Assignment Presentation
Supply Chain Management

Group 7

A supply chain is the network of all the individuals, organizations, resources, activities and technology involved in the creation and sale of a product, from the delivery of source materials from the supplier to the manufacturer, through to its eventual delivery to the end user.

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Supply chain management (SCM) is the oversight of materials, information, and finances as they move in a process from supplier to manufacturer to wholesaler to retailer to consumer.

Definition

Design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and measuring performance globally.

SCM - An Integrated Approach

- Industrial engineering

- Systems engineering

- Operations management

- Logistics, procurement

- Information technology

- Marketing

Key SC processes

- Customer relationship management

- Customer service management

- Demand management style

- Order fulfillment

- Manufacturing flow management

- Supplier relationship management

- Product development and commercialization

- Returns management

- Customer service management process

- Procurement process

- Product development and commercialization

- Manufacturing flow management process

- Physical distribution

- Outsourcing/partnerships

- Performance measurement

- Warehousing management

- Workflow management

Theories

Available to promise

- It generates available quantities of the requested product, and delivery due dates.
- ATP supports order promising and fulfillment, aiming to manage demand and match it to production plans.
- Push-based ATP is based on forecasts regarding future demand.
- Pull-based models, on the other hand, dynamically allocate resources in response to actual customer orders.

Quick Response Manufacturing

- A lead time is the latency between the initiation and execution of a process.

- QRM emphasizes the beneficial effect of reducing internal and external lead times.

- Manufacturing Critical-path time (MCT)

- Shorter lead times improve quality, reduce cost and eliminate non-value-added waste within the organization while simultaneously increasing the organization's competitiveness and market share by serving customers better and faster.
- Many opposers of QRM criticize its approach being very "marketing-style" rather than academic or statistical.

Just-in-time manufacturing

1. Japan's lack of cash made it difficult for industry to finance the big-batch, large inventory production methods common elsewhere.
2. Japan lacked space to build big factories loaded with inventory.
3. The Japanese islands were (and are) lacking in natural resources with which to build products.
4. Japan had high unemployment, which meant that labor efficiency methods were not an obvious pathway to industrial success.

- Reducing flow times within production system as well as response times from suppliers and to customers.

- Toyota production system (TPS)

- Short-cycle manufacturing (SCM)

- Continuous-flow manufacturing (CFM)

- Demand-flow manufacturing (DFM)

Inventory Management

- As an element of supply chain management, inventory management includes aspects such as controlling and overseeing ordering inventory, storage of inventory, and controlling the amount of product for sale.

Inventory control problem

- The inventory control problem is the problem faced by a firm that must decide how much to order in each time period to meet demand for its products.
- The problem can be modeled using mathematical techniques of dynamic programming, network optimisation, etc.

Issues

- Infrequent large orders vs. Frequent small orders.

- Changes in demand (predictable or random) for the product.

- If the items are not on the shelves, they cannot be sold.

Costs

- Holding cost

- Shortage cost

- Order cost

- Revenue

- Salvage value

Periodic Review System

- Inventory levels start at some restocking level.

- At regular time intervals, the inventory level is reviewed.

- Some amount is added to bring the inventory level back up to the initial level.

- Review period

- Average Demand

- Customer service level

- Safety stock

- Machine size

Economic Order Quantity(EOQ)

Mathematical Model

- It is a description of a system using mathematical concepts and language.

- The process of developing a mathematical model is termed mathematical modeling.

Inventory Model

- Inventory model is a mathematical model that helps business in determining the optimum level of inventories that should be maintained in a production process, managing frequency of ordering, etc.

- Types:

    Fixed Reorder Quantity System

    Fixed Reorder Period System

Fixed Reorder Quantity System

- Fixed Reorder Quantity System is an Inventory Model, where an alarm is raised immediately when the inventory level drops below a fixed quantity and new orders are raised to replenish the inventory to an optimum level based on the demand.

- The point at which the inventory is ordered for replenishment is termed as Reorder Point. The inventory quantity at Reorder Point is termed as Reorder Level and the quantity of new inventory ordered is referred as Order Quantity.

Fixed Reorder Period System

- Fixed Reorder Period System is an Inventory Model of managing inventories, where an alarm is raised after every fixed period of time and orders are raised to replenish the inventory to an optimum level based on the demand.

- In this case replenishment of inventory is a continuous process done after every fixed interval of time.

What is EOQ?

- The Economic Order Quantity (EOQ) is the number of units that a company should add to inventory with each order to minimize the total costs of inventory.

- The EOQ is used as part of a continuous review inventory system in which the level of inventory is monitored at all times and a fixed quantity is ordered each time the inventory level reaches a specific reorder point.

- The EOQ provides a model for calculating the appropriate reorder point and the optimal reorder quantity to ensure the instantaneous replenishment of inventory with no shortages.

Assumptions

- Constant Demand.

- Depletion of resources is in a fixed ratio.

- Instantaneous refilling of resources when they are depleted.

EOQ

$$TC = P*D + H*Q/2 + S*D/Q$$

- TC is the total annual inventory cost—to be calculated.
- P is the price per unit paid
- D is the total number of units purchased in a year
- H is the holding cost per unit per year
- Q is the quantity ordered each time an order is placed
- S is the fixed cost of each order

- EOQ=√(2*D*S/H)

Example

Let

P=$5 per unit

D=3500 units

H=$3 per unit

Q=350 gallons per order

S=$15 per order

TC=?

$$TC = PD + HQ/2 + SD/Q$$

Advantages and Disadvantages

- Specific to Business

- Minimizes storage and Holding cost

- Complicated Math calculations

- Based on Assumptions

References

- "Introduction to Operations Research" by Frederick Hillier and Gerald Lieberman
- www.wikipedia.org