

2.5: Relevant Costs

Types of Costs

The costs are usually defined separately for each item or Stock Keeping Unit (SKU). As a result, the optimal order quantities and the time of order are determined for each item specifically. The relevant costs that we have in any inventory management are as follows:

Total Purchasing or Acquisition Cost

Total purchasing or acquisition costs refer to the total expenditure incurred by an organization in procuring an item over a specific period, such as a year, quarter, or month. The time unit used for measurement depends on the organization's operational requirements.

In certain inventory models, this cost component may remain constant. This scenario arises when the total demand for the item remains unchanged throughout the period, and the supplier does not offer any quantity discounts. In such cases, the total acquisition cost or purchasing cost is fixed, as it does not vary based on the order quantities placed.

Consequently, in these scenarios, the total acquisition cost is often excluded from the mathematical models used to determine optimal order quantities. Since this cost component is fixed and does not change based on the order size, it does not influence the optimization calculations.

However, it is important to note that if the total demand or supplier pricing varies or quantity discounts are available, the total acquisition cost may become a variable component that must be incorporated into the optimization models.

By carefully analyzing the demand patterns, supplier pricing strategies, and the availability of quantity discounts, organizations can determine whether the total purchasing or acquisition cost should be treated as a fixed or variable component in their inventory management models. This approach ensures accurate cost considerations and facilitates the determination of optimal order quantities, ultimately contributing to operational efficiency and cost minimization.

Inventory Holding Costs

Inventory holding costs aim to capture all the actual and opportunity costs incurred by an organization due to maintaining inventory. The main components of holding costs include:

Financing Costs

Inventory represents a significant portion of a firm's assets and working capital. This holding cost component is often estimated as the cost of borrowing or the opportunity cost of deploying funds for alternative uses. The most accurate estimate is the weighted average cost of capital used in capital budgeting decisions. This cost component is directly proportional to the value of the firm's inventory.

Storage and Handling Costs

These costs are incurred due to the physical storage of inventory and are typically a function of the item's size rather than its value. Storage costs may include expenses related to the physical space required for inventory storage. However, these costs are irrelevant when calculating pipeline inventory (inventory in transit).

Inventory Risk Costs

This component accounts for the costs associated with deterioration, obsolescence, shrinkage, theft, or damage to inventory. The level of risk and associated costs depend on the nature of the item. For instance, fashion goods, perishable products, and high-technology items will likely have higher inventory risk costs due to their shorter shelf life or rapid obsolescence.

Insurances

Since we always need to have insurance for our warehouses, the insurance cost can be calculated as a percentage for each item. This cost will, in turn, be used as another part of the holding cost percentage.

By carefully considering and quantifying these components, organizations can accurately estimate their inventory holding costs and make informed decisions regarding inventory levels, storage strategies, and risk mitigation measures. Managing inventory holding costs effectively can contribute to overall operational efficiency and profitability.

Insight

“If the price or the value of the item is higher, the holding cost will be higher. That is one of the main reasons why companies tend to keep as few units as possible for those items when dealing with more expensive items. Sometimes, they keep only one unit just for showing at their store, and they get the customers’ orders to deliver the item to them later or to bring it to the store for customers’ pick up later. They could not afford to keep several of those very expensive items in the store because otherwise, the cost of holding them would be very high.”

Calculating Inventory Holding Costs

In operations management, inventory holding costs are typically calculated as a percentage of the item’s value. This approach allows organizations to estimate the cost of holding a particular item in stock for a specific period.

Example Scenario

Consider an item valued at \$1,000, and the organization’s inventory holding cost is 20% per annum.

Annual Holding Cost per Unit

If the organization holds one unit of this item for an entire year, the annual holding cost would be:

Annual Holding Cost per Unit = Item Value × Inventory Holding Cost Percentage

Annual Holding Cost per Unit = \$1,000 × 0.2 = \$200

Holding Cost for a Partial Year

If the same item is held in inventory for only a quarter of the year (3 months), the holding cost per unit would be:

Quarterly Holding Cost per Unit = $(\frac{1}{4}) \times$ Annual Holding Cost per Unit.

Quarterly Holding Cost per Unit = $(\frac{1}{4}) \times$ \$200 = \$50

Total Annual Holding Cost for Multiple Units

If the organization holds 10 units of this item for an entire year, the total annual inventory holding cost would be:

Total Annual Holding Cost = Number of Units × Annual Holding Cost per Unit

Total Annual Holding Cost = 10 × \$200 = \$2,000

Organizations can accurately estimate the expenses associated with maintaining inventory levels by calculating inventory holding costs as a percentage of the item’s value. This approach allows for effective inventory management, cost optimization, and informed decision-making regarding order quantities and inventory levels.

Ordering Costs

Ordering costs refer to the expenses incurred by an organization when placing an order for inventory replenishment. These costs comprise several components:

Administrative Costs

Placing an order involves administrative tasks such as preparing purchase orders, obtaining necessary approvals, and completing other formalities. The administrative cost component includes all fixed costs associated with these activities, regardless of the order size. Electronic ordering systems can help reduce the time and effort required, thereby minimizing this cost component.

Transportation Costs

A fixed transportation cost is often incurred when transporting ordered goods, regardless of the order size. This cost component accounts for the logistics expenses associated with the delivery of inventory.

Receiving Costs

Upon receiving an order, administrative work is required, such as preparing goods receipt notes, updating inventory records, and verifying the order against the respective purchase order. The receiving cost component accounts for the expenses associated with these receiving activities.

It is important to note that all fixed costs, which do not vary with the order quantity, should be included in the ordering costs. Conversely, costs that vary with the order size should be included in the cost of the item itself.

In a purchasing environment, a significant portion of the ordering cost is information-intensive. Implementing electronic ordering systems can substantially reduce these costs. In a production environment, the ordering cost is referred to as the setup cost, which is the fixed cost associated with preparing machinery or equipment for production, also called Economic Production Quantity (EPQ). Unlike purchasing environments, setup costs are less information-intensive and are primarily influenced by the time lost during the setup activity. Consequently, in production environments, the focus is reducing setup time to minimize these costs.

By carefully considering and quantifying these components, organizations can accurately estimate their ordering costs and make informed decisions regarding order quantities, inventory levels, and potential cost-saving measures, such as implementing electronic ordering systems or optimizing setup processes.

Stock-Out Costs

Stock-out costs refer to the economic consequences an organization faces when it runs out of stock for a particular item. There are two possible scenarios in this situation: either the customer is willing to wait for the item to be restocked (backorder), or the customer's order cannot be fulfilled from the current inventory (lost sale). Stock-out costs can be categorized into two types (Singla, 2018):

Lost Sales Costs

When a company cannot fulfill a customer's order due to a lack of finished goods inventory, it results in a lost sale. The associated cost is the opportunity cost of the potential profit from that transaction. Additionally, lost sales can negatively impact the company's goodwill and future sales prospects.

Backorder Costs

Backorder costs are incurred when a customer is willing to wait for their order to be fulfilled after the item is restocked. In such cases, the organization incurs additional administrative costs and potential additional transportation and handling costs if the material needs to be rushed through to meet the backorder. While some of these costs are tangible, backorder costs also include intangible costs related to the firm's goodwill and potential impact on future sales.

It is important to note that stock-out costs are often intangible and difficult to measure precisely. However, organizations must consider these costs when making inventory management decisions, as they can significantly impact customer satisfaction, profitability, and long-term business performance.

By implementing effective inventory management strategies and maintaining appropriate stock levels, organizations can minimize the occurrence of stock-outs and the associated costs, thereby enhancing customer satisfaction, operational efficiency, and overall profitability.

Source

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