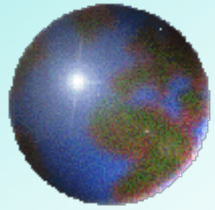


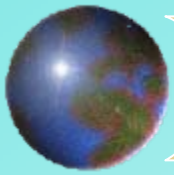
Lecture 9

Materials Management



Part 1

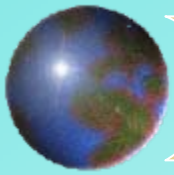
Materials Management



1. Definition

Materials management is an integral part of logistics flow. It can be formally defined as follows: materials management is a single-manager organization concept embracing the planning, organization, motivating and controlling of all those activities and personnel

principally concerned with the flow of materials into an organization.



2. The importance of materials management

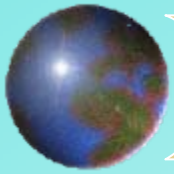
Materials management is responsible for making materials available to the production process. So it may ultimately determine the availability of products to the customer, the level of customer service, the competitive ability of the firm, and the level of sales and profits that can be achieved in the marketplace.

Without efficient and effective management of materials flow, the manufacturer can't produce products at the desired price and at the time the goods are demanded.



3. *Activities of Materials Management(bp50)*

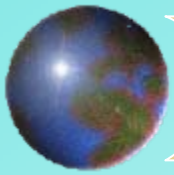
- ❖ (1) purchasing and procurement
- ❖ (2) production control
- ❖ (3) inbound traffic and transportation
 - * inbound&outbound transportation
 - features of demand
 - features of shipment
 - level of control
- ❖ (4) warehousing and storage
- ❖ (5) control of management information system
- ❖ (6) inventory planning and control(re: new concepts)
- ❖ (7) salvage and scrap disposal



4. New concepts

(1) ABC analysis

(2) JIT(Just-in-Time) system



(1) ABC analysis

step 1: rank products by sales or preferably by contribution to corporate profitability if such data are available.

step 2: check for differences between high volume and low volume items that may suggest certain items should be treated differently.

An example:

A: 5% of items, 70% of sales

B: 10% of items, 20% of sales

C: 65% of items, 10% of sales

D: 20% of items, no sales



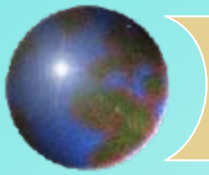
Table: Distribution-by-Value Report

Rank of items	Annual Dollar Sales	Cumulative Percent Items	Cumulative Percent Sales	Classification
1	\$126,773	0.01	1.74	A
35	\$16,899	0.22	15.90	A
438	\$3823	2.84	55.55	A
839	\$2000	5.44	70.01	A
1261	\$1186	8.18	79.40	B
1823	\$693	11.82	86.64	B
2452	\$463	15.90	90.18	B
3506	\$207	22.73	95.44	C
5688	\$60	36.88	98.73	C
6493	\$40	42.10	99.50	C
9253	\$6	60.00	99.73	C
12318	\$1	79.87	100.00	C
12970	0	84.10	100.00	D
15422	0	100.00	100.00	D



Table: Customer service levels using ABC Analysis

Category Customer Level(%)	Percent of Sales	Customer Service Level (%)	Weighted Service
A	70	98	68.6
B	20	90	18.0
C	<u>10</u>	85	8.5
	100	Overall service level	95.1



(2) JIT (Just-in-Time) system

- **Definition:** JIT is an approach to improving overall productivity and eliminating waste. It provides for the cost-effective production and delivery of only the necessary quantity of parts at the right quality, at the right time and place, while using a minimum amount of facilities, equipment, materials and human resources.
- **Development:** The JIT system is said to have been developed at the Toyota Motor Company. In the 1980s, it was transferred to the USA and Europe, in most cases, to subsidiaries of Japanese firms. The roots can probably be traced back to the Japanese environment: lack of space and natural resources have contributed to their aversion to waste.



- **JIT purchasing:** JIT ensures that suppliers deliver directly to the production site to achieve next to zero inventory and consequently, a reduction in production costs. The goals of JIT purchasing are the elimination of unnecessary activities, the elimination of in-plant inventory, in-transit inventory and the improvement of quality and reliability.

The master schedule is planned for a fixed period of time to allow work centers and suppliers to plan their respective work schedules. Within that period, the schedule is levelled on a daily basis. Suppliers are asked to make frequent deliveries (as many as four times a day) directly to the production line. Suppliers are treated much as internal work centers. To improve reliability, local suppliers are preferred.



JIT production: Inventories in production often exist “just in case” some deviation from the production plan occurs. JIT production means elimination of waste, synchronized manufacture, and little inventory: producing batch sizes to standards. JIT production includes 5 important elements: Kanban, production smoothing, standardization of jobs, multifunction workers, and JIT purchasing. Making and implementing a detailed production schedule is very important.

JIT distribution: A firm may be forced to have inventories (e.g. for getting a lower unit production cost),but because consumers now demand more varieties of customized products and fast service, immediate delivery upon call may be required. In an ideal pull system, a product can't be produced until an order is obtained. And after it is completed, it is delivered to the buyer immediately. So no inventory is created, causing inventory costs to drop to zero.



Advantages to JIT

- Lowered variety in suppliers
- Reliable delivery schedules
- High quality materials used
- Reduced waste
- Lowered variety in suppliers
- Reliable delivery schedules
- High quality materials used
- Reduced waste

● **Types of Waste**

- Waiting
- Overproduction
- Transportation
- Inefficient processing
- Inventory
- Unnecessary motion
- Product defects



Differences between JIT and Traditional Purchasing

JIT Purchasing

- Smaller lot sizes
- More frequent deliveries
- No rejection from the supplier
- Long-term contracts
- Buyer decides delivery schedule
- Innovation encouraged
- Minimal paper work
- Less formal communication

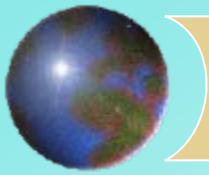
Traditional

- Relatively large lot sizes
- Less deliveries at higher quantities
- 2% rejection from supplier
- Lowest price is main objective
- Time consuming, formal paperwork
- Formal communication



JIT Operations

- Inventory pull systems/visible signals
- Facility layout changes/work cells
- Set up reductions
- Level build schedules
- Uniform loading
- Total quality and continuous improvement
- Standardized material handling/containers
- Product and process simplification
- Total preventive maintenance
- Flexible workforce
- Teamwork
- Right performance measures



● JIT management in Japan

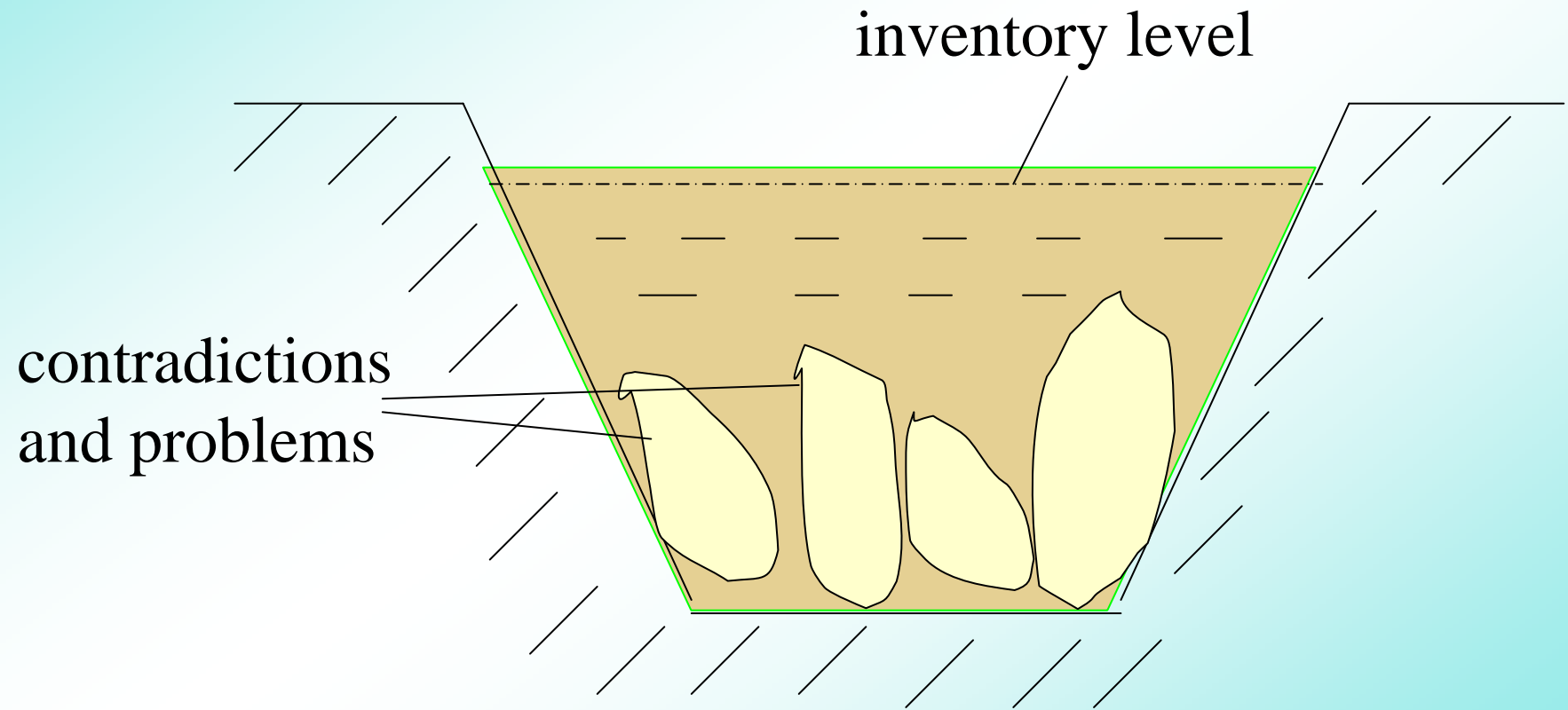
Since JIT practices originated in Japan, if zero inventory management is possible, one should find it in Japanese firms. But according to a study conducted by Japanese scholars, zero inventory management is, at least for the time being, still a fiction, although the firms strive to reach this goal.

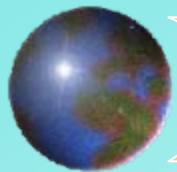
Inventories still exist because of the following factors: geographical and infrastructural factors for the inputs, technological reasons for work-in-process, and market and technological factors for output.

*Lessons for firms in China



Inventory level and problems (figure)

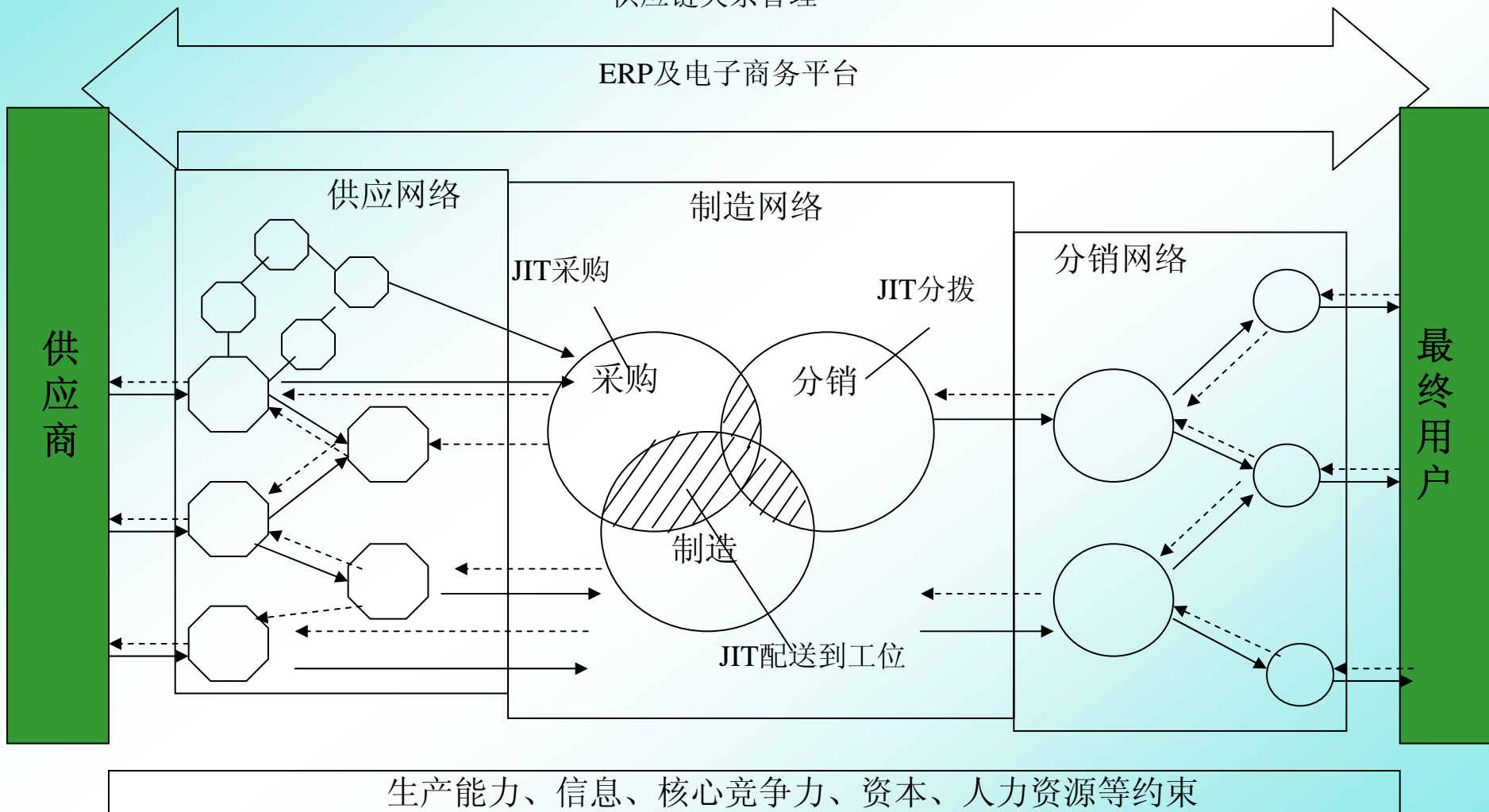




Case: JIT in Haier

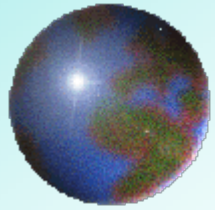
供应链关系管理

ERP及电子商务平台



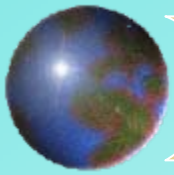
——> 物流

-----> 信息流



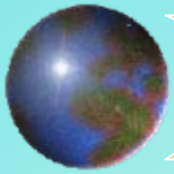
Part 2

Purchasing



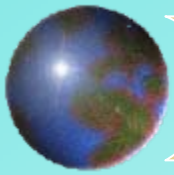
1. Goals of purchasing

- Provide an uninterrupted flow of materials, supplies and services required .
- Keep inventory investment and loss at a minimum.
- Maintain adequate quality standards.
- Find or develop quality vendors.
- Standardize the items bought, if possible.
- Purchase required items and services at the lowest ultimate prices.
- Maintain competitive position.
- Achieve harmonious, productive working relationships with other departments .
- Accomplish purchasing objectives at lowest administrative costs.



2. Purchasing activities

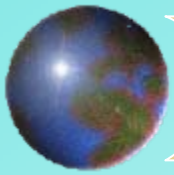
- ⊕ Supplier selection and evaluation
- ⊕ quality control
- ⊕ forward buying



2.1 Supplier selection and evaluation

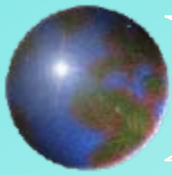
➤ 2.1.1 12 steps

- 1) identify needs, 2) establish specifications, 3) search for alternatives, 4) establish contact, 5) set purchase and usage criteria, 6) evaluate alternative buying actions, 7) determine budget availability, 8) evaluate specific alternatives, 9) negotiate with suppliers, 10) buy, 11) use, 12) conduct post purchase evaluation.**

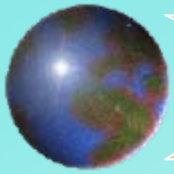


➤ 2.1.2 Variables in purchasing decision

- ✓ Lead time (variability).
- ✓ Percentage of on-time deliveries.
- ✓ Percentage in-stock availability.
- ✓ Convenience in ordering/communication.
- ✓ Ability to expedite.
- ✓ Down time.
- ✓ Product reliability.
- ✓ Ease of maintenance/operation.
- ✓ Product failures.

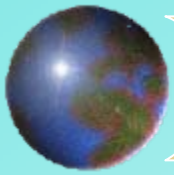


- ✓ Quality rejects.
- ✓ Technical specifications.
- ✓ Technical/training services offered.
- ✓ Competitiveness of price.
- ✓ Confidence in the sales representative.
- ✓ Past experience with vendor.
- ✓ Overall reputation of the vendor.
- ✓ Financing terms.
- ✓ Post-purchase sales service.
- ✓ Vendor's flexibility .
- ✓ Engineering/design capabilities.



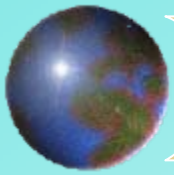
➤ 2.1.3 Six major product categories

- ✓ component parts
- ✓ raw materials
- ✓ process materials
- ✓ accessory equipment
- ✓ major equipment
- ✓ operating suppliers



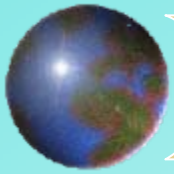
➤ 2.1.4 Four buying situations (p63)

- ✓ Routine order situations
- ✓ Procedural problem situations
- ✓ Performance problem situations
- ✓ Political problem situations



➤ 2.1.5 Evaluating procedures(p64)

- ✓ to identify all potential suppliers for item(s) being purchased.
- ✓ to develop a list of factors by which to evaluate each supplier.
- ✓ to evaluate the performance of individual suppliers on each factor.
- ✓ to determine the importance of the factors to its particular situation.
- ✓ to develop a weighted composite measure

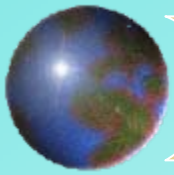


➤ **2.1.6 Sourcing Problems in International Market**

- ✓ Lack of local technological backup.
- ✓ Licence and foreign exchange difficulties.
- ✓ Poor service .
- ✓ Political instability or risk .
- ✓ Tariffs and host government pressure .
- ✓ Governmental pressures .
- ✓ Carrying higher inventories.

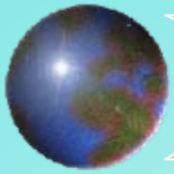


- Necessity for intensifying goods-inwards inspection activities.
- “Home” derived specifications not available from local supply markets.
- Quality inconsistency of certain imported components.
- Lack of trained local staff.



2.2 Quality Control

- 2.2.1 Quality attributes
 - ✓ Market grades.
 - ✓ Brand or trade names.
 - ✓ Commercial standards.
 - ✓ Chemical or physical specifications.
 - ✓ Performance specifications.
 - ✓ Material and method-of-manufacturer specifications.
 - ✓ Blueprints (engineering drawings).
 - ✓ Samples.
 - ✓ Quality products list.
- 2.2.2 necessary quality is enough



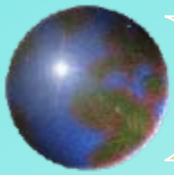
2.3 Forward buying

➤ 2.3.1 definition

Forward buying refers to the purchase of materials in quantities exceeding current requirements, well in advance of their need or use.

➤ 2.3.2 The conditions for forward buying

- ✓ a pending price increase
- ✓ a potential supply shortage



➤ **2.3.3 Two major reasons**

- ✓ minimizes the effects of rising material costs.
- ✓ provides protection against future availability problems.

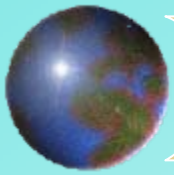
➤ **2.3.4 Disadvantages**

- ✓ the firm may purchase materials at prices higher than necessary.
- ✓ Another often overlooked disadvantage of forward buying is the increased inventory carrying cost incurred with holding excess inventory.



Using Inventory Carrying Costs to Evaluate Forward Buying

Number of Months Supply Purchased	Value	Average Inventory (1/2*Order Quantity)	Savings in Order Processing Cost from Fewer orders Being Placed	Savings in Purchase Price	Increase In Inventory Carrying Cost			Net Savings from Forward Buying
					Inventory Carrying Cost for Buy-Ahead Period 30%*avg.Inv. *No. of Months/12	Inventory Carrying cost for Remaining Months Assuming Purchases of \$2200/Mo.	Less Inventory Carrying Costs if No Forward Buying Takes Palace	
1	\$2,000	\$1,000	\$----	\$----	\$ 25	\$302.50	\$327.50	\$-----
2	4,000	2,000	20	200	100	275.00	327.50	172.50
3	6,000	3,000	40	400	225	247.50	327.50	295.00
4	8,000	4,000	60	600	400	220.00	327.50	367.50
5	10,000	5,000	80	800	625	192.50	327.50	390.00
6	12,000	6,000	100	1,000	900	165.00	327.50	362.50
7	14,000	7,000	120	1,200	1,225	137.50	327.50	285.00
8	16,000	8,000	140	1,400	1,600	110.00	327.50	157.50
9	18,000	9,000	160	1,600	2,025	82.50	327.50	(20.00)
10	20,000	10,000	180	1,800	2,500	55.00	327.50	(247.50)
11	22,000	11,000	200	2,000	3,025	27.50	327.50	(525.00)
12	24,000	12,000	220	2,200	3,600	- -----	327.50	(852.50)



➤ 2.3.5 Cost Trade-offs to be Considered (p68)

- ✓ Savings associated with volume buying
 - Lower per-unit purchasing prices
 - Lower transportation costs
 - Lower warehouse handling costs
 - Lower order processing costs
 - Lower production lot quantity costs
 - Lower stockout costs
- ✓ Costs of carrying inventory
 - Capital costs
 - Inventory service costs
 - Storage space costs
 - Inventory risk costs