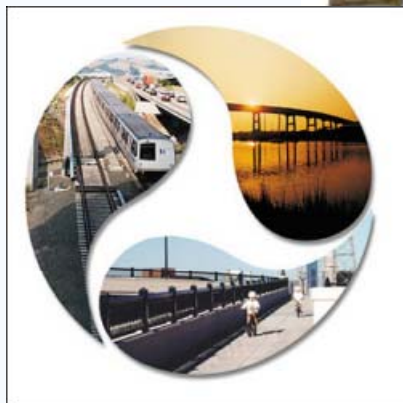


Operations Management

CHAPTER

XI

Supply Chain Management



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Outline

- ☑ ***Global Company Profile:
Volkswagen***
- ☑ ***The Strategic Importance Of The
Supply Chain***
 - ☑ ***Global Supply-Chain Issues***
- ☑ ***Supply-Chain Economics***
 - ☑ ***Make-or-Buy Decisions***
- ☑ ***Outsourcing***

Outline – Continued

- ☑ ***Ethics in the Supply Chain***
- ☑ ***Supply-Chain Strategies***
 - ☑ ***Many Suppliers***
 - ☑ ***Few Suppliers***
 - ☑ ***Vertical Integration***
 - ☑ ***Keiretsu Networks***
 - ☑ ***Virtual Companies***

Outline – Continued

- Managing the Supply Chain***
 - Issues In an Integrated Supply Chain***
 - Opportunities in an Integrated Supply Chain***
- Internet Purchasing***
- Vendor Selection***
 - Vendor Evaluation***
 - Vendor Development***
 - Negotiations***

Outline – Continued

- ☑ ***Logistics Management***
 - ☑ ***Distribution Systems***
 - ☑ ***Cost of Shipping Alternatives***
 - ☑ ***Logistics, Security, and JIT***
- ☑ ***Benchmarking Supply-Chain Management***

Learning Objectives

When you complete this chapter, you should be able to:

Identify or Define:

- Supply-chain management***
- Purchasing***
- Outsourcing***
- E-procurement***
- Materials management***
- Keiretsu***
- Virtual companies***

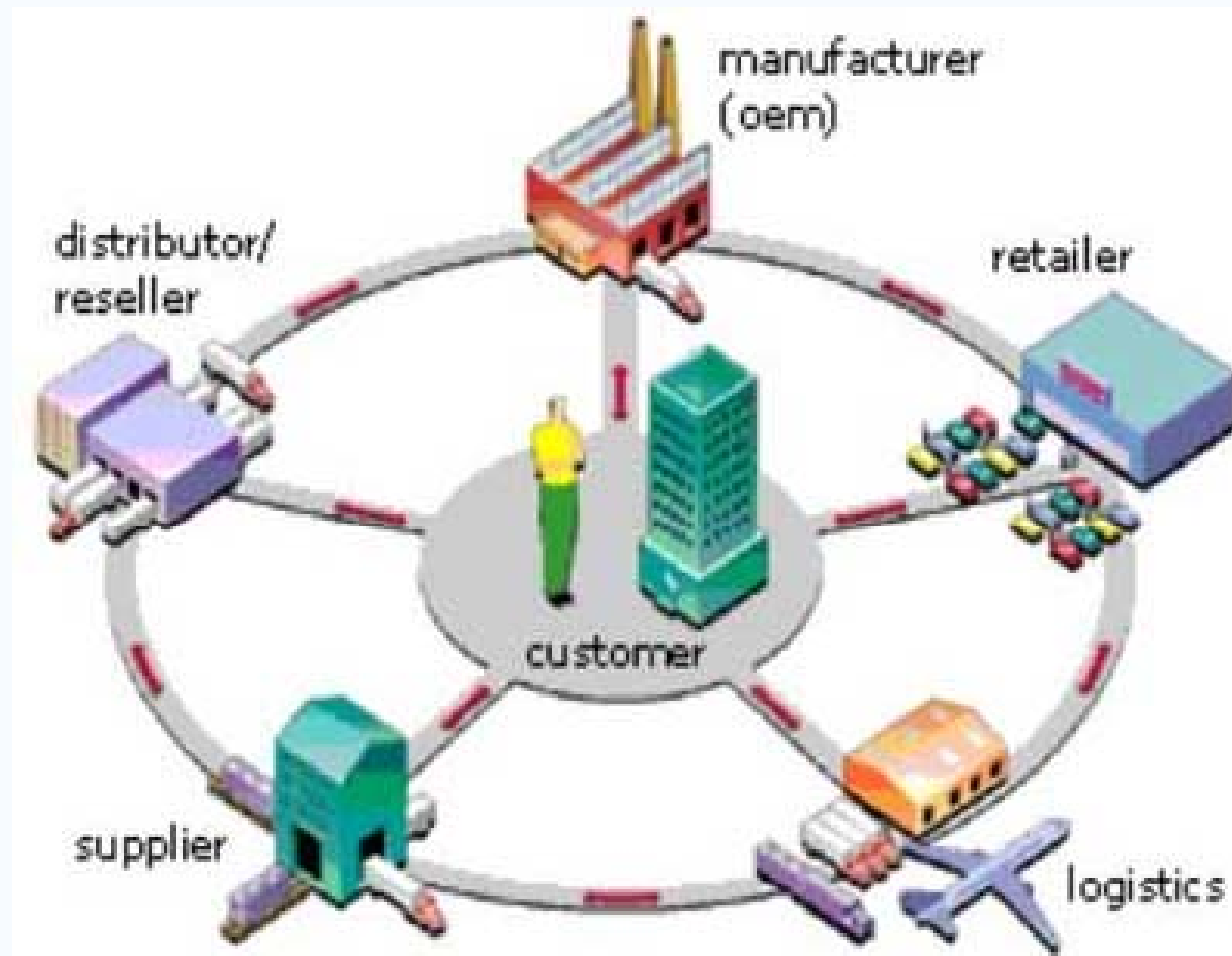
Learning Objectives

When you complete this chapter, you should be able to:

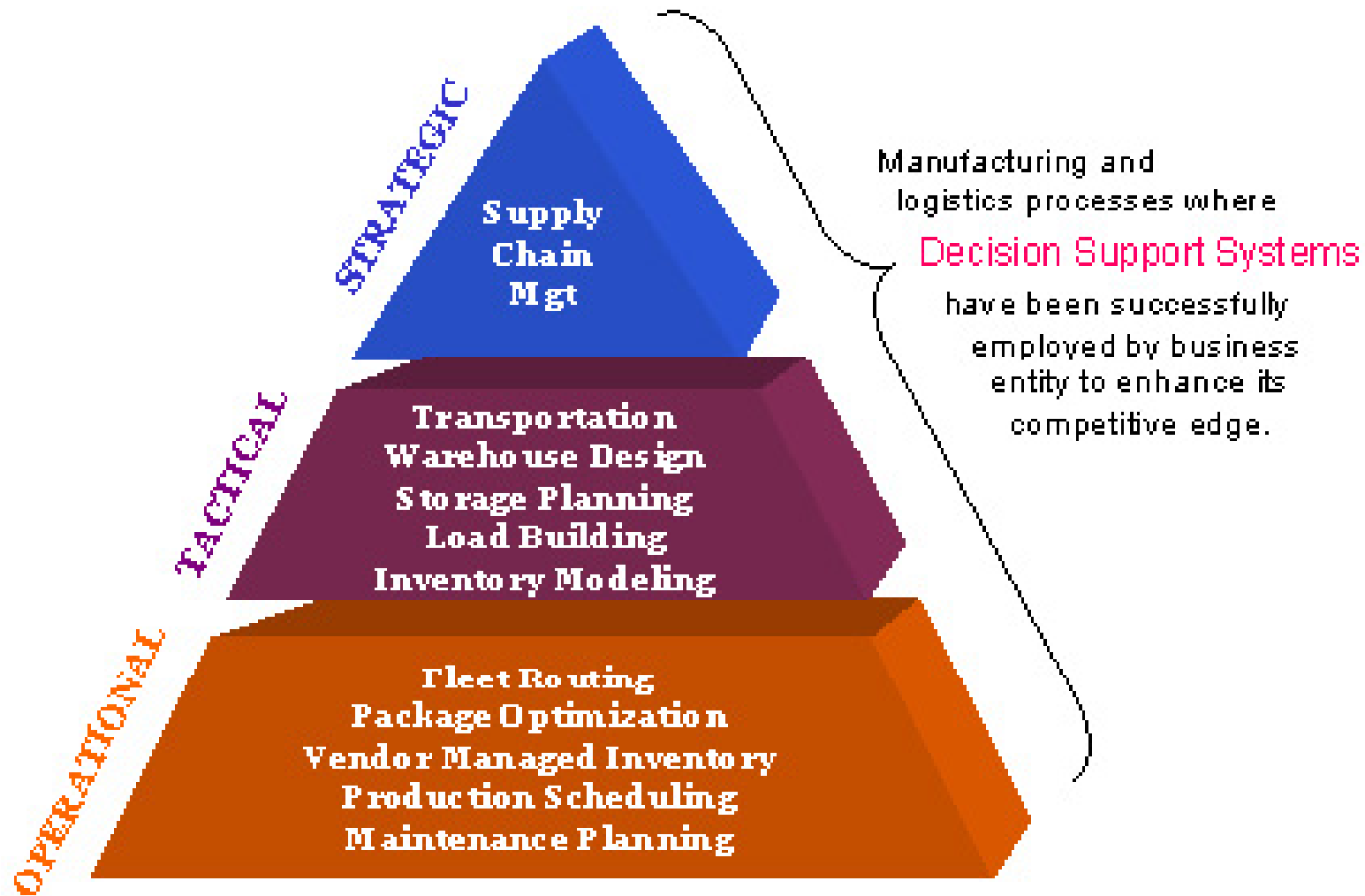
Describe or Explain:

- Supply-chain strategies***
- Approaches to negotiations***

Customer Center

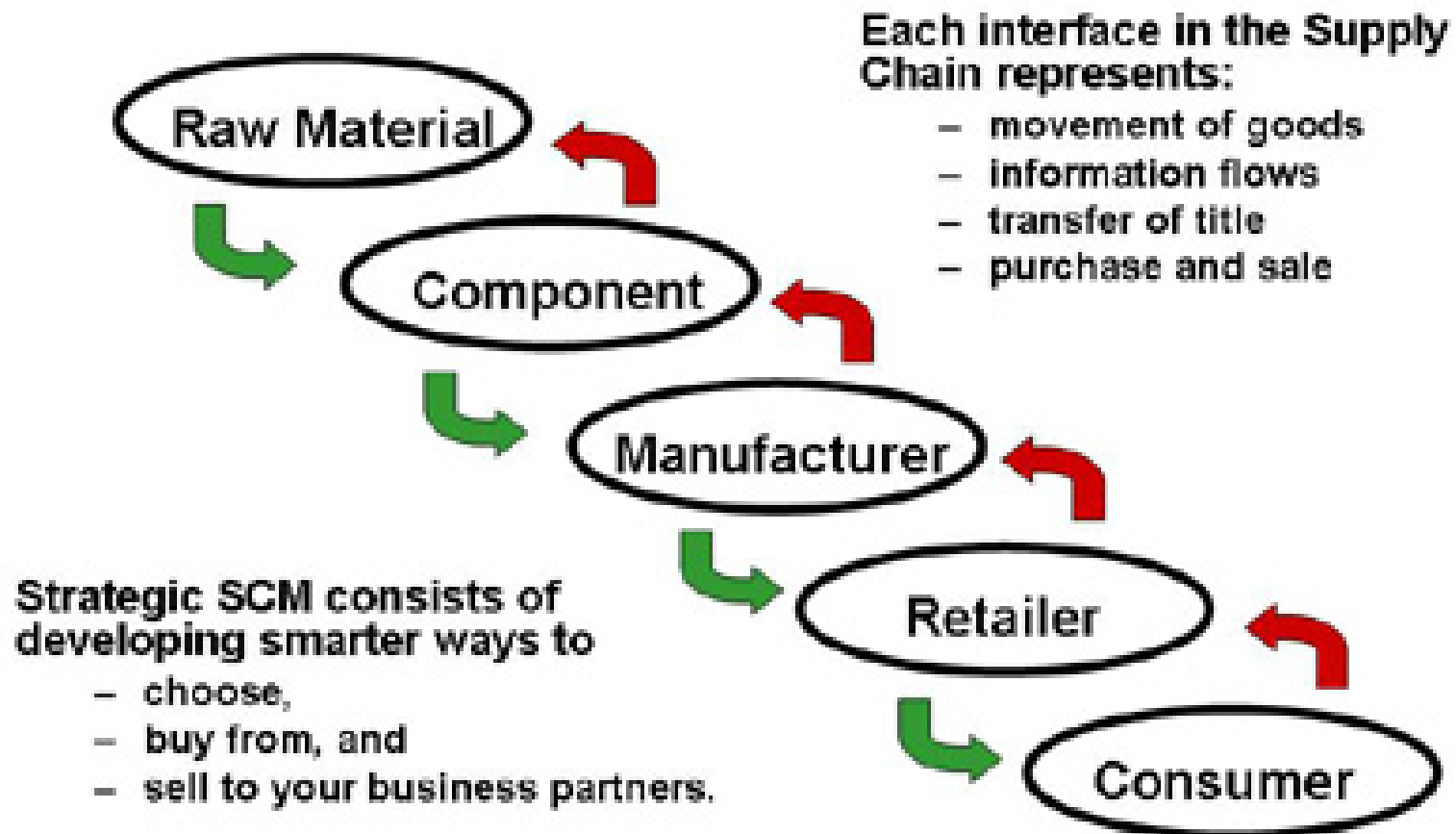


Integrated Decision Systems



Key SCM Concepts

Key SCM Concepts

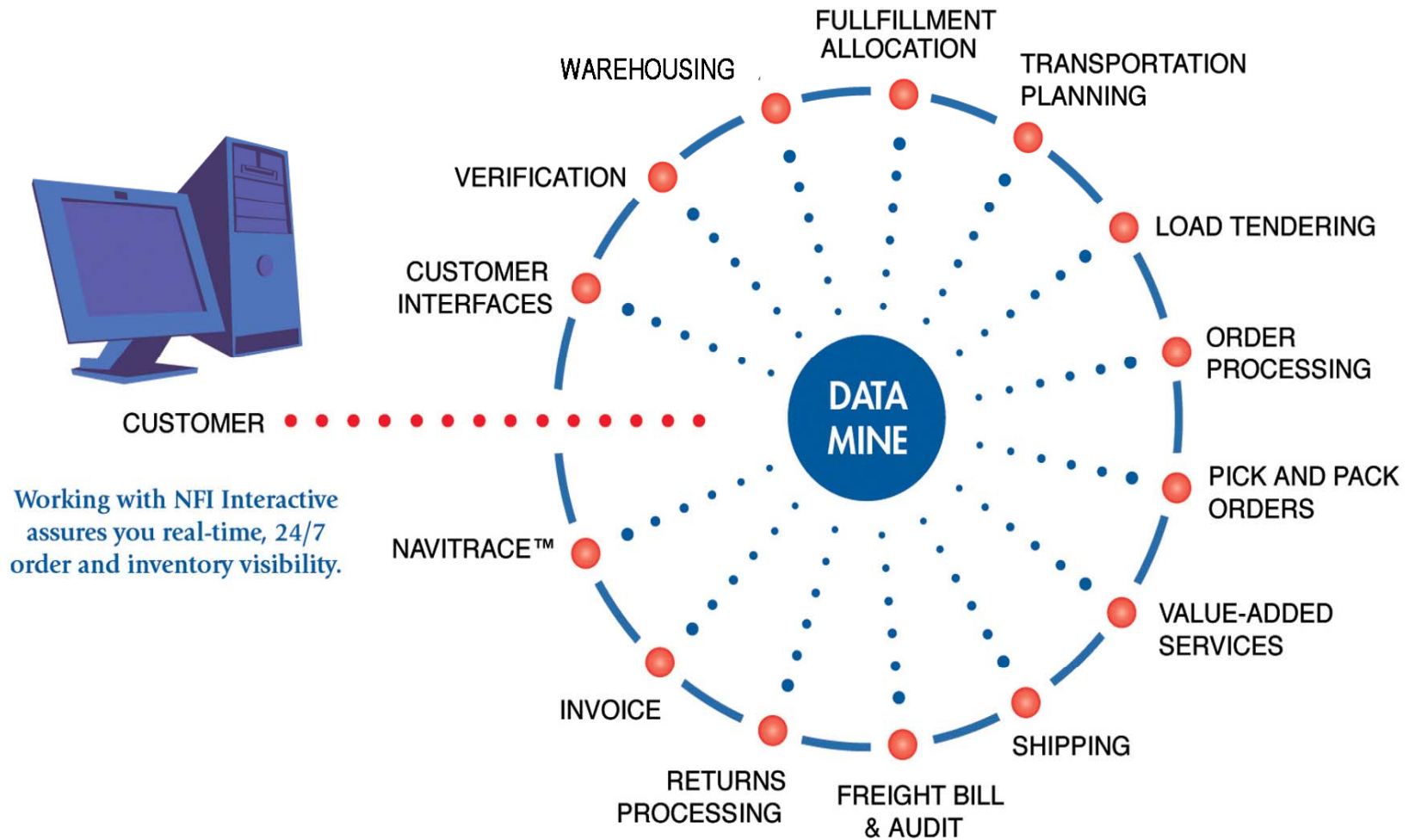


Supply Chain Management

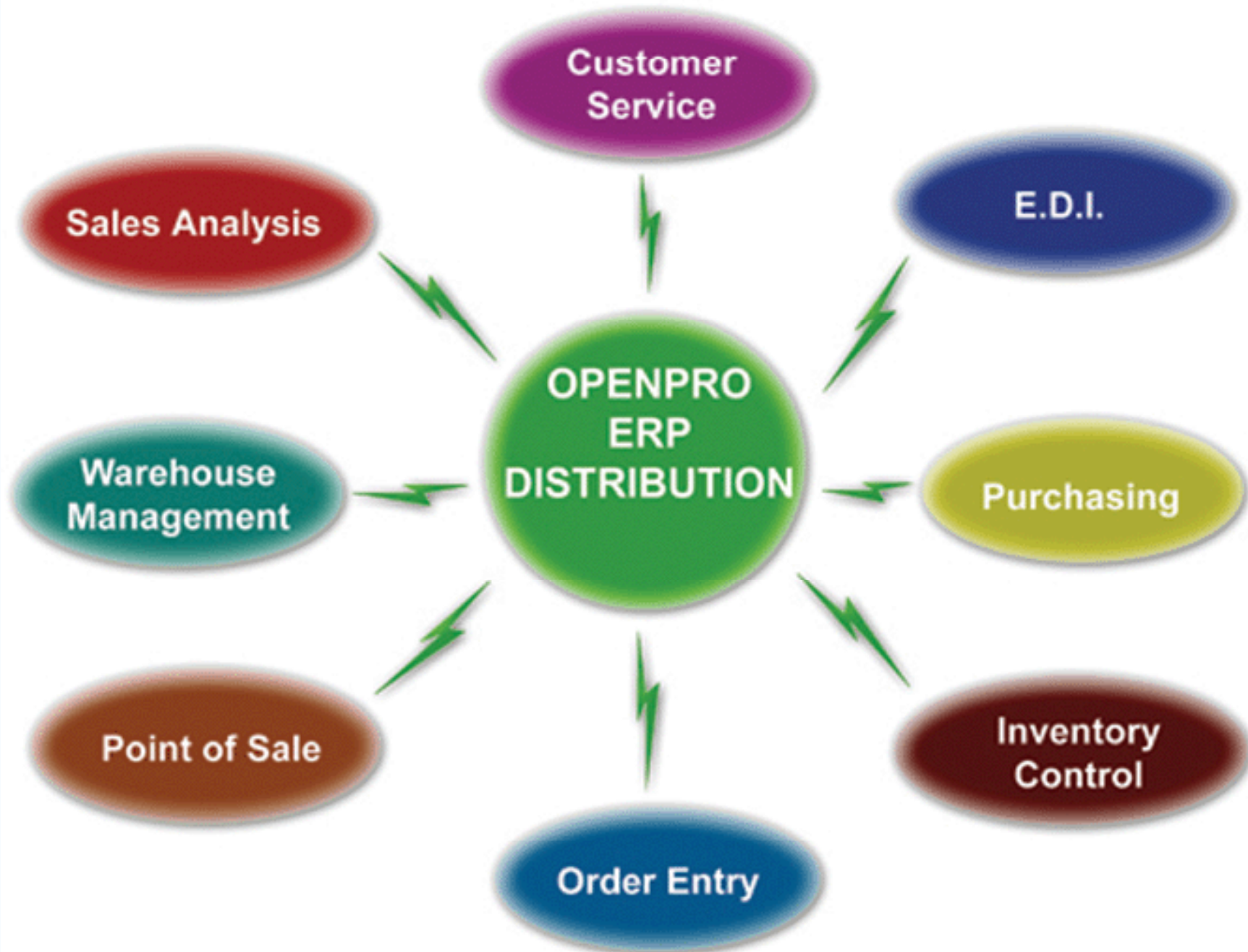


SUPPLY CHAIN MANAGEMENT SYSTEM

Our supply chain technology solutions deliver data critical to optimal Customer Relationship Management.



Distribution Architecture



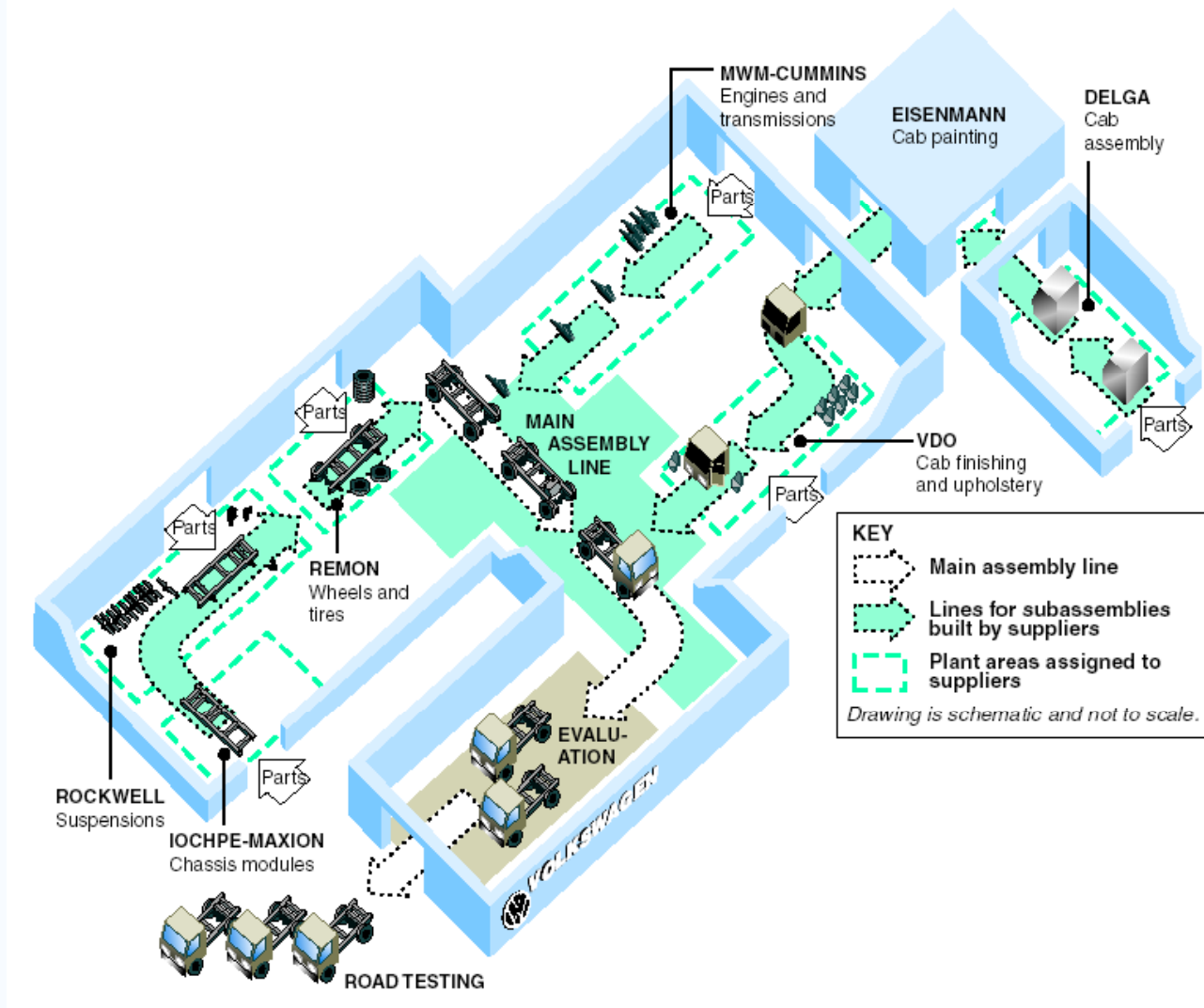
Volkswagen

- Brazilian plant employs 1000 workers***
 - 200 work for VW and are responsible for overall quality, marketing, research, and design***
 - 800 work for other contractors and do the assembly work***
- VW looks to innovative supply chain to improve quality and drive down costs***

Volkswagen

- ☑ *Important elements of this concept***
 - ☑ *VW is buying not only materials, but also the labor and related services***
 - ☑ *Suppliers are integrated tightly into VW's own network, right down to assembly work in the plant***
 - ☑ *Purchase costs in the auto industry exceed 60% of the sales dollar, so any savings are significant***

Volkswagen



The Strategic Importance of the Supply Chain

Supply-chain management is the integration of the activities that procure materials and services, transform them into intermediate goods and the final product, and deliver them to customers

Competition is no longer between companies; it is between supply chains

Supply-Chain Management

Important activities include determining

- 1. Transportation vendors***
- 2. Credit and cash transfers***
- 3. Suppliers***
- 4. Distributors and banks***
- 5. Accounts payable and receivable***
- 6. Warehousing and inventory***
- 7. Order fulfillment***
- 8. Sharing customer, forecasting, and production information***

A Supply Chain

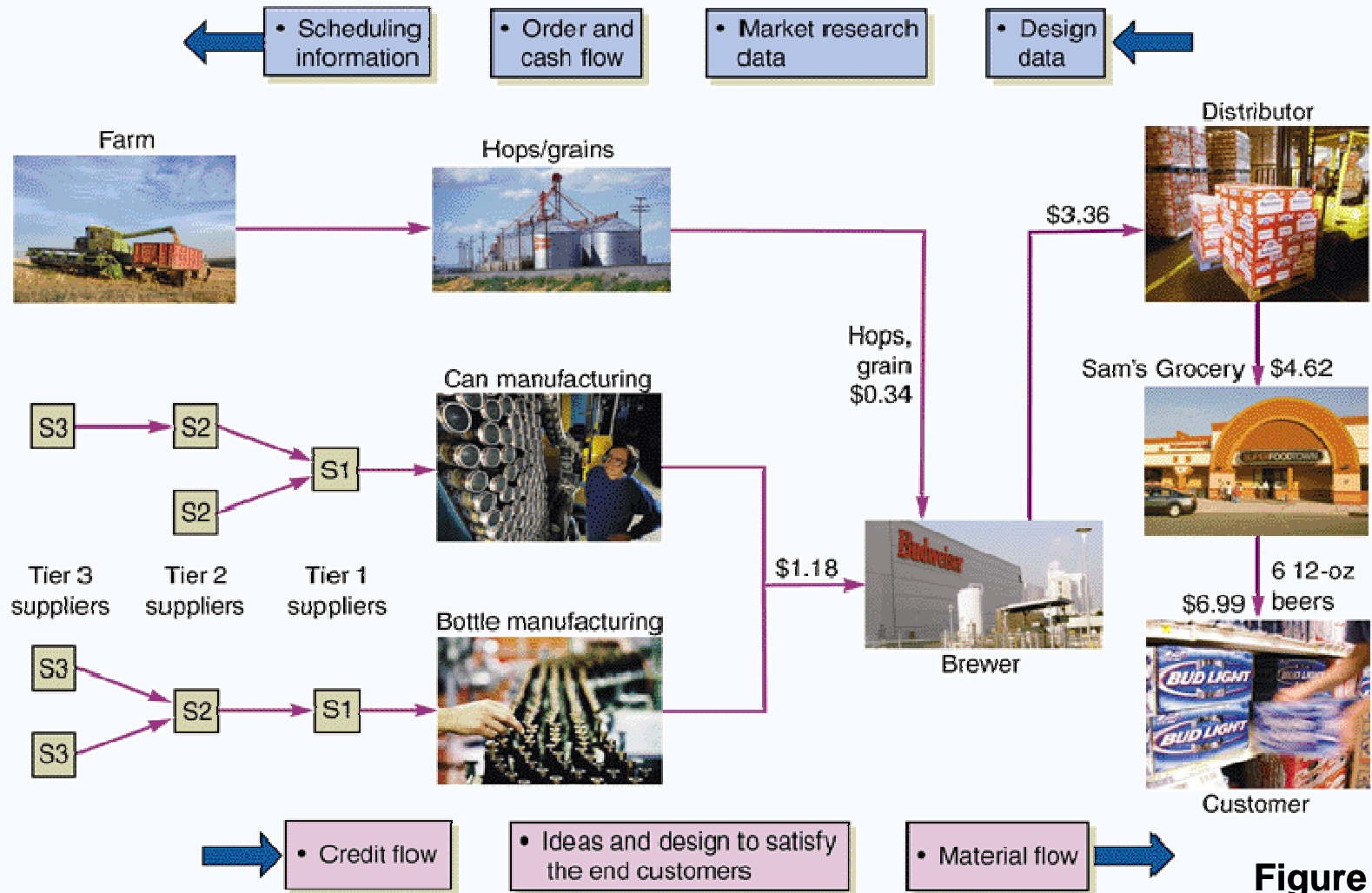


Figure 11.1

Global Supply-Chain Issues

Supply chains in a global environment must be able to

- ☑ React to sudden changes in parts availability, distribution, or shipping channels, import duties, and currency rates***
- ☑ Use the latest computer and transmission technologies to schedule and manage the shipment of parts in and finished products out***
- ☑ Staff with local specialists who handle duties, freight, customs and political issues***

How Supply-Chain Decisions Impact Strategy

	Low-Cost Strategy	Response Strategy	Differentiation Strategy
Supplier's Goal	Supply demand at lowest possible cost (e.g., Emerson Electric, Taco Bell)	Respond quickly to changing requirements and demand to minimize stockouts (e.g., Dell Computers)	Share market research; jointly develop products and options (e.g., Benetton)
Primary Selection Criteria	Select primarily for cost	Select primarily for capacity, speed, and flexibility	Select primarily for product development skills

Table 11.1

How Supply-Chain Decisions Impact Strategy

	Low-Cost Strategy	Response Strategy	Differentiation Strategy
Process Character- istics	Maintain high average utilization	Invest in excess capacity and flexible processes	Modular processes that lend themselves to mass customization
Inventory Character- istics	Minimize inventory throughout the chain to hold down cost	Develop responsive system with buffer stocks positioned to ensure supply	Minimize inventory in the chain to avoid obsolescence

Table 11.1

How Supply-Chain Decisions Impact Strategy

	Low-Cost Strategy	Response Strategy	Differentiation Strategy
Lead-Time Characteristics	Shorten lead time as long as it does not increase costs	Invest aggressively to reduce production lead time	Invest aggressively to reduce development lead time
Product- Design Characteristics	Maximize performance and minimize costs	Use product designs that lead to low setup time and rapid production ramp-up	Use modular design to postpone product differentiation as long as possible

Table 11.1

Supply-Chain Economics

Supply Chain Costs as a Percent of Sales

<i>Industry</i>	<i>% Purchased</i>
<i>All industry</i>	<i>52</i>
<i>Automobile</i>	<i>67</i>
<i>Food</i>	<i>60</i>
<i>Lumber</i>	<i>61</i>
<i>Paper</i>	<i>55</i>
<i>Petroleum</i>	<i>79</i>
<i>Transportation</i>	<i>62</i>

Table 11.2

Supply-Chain Economics

Dollars of additional sales needed to equal \$1 saved through the supply chain

<i>Percent Net Profit of Firm</i>	<i>Percent of Sales Spent in the Supply Chain</i>					
	<i>40%</i>	<i>50%</i>	<i>60%</i>	<i>70%</i>	<i>80%</i>	<i>90%</i>
<i>2</i>	<i>\$3.23</i>	<i>\$3.85</i>	<i>\$4.76</i>	<i>\$6.25</i>	<i>\$9.09</i>	<i>\$16.67</i>
<i>4</i>	<i>\$3.13</i>	<i>\$3.70</i>	<i>\$4.55</i>	<i>\$5.88</i>	<i>\$8.33</i>	<i>\$14.29</i>
<i>6</i>	<i>\$3.03</i>	<i>\$3.57</i>	<i>\$4.35</i>	<i>\$5.56</i>	<i>\$7.69</i>	<i>\$12.50</i>
<i>8</i>	<i>\$2.94</i>	<i>\$3.45</i>	<i>\$4.17</i>	<i>\$5.26</i>	<i>\$7.14</i>	<i>\$11.11</i>
<i>10</i>	<i>\$2.86</i>	<i>\$3.33</i>	<i>\$4.00</i>	<i>\$5.00</i>	<i>\$6.67</i>	<i>\$10.00</i>

Table 11.3

Make-or-Buy Decisions

Reasons for Making

- 1. Maintain core competence***
 - 2. Lower production cost***
 - 3. Unsuitable suppliers***
 - 4. Assure adequate supply (quantity or delivery)***
 - 5. Utilize surplus labor or facilities***
 - 6. Obtain desired quality***
 - 7. Remove supplier collusion***
 - 8. Obtain unique item that would entail a prohibitive commitment for a supplier***
 - 9. Protect personnel from a layoff***
 - 10. Protect proprietary design or quality***
 - 11. Increase or maintain size of company***
-

Make-or-Buy Decisions

Reasons for Buying

- 1. Frees management to deal with its primary business***
 - 2. Lower acquisition cost***
 - 3. Preserve supplier commitment***
 - 4. Obtain technical or management ability***
 - 5. Inadequate capacity***
 - 6. Reduce inventory costs***
 - 7. Ensure alternative sources***
 - 8. Inadequate managerial or technical resources***
 - 9. Reciprocity***
 - 10. Item is protected by a patent or trade secret***
-

Outsourcing

- ☑ ***Transfers traditional internal activities and resources of a firm to outside vendors***
- ☑ ***Utilizes the efficiency that comes with specialization***
- ☑ ***Firms outsource information technology, accounting, legal, logistics, and production***

Ethics in the Supply Chain

- ☑ ***Opportunities for unethical behavior are enormous and temptations are high***
- ☑ ***Many companies have strict rules and codes of conduct that define acceptable behavior***
- ☑ ***Institute for Supply Management has developed a detailed set of principles and standards for ethical behavior***

Principles and Standards for Ethical Supply Management Conduct

***LOYALTY TO YOUR ORGANIZATION
JUSTICE TO THOSE WITH WHOM YOU
DEAL
FAITH IN YOUR PROFESSION***

Table 11.5

Principles and Standards for Ethical Supply Management Conduct

- 1. Avoid the intent and appearance of unethical or compromising practice in relationships, actions, and communications***
- 2. Demonstrate loyalty to the employer by diligently following the lawful instructions of the employer, using reasonable care and granted authority***
- 3. Avoid any personal business or professional activity that would create a conflict between personal interests and the interests of the employer***

Table 11.5

Principles and Standards for Ethical Supply Management Conduct

- 4. Avoid soliciting or accepting money, loans, credits, or preferential discounts, and the acceptance of gifts, entertainment, favors, or services from present or potential suppliers that might influence, or appear to influence, supply management decisions***
- 5. Handle confidential or proprietary information with due care and proper consideration of ethical and legal ramifications and government regulations***
- 6. Promote positive supplier relationships through courtesy and impartiality***
- 7. Avoid improper reciprocal agreements***

Table 11.5

Principles and Standards for Ethical Supply Management Conduct

- 8. Know and obey the letter and spirit of laws applicable to supply management***
- 9. Encourage support for small, disadvantaged, and minority-owned businesses***
- 10. Acquire and maintain professional competence***
- 11. Conduct supply management activities in accordance with national and international laws, customs, and practices, your organization's policies, and these ethical principles and standards of conduct***
- 12. Enhance the stature of the supply management profession***

Table 11.5

Supply-Chain Strategies

- Negotiating with many suppliers***
- Long-term partnering with few suppliers***
- Vertical integration***
- Keiretsu***
- Virtual companies that use suppliers on an as needed basis***

Many Suppliers

- Commonly used for commodity products***
- Purchasing is typically based on price***
- Suppliers are pitted against one another***
- Supplier is responsible for technology, expertise, forecasting, cost, quality, and delivery***

Few Suppliers

- ☑ ***Buyer forms longer term relationships with fewer suppliers***
- ☑ ***Create value through economies of scale and learning curve improvements***
- ☑ ***Suppliers more willing to participate in JIT programs and contribute design and technological expertise***
- ☑ ***Cost of changing suppliers is huge***

Vertical Integration

Vertical Integration

Raw material
(suppliers)

Backward
integration

Current
transformation

Forward
integration

Finished goods
(customers)

Examples of Vertical Integration

Iron ore

Silicon

Farming

Steel

Automobiles

Integrated
circuits

Flour milling

Distribution
systems

Circuit boards

Dealers

Computers
Watches
Calculators

Baked goods

Figure 11.2

Vertical Integration

- ☑ ***Developing the ability to produce goods or service previously purchased***
- ☑ ***Integration may be forward, towards the customer, or backward, towards suppliers***
- ☑ ***Can improve cost, quality, and inventory but requires capital, managerial skills, and demand***
- ☑ ***Risky in industries with rapid technological change***

Keiretsu Networks

- A middle ground between few suppliers and vertical integration***
- Supplier becomes part of the company coalition***
- Often provide financial support for suppliers through ownership or loans***
- Members expect long-term relationships and provide technical expertise and stable deliveries***
- May extend through several levels of the supply chain***

Virtual Companies

- ☑ ***Rely on a variety of supplier relationships to provide services on demand***
- ☑ ***Fluid organizational boundaries that allow the creation of unique enterprises to meet changing market demands***
- ☑ ***Exceptionally lean performance, low capital investment, flexibility, and speed***

Managing the Supply Chain

There are significant management issues in controlling a supply chain involving many independent organizations

- Mutual agreement on goals***
- Trust***
- Compatible organizational cultures***

Issues in an Integrated Supply Chain

- Local optimization - focusing on local profit or cost minimization based on limited knowledge***
- Incentives (sales incentives, quantity discounts, quotas, and promotions) - push merchandise prior to sale***
- Large lots - low unit cost but do not reflect sales***
- Bullwhip effect - stable demand becomes lumpy orders through the supply chain***

Opportunities in an Integrated Supply Chain

- Accurate “pull” data***
- Lot size reduction***
- Single stage control of replenishment***
- Vendor managed inventory***
- Postponement***

Opportunities in an Integrated Supply Chain

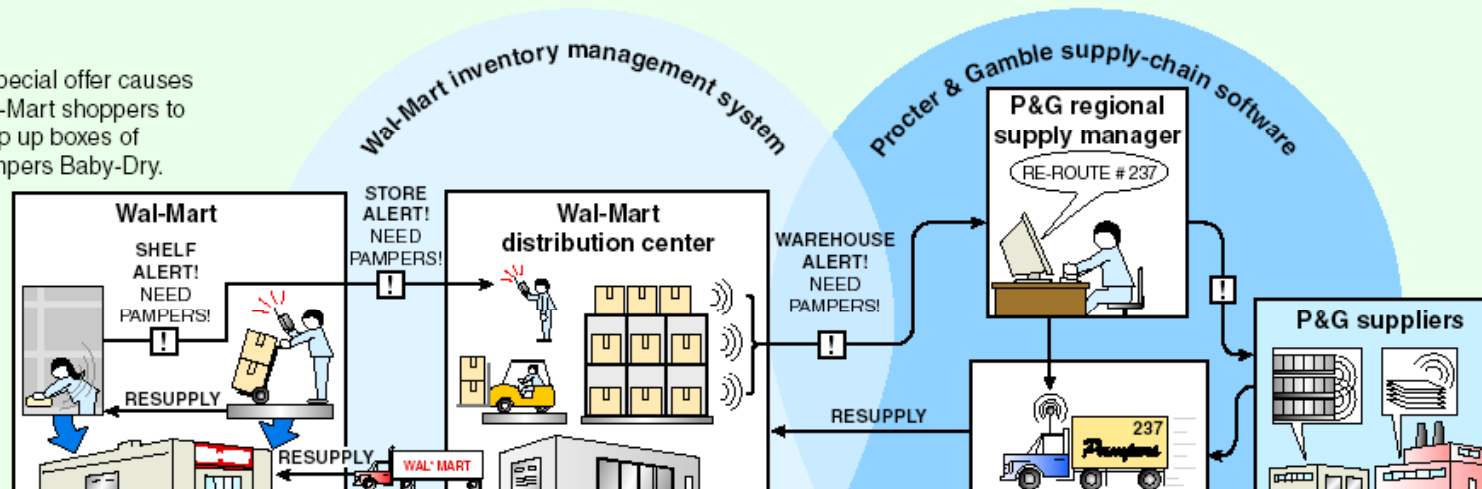
- Channel assembly***
- Drop shipping and special packaging***
- Blanket orders***
- Standardization***
- Electronic ordering and funds transfer***

Radio Frequency Tags

Radio Frequency Tags: Keeping the Shelves Stocked

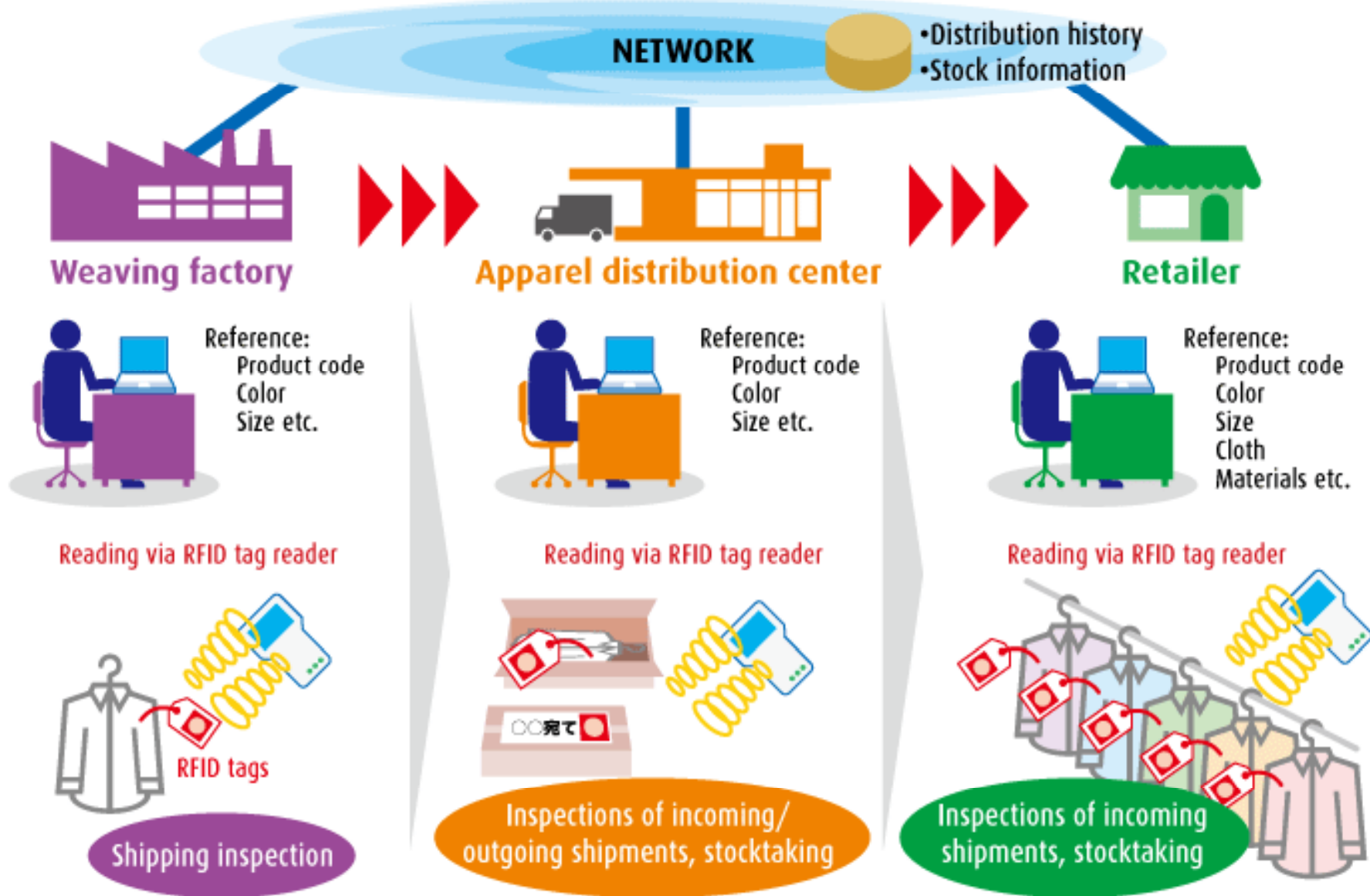
The supply chain works smoothly when sales are steady, but it often breaks down when confronted by a sudden surge in demand. Radio Frequency ID (or RFID) tags could change that by providing real-time information about what's happening on store shelves. Here's how the system works.

1. A special offer 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.

Radio Frequency Tags



Internet Purchasing

Four Common Variations

- Internet used to communicate order releases against blanket purchase orders***
- Internet replaces other forms of electronic order releases***

Internet Purchasing

Four Common Variations

- Internet used to buy non-standard items from catalogs***
 - Long-term master agreements in place***
 - Reduces order lead-time and purchasing costs***

Internet Purchasing

Four Common Variations

- Traditional purchasing system, but Internet-based***
 - Significantly speeds up requisitioning, bidding, supplier selection, and order placement***

Internet Purchasing

Four Common Variations

Internet auctions

- May be used for commodity items for which long-term contracts do not exist***

Internet Purchasing

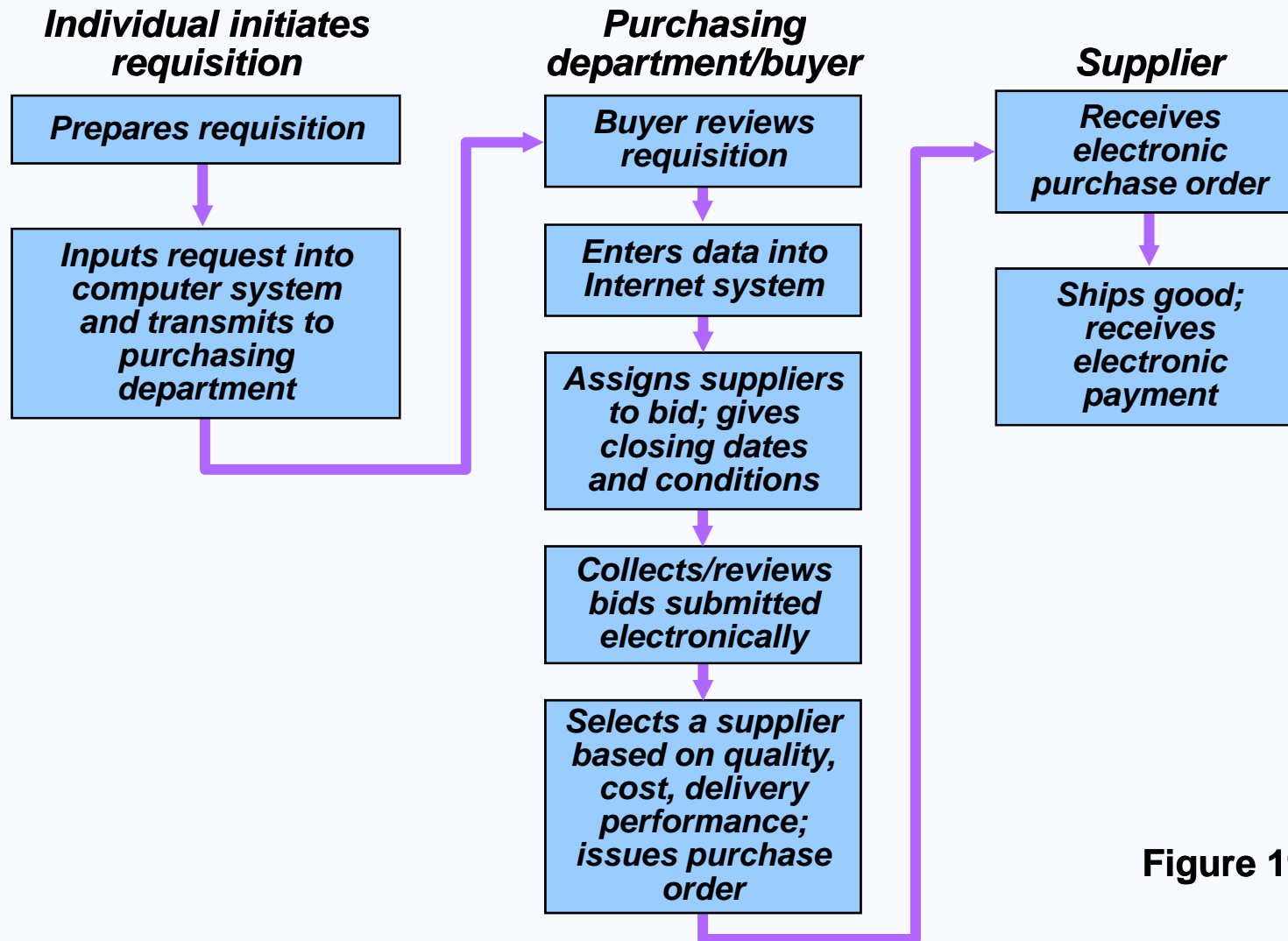


Figure 11.3

Internet Purchasing

- ☑ ***Suppliers get closer to their customers***
- ☑ ***Shorter cycle times may improve cash flow***
- ☑ ***Capital investment is low***
- ☑ ***Buyers enjoy comparison shopping, rapid ordering, reduced transaction costs, and lower inventory***
- ☑ ***May be part of an integrated Enterprise Resource Planning (ERP) system***

Vendor Selection

- ☑ ***Vendor evaluation***
 - ☑ ***Critical decision***
 - ☑ ***Find potential vendors***
 - ☑ ***Determine the likelihood of them becoming good suppliers***
- ☑ ***Vendor Development***
 - ☑ ***Training***
 - ☑ ***Engineering and production help***
 - ☑ ***Establish policies and procedures***

Vendor Selection

- Negotiations***
 - Cost-Based Price Model - supplier opens books to purchaser***
 - Market-Based Price Model - price based on published, auction, or indexed price***
 - Competitive Bidding - used for infrequent purchases but may make establishing long-term relationships difficult***

Vendor Evaluation

Criteria	Weights	Scores (1-5)	Weight x Score
Engineering/research/innovation skills	.20	5	1.0
Production process capability (flexibility/technical assistance)	.15	4	.6
Distribution/delivery capability	.05	4	.2
Quality systems and performance	.10	2	.2
Facilities/location	.05	2	.1
Financial and managerial strength (stability and cost structure)	.15	4	.6
Information systems capability (e- commerce, Internet)	.10	2	.2
Integrity (environmental compliance/ ethics)	.20	5	1.0
Total	1.00		3.9

Logistics Management

- ☑ Objective is to obtain efficient operations through the integration of all material acquisition, movement, and storage activities***
- ☑ A frequent candidate for outsourcing***
- ☑ Gain competitive advantage through reduced costs and improved customer service***

Distribution Systems

Trucking

- Moves the vast majority of manufactured goods***

- Chief advantage is flexibility***

Railroads

- Capable of carrying large loads***

- Little flexibility though containers and piggybacking have helped with this***

Distribution Systems

Airfreight

Fast and flexible for light loads

May be expensive

Waterways

Typically used for bulky, low-value cargo

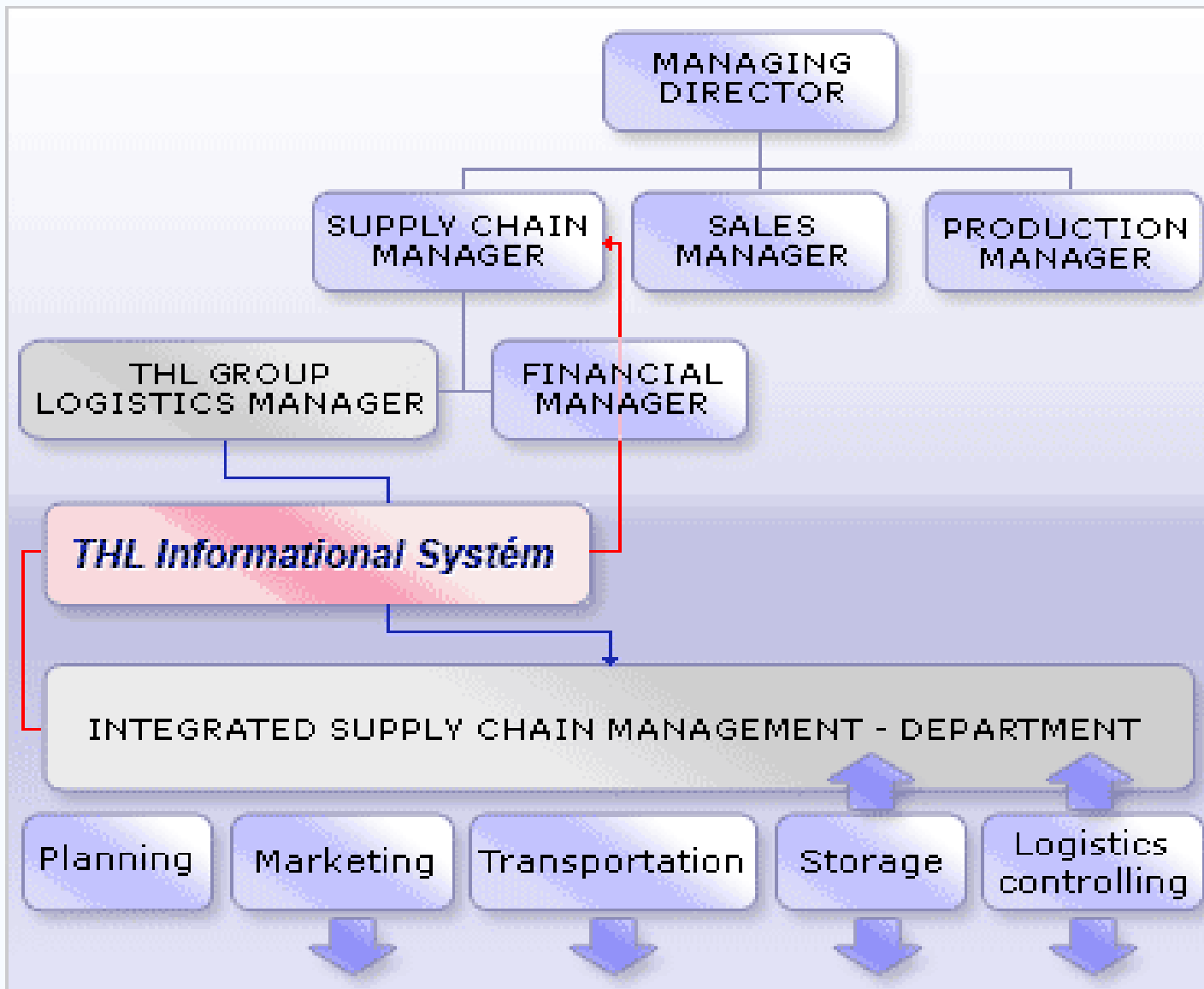
Used when shipping cost is more important than speed

Distribution Systems

- Pipelines***

- Used for transporting oil, gas,
and other chemical products***

Integrated SCM



Cost of Shipping Alternatives

- Product in transit is a form of inventory and has a carrying cost***
- Faster shipping is generally more expensive than slower shipping***
- We can evaluate the two costs to better understand the trade-off***

Cost of Shipping Alternatives

Value of connectors = \$1,750.00

Holding cost = 40% per year

Second carrier is 1 day faster and \$20 more expensive

$$\begin{aligned} \text{Daily cost of holding product} &= \left(\frac{\text{annual holding cost} \times \text{product value}}{365} \right) \\ &= (.40 \times \$1,750) / 365 = \$1.92 \end{aligned}$$

Since it costs less to hold the product one day longer than it does for the faster shipping (\$1.92 < \$20), we should use the cheaper, slower shipper

Logistics, Security, and JIT

- Borders are becoming more open in the U.S. and around the world***
- Monitoring and controlling stock moving through supply chains is more important than ever***
- New technologies are being developed to allow close monitoring of location, storage conditions, and movement***

Benchmarking Supply-Chain Management

	Typical Firms	Benchmark Firms
<i>Administrative costs as a percent of purchases</i>	3.3%	.8%
<i>Lead time (weeks)</i>	15	8
<i>Time spent placing an order</i>	42 minutes	15 minutes
<i>Percentage of late deliveries</i>	33%	2%
<i>Percentage of rejected material</i>	1.5%	.0001%
<i>Number of shortages per year</i>	400	4

Table 11.6

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Supply Chain Management

