

Inventory management includes planning, coordinating, and controlling activities related to the flow of inventory into, through, and out of an organization.

Cost associated with goods for sale: Purchasing costs, ordering costs (costs of preparing and issuing orders, receiving and inspecting the items), carrying costs (opportunity costs of investment, costs of storage such as rental and insurance), stockout costs (opportunity costs of loss of sale/costs of expediting orders associated with transportation fees), costs of quality (prevention costs, appraisal cost, internal failure costs and external failure costs), and shrinkage costs (result from theft by outsiders, embezzlement by employees, misclassifications, and clerical errors.; shrinkage is measured by the difference between (a) the cost of inventory recorded on the books (after correcting errors) and (b) the cost of inventory when physically counted).

**Economic Order Quantity (EOQ) model:** assume there are only carrying and ordering costs, and purchasing costs aren't affected by order quantity. The sum of its cost is relevant total costs = relevant ordering costs + relevant carrying costs.

Number of orders per period = Demand in units per period / size of each order =  $D / Q$

Average inventory =  $Q / 2$

Annual relevant ordering costs =  $D / Q * P$

Annual relevant carrying costs =  $Q / 2 * C$  (注意C是per unit! )

So, annual relevant total costs =  $DP / Q + QC / 2$

Relevant total costs are minimized when relevant ordering costs = relevant carrying costs  $EOQ = \sqrt{\frac{2DP}{C}}$

When to order: inventory left = number of units sold per period \* purchase-order lead time (

Safety stock: inventory held at all times regardless of the quantity of inventory ordered using the EOQ model. The optimal safety-stock level is the quantity of safety stock that minimizes the sum of annual relevant stockout and carrying costs. Ordering costs are irrelevant for the safety-stock decision

Inventory carrying costs: consist of the relevant incremental costs plus the relevant opportunity cost of capital.

Relevant incremental costs: **costs change with the quantity of inventory** such as costs of obsolescence, costs of shrinkage, costs of breakage, and costs of insurance.

Cost of prediction error: when the prediction of ordering costs is wrong, calculate the difference between the total relevant costs. 把正确的和错误的ordering costs带入算出来两个total relevant costs, 相减即可。

Conflicts between EOQ Decision Model and Managers' Performance Evaluation: managers evaluated on financial accounting numbers, which is often the case, will ignore opportunity costs. Why? Because financial accounting only records actual transactions, not the costs of opportunities forgone. As a result of ignoring some of the carrying costs (the opportunity costs), managers will be inclined to purchase larger lot sizes of materials than the lot sizes calculated according to the EOQ model, particularly if larger lot sizes result in lower purchase prices. However, if the lot sizes become much greater, the cost to the company can be quite large. Moreover, if we consider other costs, such as costs of quality and shrinkage of holding large inventories, the cost to the company of purchasing in large lot sizes is even greater.

Just-In-Time Purchasing: is the purchase of materials (or goods) so that they are delivered just as needed for production (or sales). JIT purchasing is not guided solely by the EOQ model because that model only emphasizes the tradeoff between relevant carrying and ordering costs. Inventory management, however, also includes accounting for a company's purchasing costs, stockout costs, costs of quality, and shrinkage costs (即: JIT 也关注另外四个costs). Companies that implement JIT purchasing choose their suppliers carefully and develop long-term supplier relationships.

有的东西销量随机变化, 导致零售商的需求量随机变化--导致生产商的原料需求量随机变化--导致原料商的供货量随机变化—应对方案: share information & planning and coordinating activities through the supply chain.

**Materials Requirements Planning (MRP) system** is a “push-through” system that manufactures finished goods for inventory on the basis of demand forecasts. Maintaining accurate inventory records and costs is critical in an MRP system.

**Just-in-time (JIT) production**, which is also called lean production, is a “demand-pull” manufacturing system that manufactures each component in a production line as soon as, and only when, needed by the next step in the production line. The demand-pull feature of JIT production systems results in close coordination among workstations and smooths the flow of goods, despite low quantities of inventory. JIT production systems help companies meet the demand for high-quality products on time and at the lowest possible cost.

**Features of JIT:** 1. Production is organized in manufacturing cells, which are work areas with different types of equipment grouped together to make related products. 2. Workers are hired and trained to be multiskilled and