Overview of Logistics & Supply Chain Systems

Lecture 1
ESD.260, 1.260, 15.770
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Agenda

- What is Logistics / Supply Chain Management?
- Why is it important?
- What are the specific components?
- What are the core concepts of the course?
- What is the schedule?

Some Definitions

Logistics is the . . . "process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements."

Council of Logistics Management

Supply chain management . . . "encompasses every effort involved in producing and delivering a final product or service, from the supplier's supplier to the customer's customer. Supply Chain Management includes managing supply and demand, sourcing raw materials and parts, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, and delivery to the customer."

The Supply-Chain Council

Some More Definitions

"Supply Chain Management deals with the management of materials, information, and financial flows in a network consisting of suppliers, manufacturers, distributors, and customers."

Stanford Supply Chain Forum

Logistics involves . . . "managing the flow of items, information, cash and ideas through the coordination of supply chain processes and through the strategic addition of place, period and pattern values."

MIT Center for Transportation & Logistics

"Call it distribution or logistics or supply chain management. By whatever name it is the sinuous gritty, and cumbersome process by which companies move material, parts, and products to customers."

Fortune (1994)

Enough Definitions

- Logistics and Supply Chain are equivalent terms
- Key Observations
  - Integrated activity
    - X-functions, X-divisions, X-companies, etc.
    - Coordination of conflicting goals, metrics, etc.
  - Responsible for multiple flows:
    - Information (orders, status, contracts)
    - Physical (finished goods, raw materials, wip)
    - Financial (payment, credits, etc.)
  - Most analysis involves trade-offs
    - Across different entities
    - Across metrics: Cost, Service, Time, Risk, etc.

Why is Logistics Important?

- Size of Market – **It Is Big**
  - Tough to estimate since it touches everything
  - In pieces[1] (2002 US):
    - Total Inventory $1,444 M (~14% GDP)
    - WH & Carrying $ 298 M (~ 3% GDP)
    - Transportation $ 571 M (~ 6% GDP)
- Strategic Advantage – **It Can Drive Strategy**
  - Manufacturing is becoming more efficient
  - SCM offers opportunity for differentiation (Dell) or cost reduction (Wal-Mart)
  - Increased use of logistics outsourcing[2] – (3PLs, WH, etc.)
    - $65 B with 6.9% annual growth
- Globalization – **It Covers The World**
  - Requires greater coordination of production & distribution
  - Increased risk of supply chain interruption
  - Increases need for robust and flexible supply chains

Sources:
1 – 14th Annual State of Logistics Report, Wilson & Delaney, 2003
2- Armstrong & Associates 2003

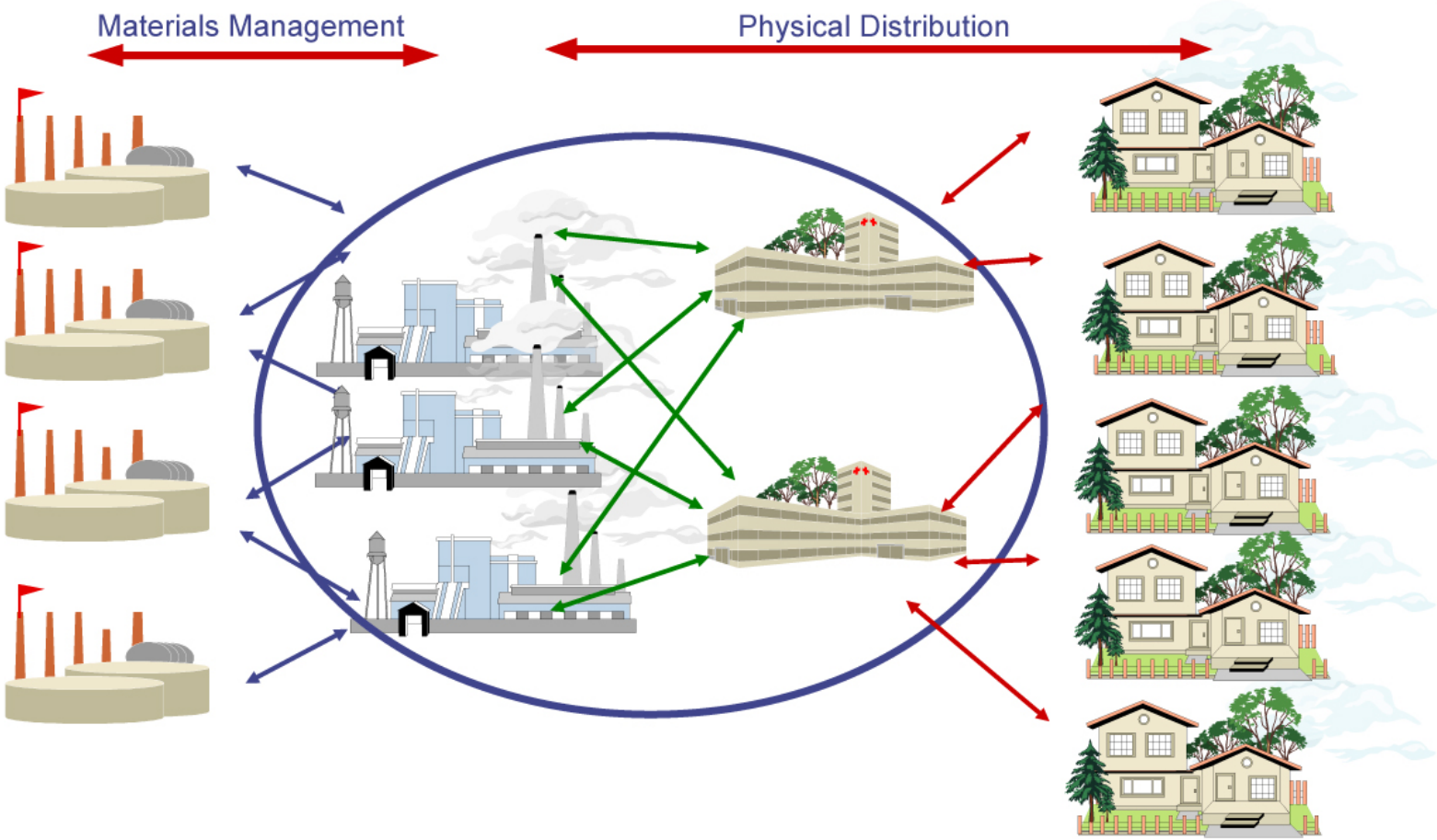
Why is Logistics Important?

- At the company level, logistics impacts:
  - COST - For many products, 20% to 40% of total product costs are controllable logistics costs.
  - SERVICE - For many products, performance factors such as inventory availability and speed of delivery are critical to customer satisfaction.
- Logistics involves intelligent trade-offs:
  - Purchase discounts versus Raw Materials Inventory
  - Production efficiency versus Finished Goods Inventory
  - Freight discounts versus Finished Good Inventory
  - Lower planned cost versus More stable costs

Traditional Logistics Functions

- Purchasing / Procurement
- Inventory Control
- Warehousing
- Materials Handling
- Order Processing
- Transportation
- Customer Service
- Facility Location / Network Design

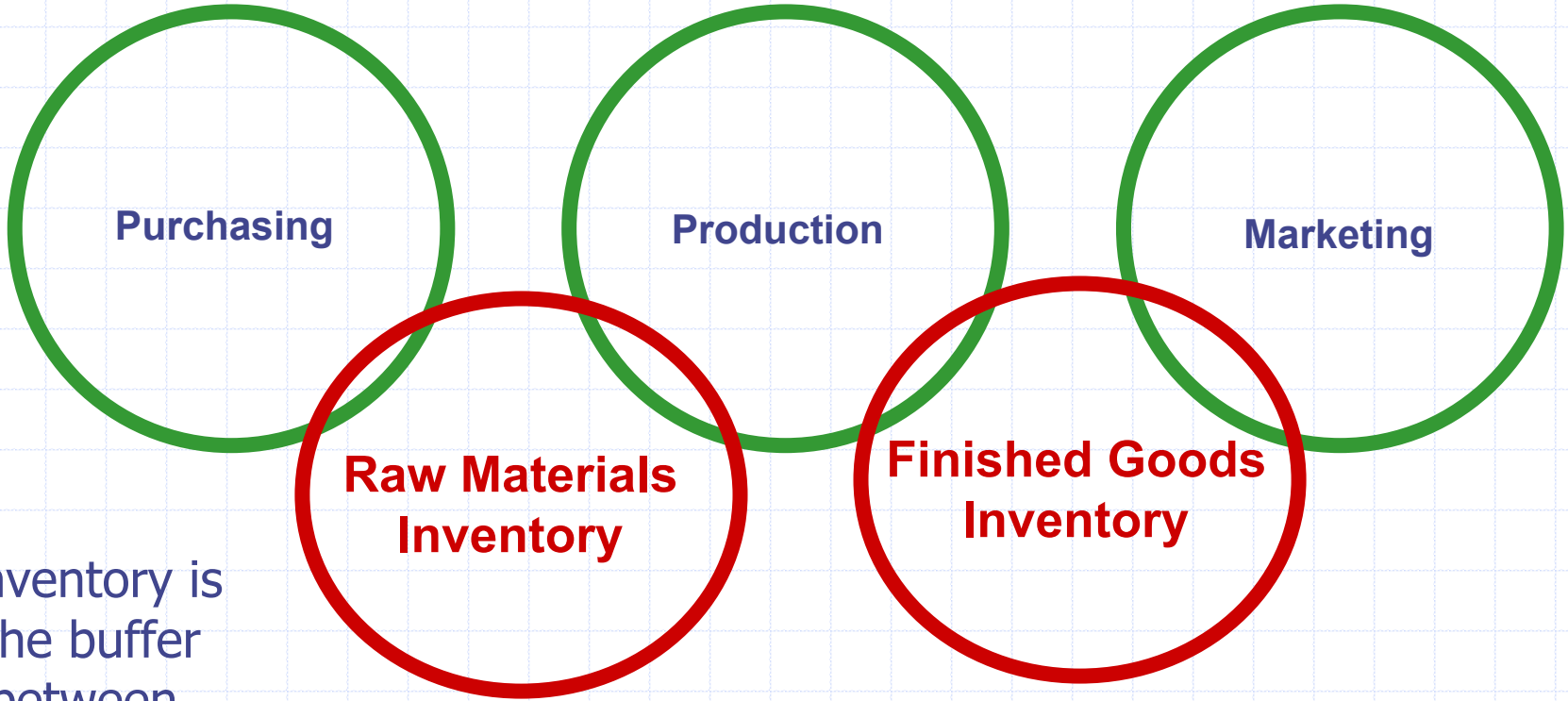
Some Standard Definitions



Logistics / Supply Chain Management

Traditional Logistics Management

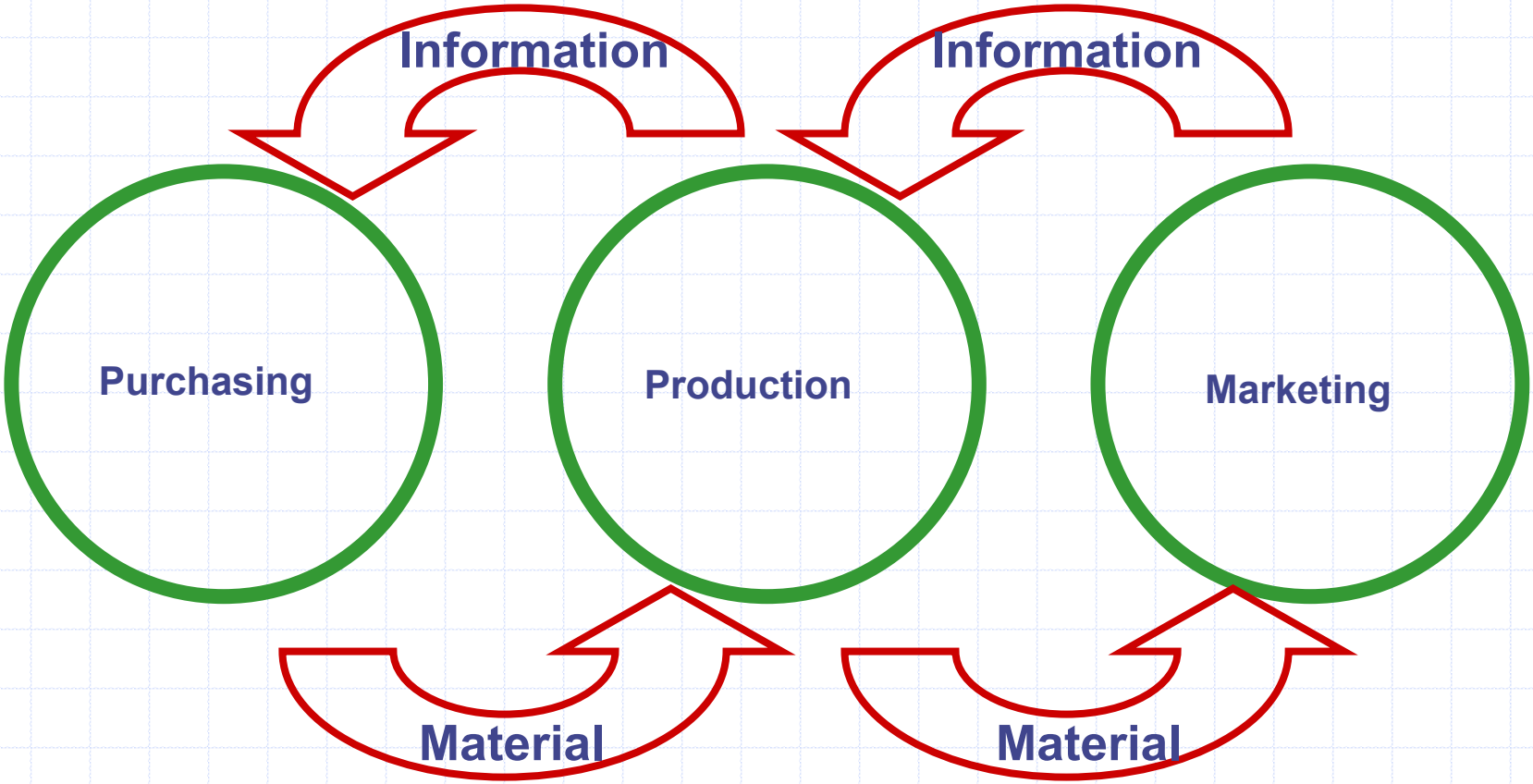
Typical silo approach – each department operates in isolation



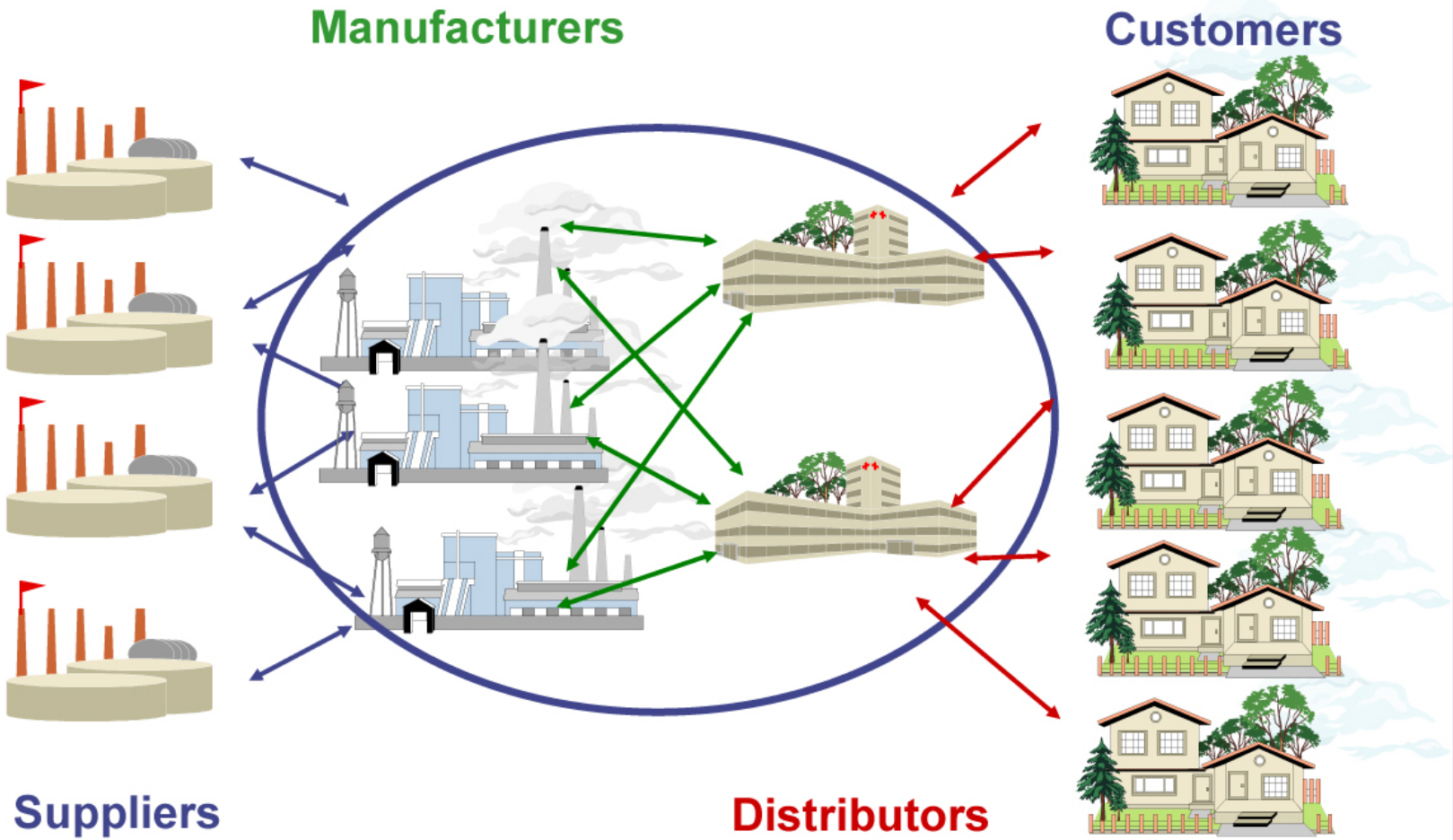
Inventory is the buffer between.

Key Insight:
Trade-off inventory versus information, because inventory is expensive, and information is cheap.

Integrated Logistics Management



An Inter-Enterprise Supply Chain

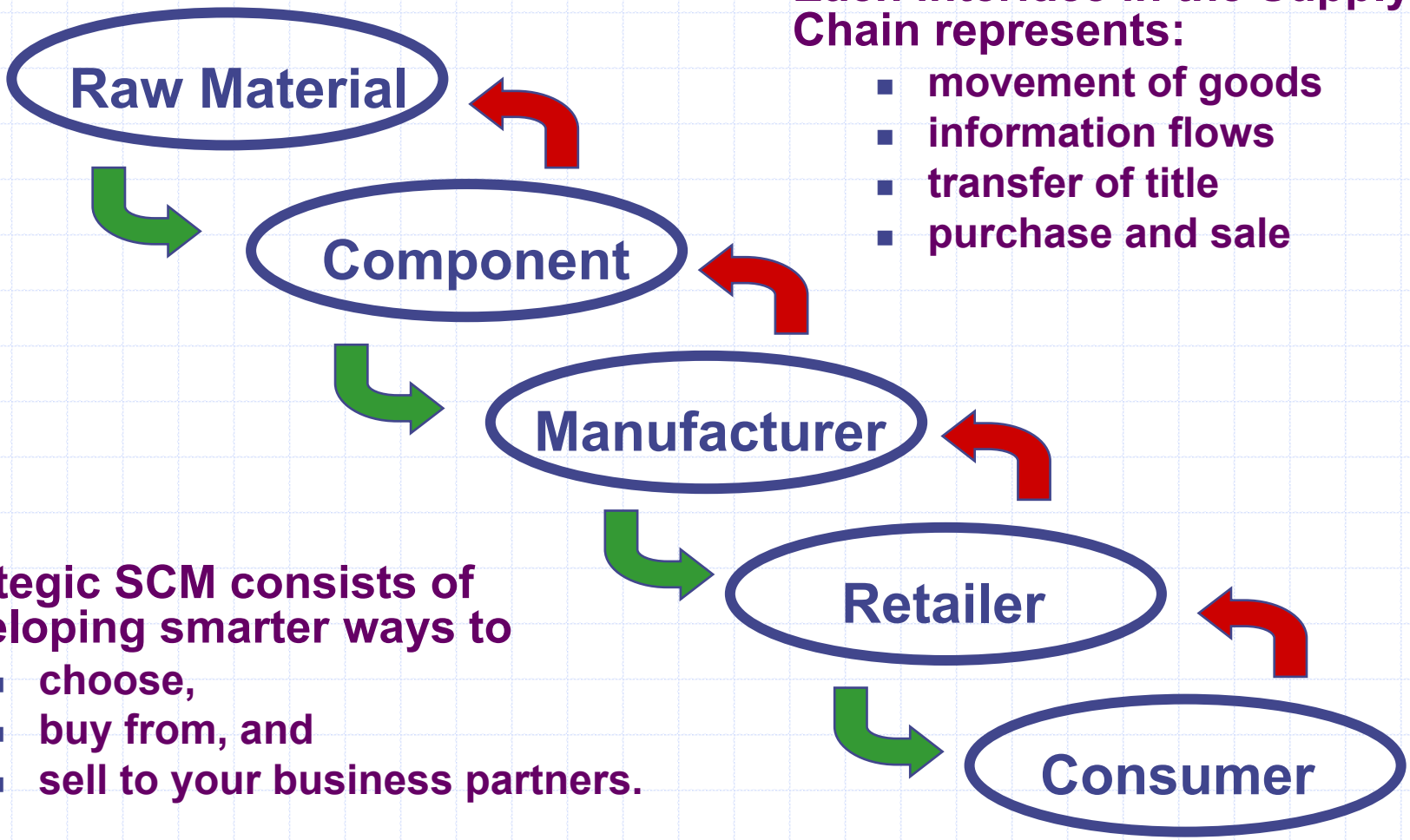


Key Insight:
We can extend the concepts across multiple companies and treat the supply chain as one entity.

Key Concepts

- Design, operate, and control the physical and information flows as though the channel were one seamless corporate entity.
- Let the activities (and costs) migrate across corporate boundaries to where they make the most sense.
- Rely on the benefits of channel integration to replace the benefits of open market forces.
- Share the risks and the rewards between players.

Key SCM Concepts



Each interface in the Supply Chain represents:

- movement of goods
- information flows
- transfer of title
- purchase and sale

Strategic SCM consists of developing smarter ways to

- choose,
- buy from, and
- sell to your business partners.

A Plethora of Approaches

- Just in Time Inventory
- Vendor Managed Inventory
- Quick Response
- Collaborative Planning, Forecasting, and Replenishment
- Cross-docking / Flow Through Centers
- Internet / XML / EDI
- Outsourcing / 3PLs
- Activity Based Costing
- Build to Order
- SC Visibility Software
- SC Event Management
- Auctions / Exchanges
- Merge - In - Transit
- Partnerships / Alliances
- Postponement Strategies
- Cash - to - Cash Metrics
- Collaborative Transportation Management

Core Concepts of ESD.260

- Model Based Approach
  - Use fundamental models to gain insights
  - Analytical, not necessarily OR, approach
  - Extensive use of real examples – but not case studies
- Total System Cost
  - Avoid the silo effect of traditional logistics
  - Capture and integrate across different players in SC
  - Service can be included
- Portfolio of Solutions
  - Rarely is a single solution sufficient or practical
  - A set of solutions is usually more applicable
  - The context matters
- Management of Uncertainty
  - Risk can be measured, monitored, and managed
  - Impacts sourcing, contracting, pricing, incentives, etc.

ESD.260 Outline

- Intra-Company Focus
  - Demand Forecasting (2 lectures)
  - Inventory Models (5 lectures)
  - Inventory Control (6 lectures)
  - Transportation (3 lectures)
- Inter-Company Focus
  - Contracting (3 lectures)
  - Procurement / Auctions (3 lectures)
  - Network Design / Collaboration (2 lectures)