factories: from geographical to product segmentation



(a) Focused markets: full-range manufacture for local markets

(b) Focused factories: limited range manufacturing for all markets

Harrison et al (2012)

Focused Factories Example

- **Kellogs** who manufacture their successful product Pringles in just two plants to meet worldwide demand
- **M&Ms** for sale in Moscow are likely to have been produced in the United States
- **Heinz** produce tomato ketchup for all of Europe from just three plants
- **Unilever's** long-established soap brand, Pears, is produced in India for world markets

Obvious trade-offs

- The effect on transport costs and delivery lead-times
- The costs of shipping products, often of relatively low value, across greater distances may erode some or all of the production cost saving
- The longer lead-times involved may need to be countered by local stock holding, again possibly offsetting the production cost advantage

Problems of focused production

1. The **need for local packs** exist, e.g. with labelling in different languages or even different brand names and packages

- **Overcome by 'postponing'** the final packaging until closer to the point-of-sale

2. **Customers ordering a variety of products** from the same company on a single order but which are now produced in a number of focused factories in different locations

- **Solution** here may be some type of trans-shipment or cross-dock operation where flows of goods from diverse localities and origins are merged for onward delivery to the customer

Rethinking Focused Factories

- **Sony** used to manufacture their digital cameras and camcorders in China, attracted by the lower labour costs
- Less than 10 per cent of a high-tech company's costs are direct labour.
- In addition, because life cycles were so short for these products it was better to bring the assembly back to Japan where the product design took place and, indeed, where most of the components originated
- Hence the **decision to source offshore**, simply to save on labour costs, makes little sense if penalties are incurred elsewhere in the supply chain

Inventory

- **Centralizing inventories** across multiple countries can hold advantages in terms of inventory-holding costs and inventory levels that are especially relevant for high-value products.
- On the other hand, internationalisation **may lead to product proliferation** due to the need for localisation of products and the need to respond to specific local product/market opportunities

Centralized Inventories

- **Rather than have a large number of local distribution centres, bringing these together at a small number of locations can save cost**
- Savings can be achieved in this way by:
 - coordinating inventory management across the supply pipeline.
 - Therefore duplication eliminated
 - safety stocks to be minimized,
 - thereby lowering logistics costs and overall distribution cycle times.
 - lower factory-to-warehouse distribution costs because shipments can be consolidated into full container loads.

Example of Centralized Inventories

- Taking the European market as an example, the range is from local inventories (by country or even by location)
- Through international (a selection of countries) to the complete continent.
- Many companies now include the Middle East and Africa as a trading bloc (Europe, Middle East and Africa – EMEA).

- Philips has reduced its consumer electronics products warehouses in western Europe from 22 to just four.
- Likewise Apple Computers replaced their 13 national warehouses with two European RDCs.

Nike- Case Study

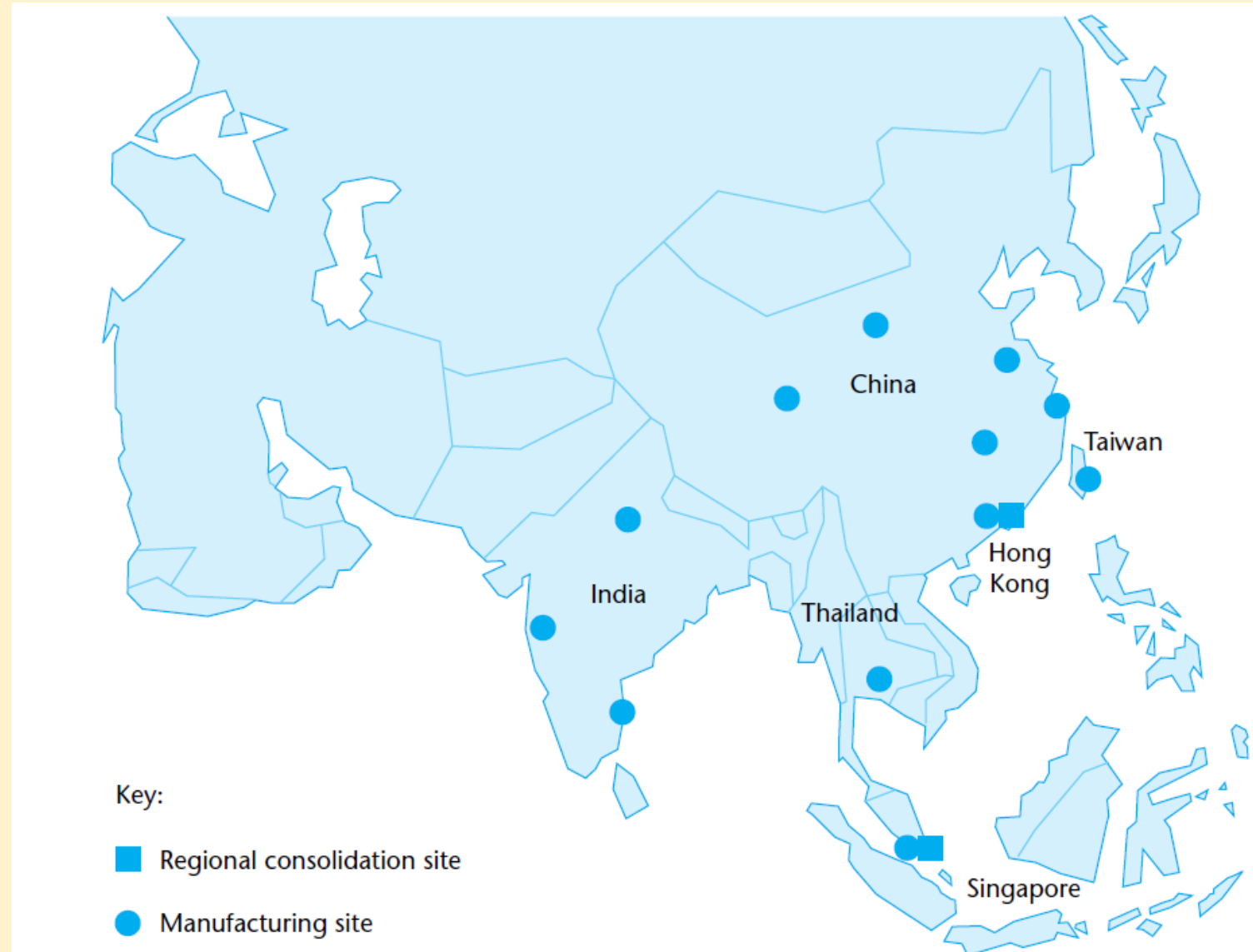
- Multi-product and Multi-jurisdictional company
- Manufacturing network has over 525 factories in 40 countries - Vietnam, China, and Indonesia, Thailand
- Sources most of its raw materials in the manufacturing host country by independent contractors
- Products move from several distribution centers across a network of thousands of retail accounts.
 - **6 primary distribution centers in the US**
 - **67 distribution centers outside the US**
- Nike-owned retail stores and digital platforms
- Nike Centralized Distribution

Consolidation

- Consolidation is one of the key ways in which costs in pipelines can be lowered.
- Economies of scale are achieved when **goods produced in a number of different facilities are batched together for transport to a common market**
- The location of consolidation points depends on many factors:
 - extended lead time of supply;
 - extended and unreliable transit times;
 - multiple freight modes and cost options.

Activity- Location of Consolidation Points and flows

- A footwear company has a number of manufacturing facilities around Asia,
- There are six manufacturing sites in China, three in India, and one each in Thailand, Singapore and Taiwan.
- Singapore and Hong Kong also have the facility to act as regional consolidation sites.
- Draw arrows on the map showing where the flow of exports to the North American market could be consolidated

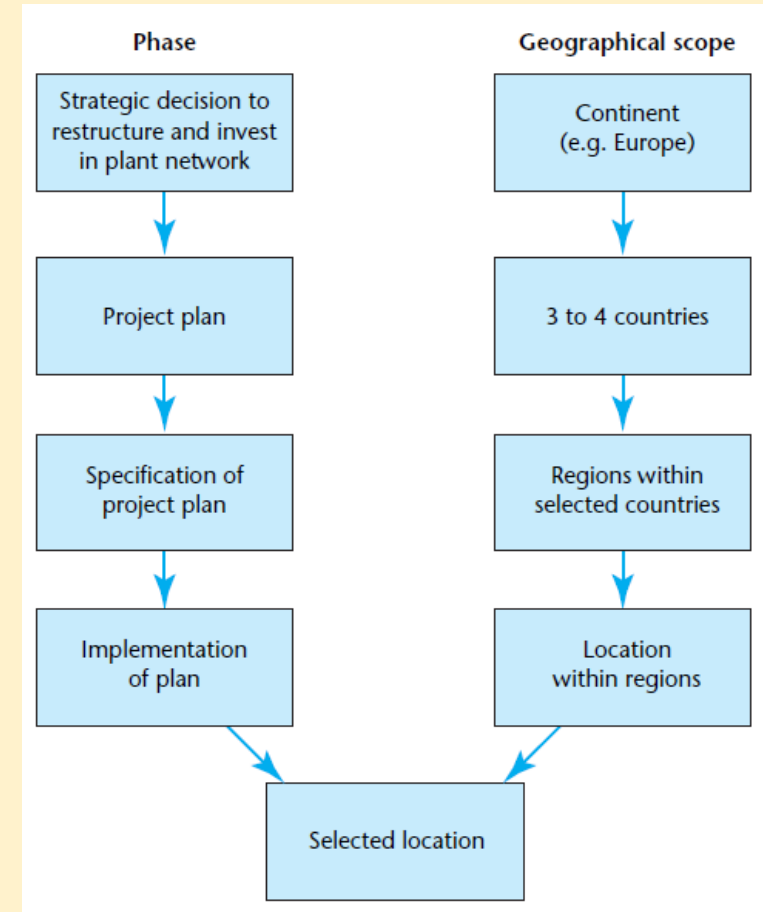


China's 'One Belt, One Road' Initiative



Phases in the location selection process

- Deciding where operations are going to be performed



Harrison et al (2012)

Four-phase decision-making process- Between Locations

1. Deciding upon the appropriate level of centralisation– decentralization
2. Selecting relevant location criteria
3. Selecting criteria weightings
4. An economic trade-off analysis of structures and relevant locations

Location criteria	Weight	Score region A	Score region B
Railways	1	4	1
Water connections	1	4	1
Road connections	2	2	4
Site availability	2	2	3
Central location	3	1	2
...	...		
Total		19	22

Key: Score on a five-point scale ranging from poor to excellent

Harrison et al (2012)

Layering and tiering

- Internationalisation is often looked at from the point of view of asset centralization and localisation.

“global coordination and local operation”

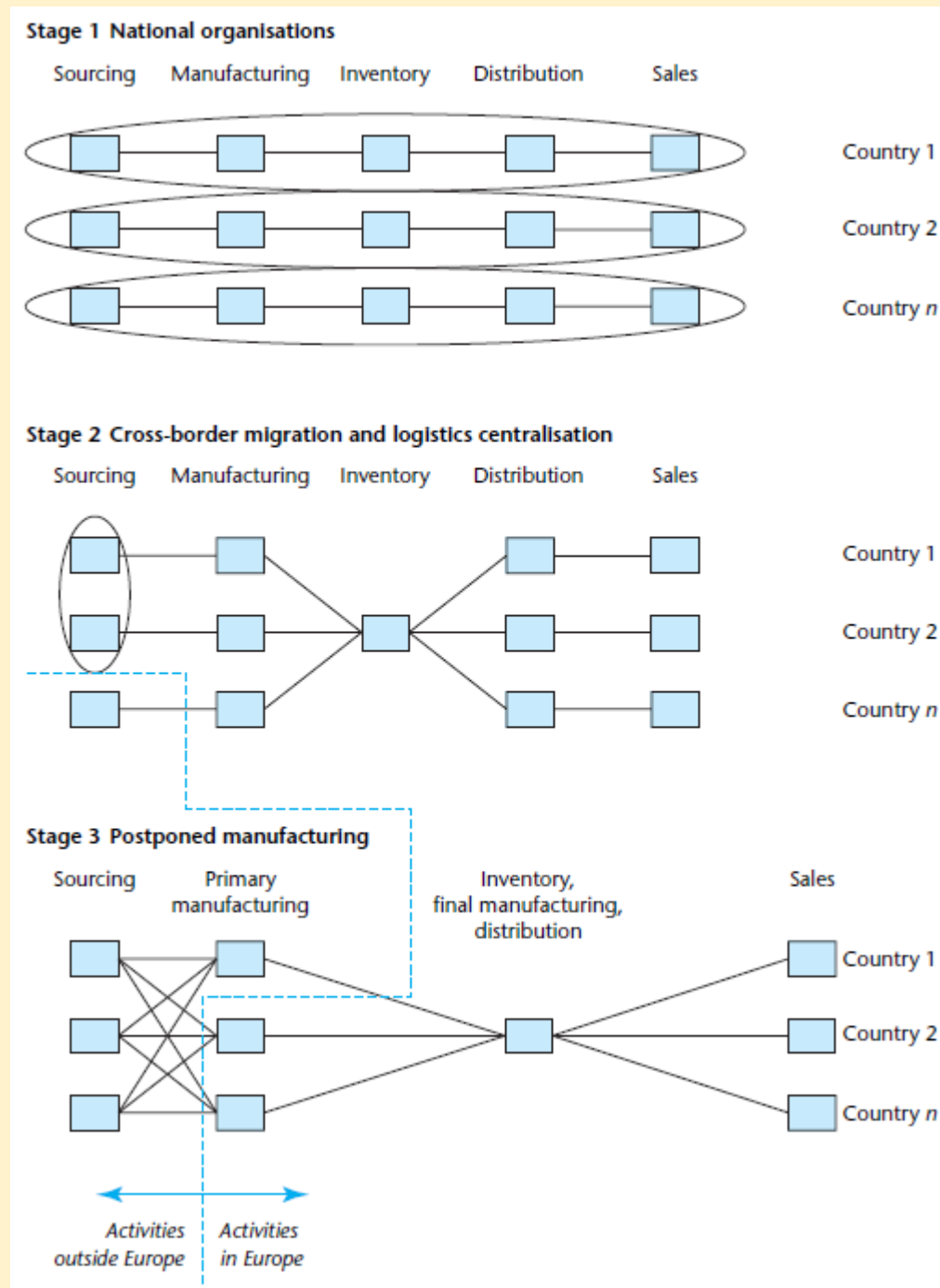
- By including tiers of players in the supply chain, these **operations are largely outsourced.**
- Facilities are often owned and operated on a dedicated basis by a **contract manufacturer and third parties.**

Reconfiguration processes

- **Starting point:** Is the base structure localised or globalised?

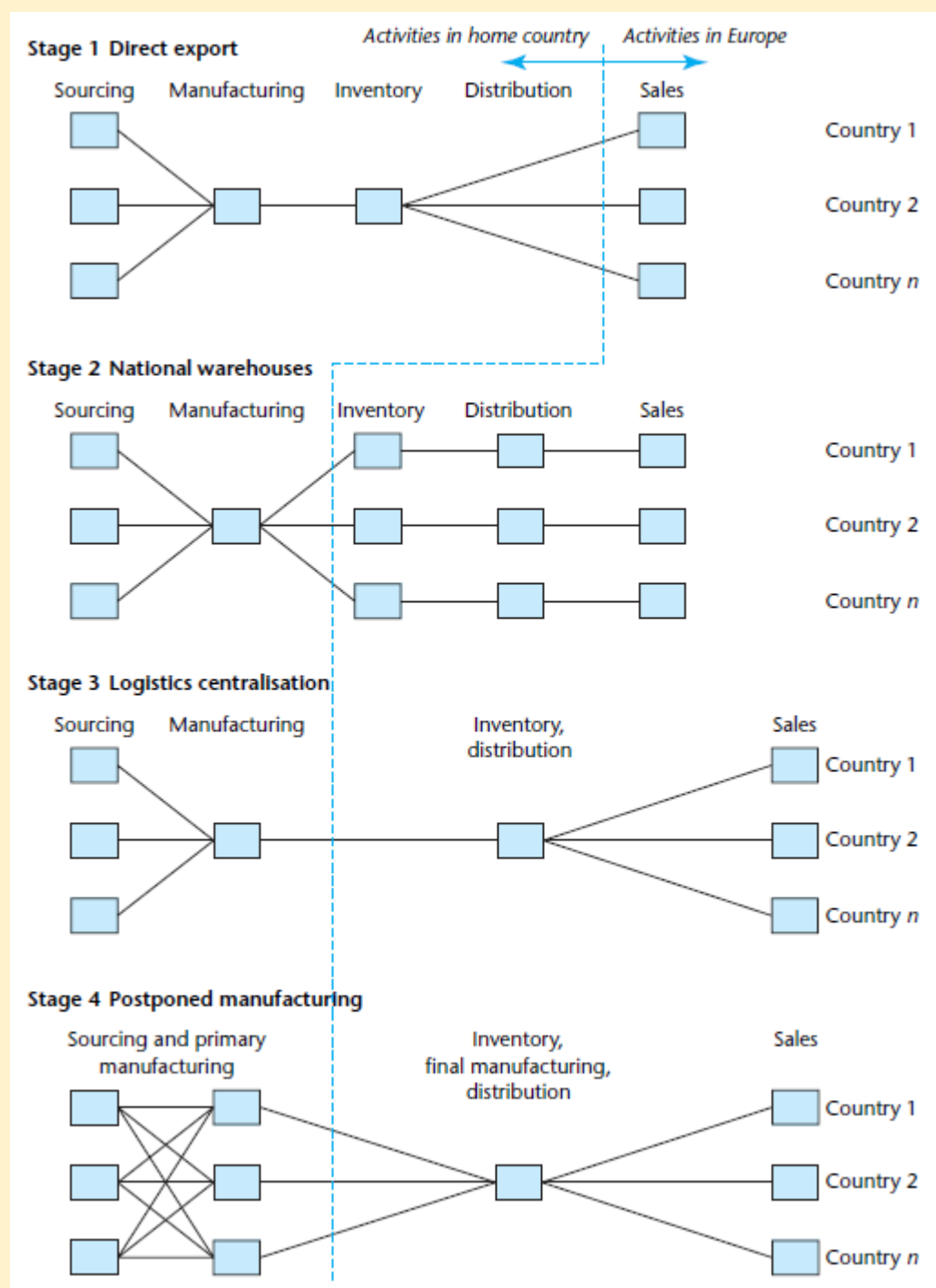
Stages in the implementation of postponed manufacturing: **local starting point**

The path with a **localised starting point** - goes through centralisation within Europe starting from autonomous, duplicated local structures

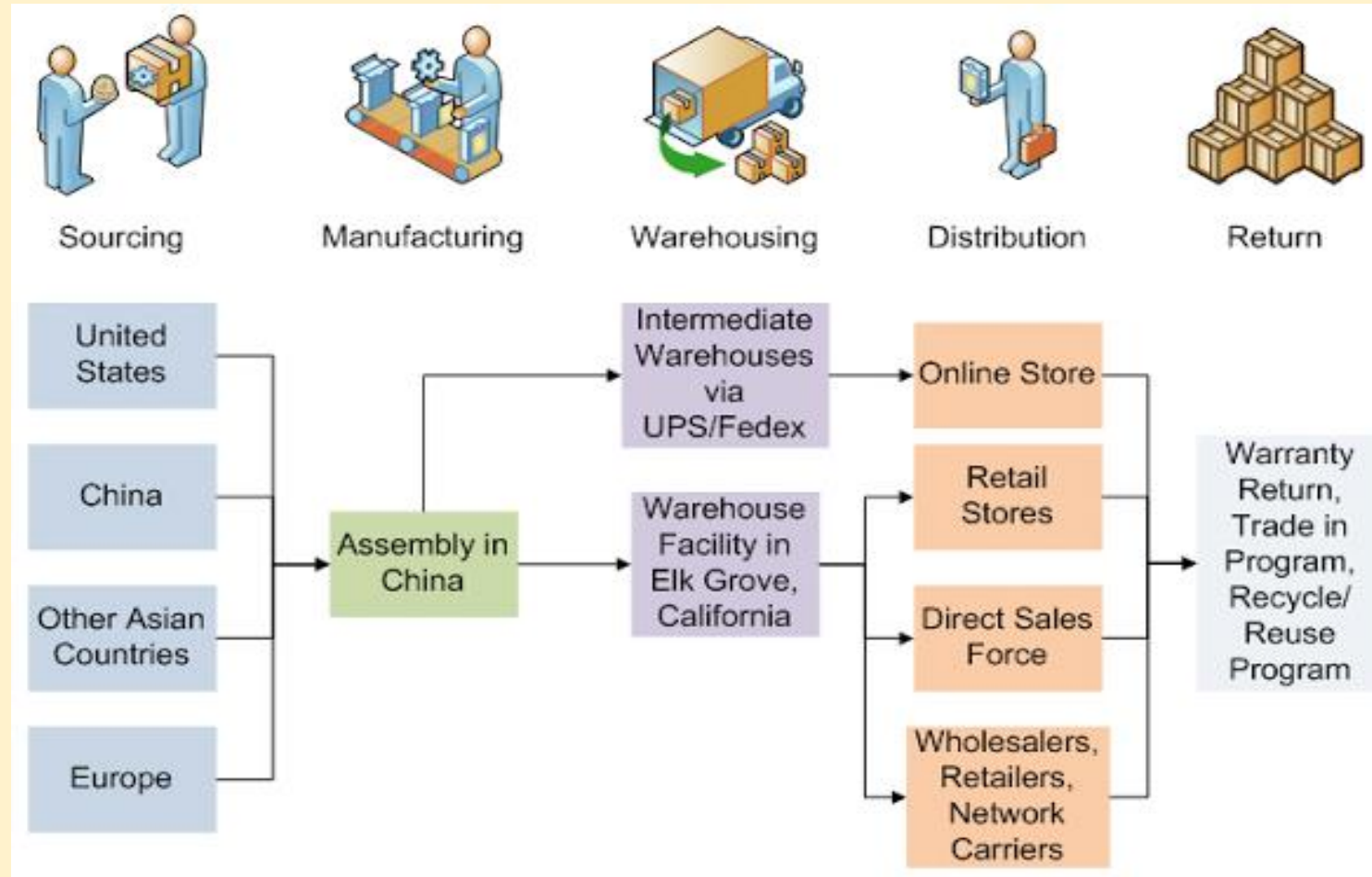


Stages in the implementation of postponed manufacturing: **global starting point**

The path with a global starting point builds a small European presence and then migrates through the increase of European presence centrally



Apple- Case Study



https://www.supplychain247.com/article/is_apples_supply_chain_a_risk/Apple

The Supply Chain of Chocolate



<https://www.youtube.com/watch?v=-itoRCPMC5s>

Activity- Design a Global Supply Chain- Blue Jeans

- Your company is a Garment Manufacturer for 10 years
- Based in Miami
- Decision has been made to enter a **New market- Blue Jeans**
- For the Latin America and the Caribbean (LAC) Market
- Distribute to Garment Importers in various countries across the LAC region:
 - Argentina
 - Columbia
 - Brazil
 - Belize

- The company will design the blue jeans
 - Blue jeans consist of:
 - mostly cotton, and copper or zinc used for buttons, rivets and zippers.
 - You will need to source these materials
- Your company has decided to Outsource the Production to a Garment Contract Manufacturer in the LAC region
- The company has already negotiated contracts with Retailers in the chosen countries to sell their product
- Each group will focus on **ONE** of the SC process:
 - Source
 - Make
 - Distribution
- For your assigned SC Process, as a group, make decisions related to the process