Learning Objectives

- Explain what strategic cost management and how it can be used to help a firm create a competitive advantage.
- Discuss the importance of the value chain approach to analysing decision alternatives.
  - Supply chain management
  - Managing suppliers
    - Supplier selection, supplier profitability, performance measures
  - Managing inventory
    - Economic order quantity (EOQ)
    - Just-in-time system (JIT)
Supply chain management (SCM) (cont.)

- Ecommerce—use of electronic transmission media to engage in the buying and selling of goods and services
- B2B—ecommerce activities between two businesses
- Electronic data interchange (EDI) links a firm’s computer system to suppliers/customers to allow electronic purchasing and buying
- Enterprise resource planning (ERP) systems support different functional areas of a business and enable SCM

Managing suppliers

- Improved supplier relationships can reduce supplier and inventory-related costs
- Selecting suppliers
  - Based on a range of criteria
  - Price, quality, delivery, performance history, capacity, communications systems and geographical location
  - Long-term supply controls and preferred suppliers
• Analysing supplier costs
  • The total cost of ownership is the total cost of dealing with suppliers, including:
    • Purchase price
    • Costs of purchasing—ordering, receiving and inspection
    • Costs of holding inventory
    • Costs of poor quality
    • Costs of delivery failure
    • Activity-based costing can be used to estimate total cost of ownership
    • Hierarchy of supplier activities: unit-level, order-level, supplier-level (cont.)

• Evaluating supplier performance
  • Supplier performance index: the ratio of supplier costs to total purchase price
  • Measures include ability of supplier to supply at the contract price, material quality, delivery performance, quality of relationships between employees, union and management
  • A buyer may also assess their own performance in relation to the management of the supplier
Managing inventory

- Why hold inventory?
  - Cope with uncertainties in customer demand and in production processes
  - Qualify for quantity discounts
  - Avoid future price increases in raw materials
  - Avoid the costs of placing numerous small orders
  - Conventional approaches to inventory management focus on balancing
  - Ordering costs: incremental costs of placing an order
  - Carrying costs: the costs of carrying inventory in stock
  - Shortage costs (or out-of-stock costs)

Inventory management in retail organisations

\[ EOQ = \sqrt{\frac{2DP}{C}} \]

- D = demand in units for specified period
- P = relevant ordering cost per purchase order
- C = relevant carrying cost of one unit in stock for the time period used for D

Inventory management in retail organisations

![Graph showing inventory management in retail organisations](image_url)
Timing of orders under EOQ
- Inventory re-order point (ROP)
  - The level of inventory on hand that triggers the placement of a new order (or setup)
- Lead time - the length of time between placing an order and receiving the order
- Safety stock
  - The extra inventory kept on hand to cover any above-average usage or demand
  - May be costly to maintain extra inventory

INVENTORY REPLENISHMENT METHODS

\[
\text{Q}_{\text{Ord}} = (\text{Q}_{\text{Safe}} + \text{Q}_{\text{B/Ord}}) - (\text{Q}_{\text{Ord}} + \text{Q}_{\text{B/Ord}})
\]

\[
\text{Q}_{\text{Safe}} = (\text{Q}_{\text{Max}} - \text{Q}_{\text{Dm}}) \times (\text{T}_{\text{VL}} + \text{T}_{\text{Ord}})
\]

Inventory Replenishment Graph
- Maximum Inventory Holding
- Safety Stock
- Order Quantity Received
- Vendor Lead Time
Inventory Replenishment Methods

\[Q_{\text{out}} = (Q_{\text{safe}} + Q_{\text{dmax}} + Q_{\text{dend}}) - (Q_{\text{safe}} + Q_{\text{dend}})\]

- Equation does not consider purchase order cost or inventory carrying costs
- Assumes that the order frequency is known
- Assumes that safety stock has been specified

Inventory Replenishment
Economic Order Quantity Method

\[EOQ = \sqrt{\frac{2DP}{C}}\]

- \(D\) = demand in units for specified period
- \(P\) = relevant ordering cost per purchase order
- \(C\) = relevant carrying cost of one unit in stock for the time period used for \(D\)

With known EOQ, then annual number of orders is determined

\[\text{No. of Orders} = \frac{D}{\text{EOQ}}\]

WITH KNOWN No. of Orders, THEN ORDER FREQUENCY IS DETERMINED

ORDER FREQUENCY = Annual Working Days

No. of Orders

Assumptions underlying EOQ

- Demand is known and constant
- Incremental ordering costs are known and constant per order
- Acquisition cost per unit is constant
- Entire order is delivered at one time
- Carrying costs are known and constant per unit
- On average, one-half of order is in stock at any time
• Just-in-time (JIT) inventory management is a comprehensive inventory management philosophy that stresses policies, procedures, and attitudes by managers and other workers that result in the efficient production of high quality goods while maintaining the minimum level of inventories.

JIT is a business philosophy that focuses on reducing time and cost; eliminating poor quality and removing non-value added activities.

• JIT organises work cells that perform several manufacturing steps.
• Workers are cross-trained to perform more than one task. This provides flexibility and worker pride and involvement in the final product.
• Because products have limited movement between departments, the nonvalue-added cost of transporting products and parts is reduced.

• The key elements of the JIT philosophy include:
  • Increased co-ordination throughout the value chain
  • Reduced inventory
  • Reduced production times
  • Increased product quality
  • Increased employee involvement and empowerment
The JIT approach to reducing raw materials includes:
- Developing long-term relationships with a limited number of vendors
- Selecting vendors on the basis of service and material quality as well as price
- Establishing procedures for production employees to order raw materials for current production needs directly from approved vendors
- Accepting vendor deliveries directly to the shop floor

JIT is not necessarily the answer to inventory management problems
- Whilst firms who implement JIT can save significantly, the costs of holding inventory are often pushed back onto suppliers who pass on the extra cost to the buyer
- Some firms need to hold inventories due to market conditions and therefore JIT is not appropriate (note the Japanese example of holding inventories in delivery trucks offsetting the benefits of JIT implementation)

Increased costs of JIT
- Substantial investment may be required to change the production to minimise non-value-added activities
- An increase in the risk of inventory shortages and the associated loss of production, expediting materials costs and loss of sales
• Reduces inventory; Total Preventative Maintenance
• Reduces lead time
• Emphasises product-oriented layout
• Emphasises team-oriented employee involvement

Just-in-Time Manufacturing
• Increases inventory to protect against process problems
• Increases lead time to protect against uncertainty
• Emphasises process-oriented layout
• Emphasises work of individuals, following manager instructions

Traditional Manufacturing

Just-in-Time Principles

• Reduces setup time
• Emphasises PULL manufacturing
• Emphasises zero defects
• Emphasises supplier partnering
• Using long-term contracts for outside purchases

Just-in-Time Manufacturing
• Disregards setup time as an improvement priority
• Emphasises PUSH manufacturing
• Tolerates defects
• Treats suppliers as “arms-length,” independent entities
• Supply contracts revised frequently

Traditional Manufacturing

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Materials Push System

Under a traditional materials push system, employees work to reduce the pile of inventory building up at their workstations.

• Workers at each station remove materials from an in-process storage area, complete their operation, and place the output in another in-process storage area.
• Hence, they “push” the work to the next workstation.
• The emphasis is on production efficiency at each station.

Materials Push System
Materials Pull System

- Under a materials pull system employees at each station work to replenish the inventory used by employees at subsequent stations.
- The building of excess inventories is strictly prohibited.
- When the number of units in inventory reaches a specified limit, work at the station stops until workers at a subsequent station “pull” a unit from the in-process storage area.

JIT Inventory Management and TQM

- Total Quality Management (TQM) is a philosophy that strives to build good quality in before and during production, rather than inspecting for bad quality out after production. The aim is for zero defects.
- With TQM, the potential for continuous improvement is actively sought.
- JIT however, emphasises improving manufacturing efficiencies. Production problems such as bottleneck activities caused by quality control problems become apparent as inventory levels are progressively reduced.

The combination of TQM and JIT support and enhance the outcomes of each philosophy.
In a just-in-time operating environment, the accounting system will have the following characteristics:

- Fewer transactions. The accounting system is simpler because there are fewer transactions to record.
- Combined accounts. All in-process work is combined with raw materials to form a new account, raw and in process (rip) inventory.
- Nonfinancial performance measures. There is a greater emphasis on nonfinancial measures.
- Direct tracing of overhead. Indirect labour is directly assigned to product production cells.

JIT regards inventory as something to be eliminated.

In a manufacturing organisation inventories are kept as small as possible.

And under the JIT “ideal”, inventories do not exist.

JIT also strives to minimise work-in-process inventory by minimising the non-processing elements of cycle time and by having processing times as short as possible.

Cycle time is the total time required to complete a process.

Reducing cycle time is the key to reducing work-in-process inventories.

In a manufacturing organisation, cycle time is composed of:

- Setup Time
- Processing Time
- Movement Time
- Waiting Time
- Inspection Time
Cycle Time

- **Start of production** for a single item
- **End of production** for a single item
- **Conversion Time**
- **Wait Time**
- **Move Time**
- **Down Time**
- **Value-added**
- **Non-value-added**
- **Total Cycle Time**

Traditional Operations

- **Administrative Offices**:
  - Accounting
  - Sales
  - Customer Service
- **Technical Offices**:
  - Design
  - Scheduling
  - Manufacturing
- **Work in Process Areas**:
  - Stamping
  - Forming
  - Punching
  - Receiving and Raw Materials Inventory
  - Shipping Department
  - Finished Goods Inventory

Performance Evaluation

- Ideally,
  - Setup ✓
  - Waiting ✓
  - Movement ✓
  - and Inspection Times ✓
- are to be eliminated
Just-in-Time Operations

Performance Evaluation

- There is a potential conflict between the goals of JIT and those of traditional financial performance measures applied at the department or cost centre level
- JIT emphasises OVERALL efficiency
- Traditional financial performance measures emphasise LOCAL (departmental) cost savings and LOCAL efficiency

Use of Nonfinancial Performance Measures

- To avoid the problems associated with traditional financial performance measures, nonfinancial performance measures should be emphasised for first level control in a JIT environment
- Financial performance measures are reserved for overall evaluation rather than for detailed or daily evaluation
- JIT performance measures emphasise
  - Inventory Turnover
  - Cycle Time
  - Cycle Efficiency
Use of Nonfinancial Performance Measures

\[
\text{INVENTORY TURNOVER} = \frac{\text{Annual demand in units}}{\text{Average inventory in units}}
\]

Use of Nonfinancial Performance Measures

\[
\text{Cycle time} = \text{Setup time} + \text{Process time} + \text{Move time} + \text{Wait time} + \text{Inspection time}
\]

Use of Nonfinancial Performance Measures

\[
\text{CYCLE EFFICIENCY} = \frac{\text{Process Time}}{\text{Cycle Time}}
\]
Co-ordinate the flow of information to eliminate non-value activities
Provide reports to appropriate levels of management

Management Still Needs Accurate Cost Data
- Although JIT Inventory Management reduces the importance of product costing for external reporting, it does not reduce management's need for accurate product cost information for internal purposes.

Just-In-Time (JIT) Inventory Management
- What is important is not the tools. It is the concepts behind them. They convert what were always seen as discrete techniques to be used in isolation and for separate purposes into one integrated information system. That system then makes possible business diagnosis, business strategy, and business decisions.
Supply chain management involves managing costs and creating closer relationships with suppliers and customers to increase efficiency and profitability.

Supplier management involves selecting the best suppliers, analysing supplier profitability and measuring and managing supplier performance.

Conventional inventory management, such as EOQ, focuses on optimising orders to minimise costs, whereas JIT involves working with suppliers to minimise inventory holdings and increase the efficiency of production and ordering processes.