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Inventory Management in Wholesale/Retail

Introduction

You are in trouble if you have to keep telling customers, "I'm sorry we're out of that size. May we order it for you?" Even though the shirts are selling briskly, you will lose customers if you don't have an item in stock. When the customer spends, you have got to be ready with the goods. This is what inventory management is all about.

In many retail and wholesale operations, the single largest asset is inventory. Control of this investment is vital. It will eliminate a number of the problems associated with capital shortages and will also provide capital to permit expansion of operations for increased sales and profit.

1. Need for Prompt Action

Inventory problems often require prompt corrective action. In many businesses, the market life of inventory is short and if inventory is insufficient when market demand peaks, sales and profits are lost. If inventory is excessive when demand declines, the excess must be cleared, often at sharply reduced prices, again affecting profits.

These special problems are particularly acute in certain businesses. The market life for the latest hit record may be just a few months. For seasonal greeting cards, the market life is a few weeks, and for fresh fruit, produce and baked goods, the market life is measured in days!

2. Controlling Inventory Levels

You can control the inventory levels in your business to provide a suitable assortment and supply to meet market requirements while minimizing the risk of excessive investments.

This can be accomplished by:

- Investing in inventory wisely so that excessive capital is not tied up, excessive space is not required, and the investment does not force unnecessary borrowing and interest expense.
- Maintaining accurate, up-to-date records to help identify and prevent shortages and to serve as a database for decisions.
- Making prompt action to correct inventory imbalances.

3. Inventory Management

Inventory management can be briefly described as:

- Acquiring an adequate supply and assortment of merchandise from which customers can buy.
- Providing safety stocks to meet unexpected demand or delays in inventory replenishment.
- Maintaining clear, correct, and current records.
- Purchasing the proper assortment of goods in quantities that will maintain inventory levels consistent with business requirements, while providing adequate safety stocks.
- Reducing excessive inventories promptly, so that the dollars realized from clearing overstocks can be invested in merchandise with a greater market potential.

4. Inventory Investment Control

Inventory investment control is accomplished in two ways:

- Prompt elimination of overstocked items.
- Inventory replenishment in anticipation of customer demand.

Whenever a particular item is overstocked, the overstock should be reduced as promptly as possible. Naturally, the most effective and profitable way is to sell it to customers, even at a discount. However, there are other possibilities. There may be a wholesale market available for certain kinds of inventory. Excessive consumer goods inventories are often sold to "bargain basements" or warehouse outlets. Perhaps you can even arrange wholesale sales to a competitor. Frequently, it is wiser to scrap inventory that shows no sales activity for an extended period of time. In this way, you reduce a misleading overstatement of inventory on your company's books. At the same time, you make space available for inventory that can be sold at a profit.

5. Inventory Replenishment

The key to successful inventory management is adherence to procedures for inventory replenishment. Your ability to anticipate customer demand for certain items will help you plan your inventory purchases so that sufficient stocks are on hand to accommodate sales volume without excesses that cause other problems.

Planning your purchases will also help you avoid shortages that can only be filled through forfeiture of discounts or absorption of premium shipping charges.

Determining purchasing requirements involves answering two questions:

1. What to buy?
2. How much to buy?

Both questions can be answered by establishing an inventory target for any item you carry expressed as so many days', weeks', or months' sales. For example, if a grocery store planned to carry a two days' supply of muffins, and average daily sales were 15 boxes of muffins, then a desirable inventory level could be calculated as follows:

Inventory Level = Days' Supply x Average Daily Sales Inventory Level = 2 x 15 = **30**

If the supply on hand is less than 30 boxes, then more muffins must be purchased. If the actual stock were 17 boxes, then the grocer would have to purchase 13 (30 - 17) boxes.

The example of the grocer is relatively simple. Purchases are made directly from the truck. Sales in the last few days are a reasonable indicator of sales in the next two days. There is no waiting period for deliveries and supply is reliable. In many businesses, the problem becomes far more complex.

In any business, an appropriate inventory level should be calculated by considering expected sales in the coming period. For products that show a steady sales pattern regardless of season or current fads, this can be based upon average monthly sales.

6. Sales Forecasting

The first step in estimating expected sales in coming months is to calculate, from inventory records, actual sales during an appropriate review period. For example, if you want to determine an appropriate inventory level for ski boots on October 1, it will be of little value to consider sales in July, August, or September. Average monthly sales for the entire year will tell you little or nothing either. A more suitable review period would be the months of October, November, and December of the previous year. In addition, if your sales showed a year-to-year growth rate, you should adjust review period sales for the average sales growth that your business has experienced in the previous year.

Example

A sporting goods store desires to maintain a three months' supply of ski boots in inventory. On October 1, the store is determining a suitable inventory level so that an order can be prepared to build inventory to the three-month level. Sales of ski boots have increased 20% from year to year.

Month	Previous Year Sales	20% Increase	Expected Sales
October	5	5 x 1.2 = 1	6
November	10	10 x 1.2 = 2	12
December	20	20 x 1.2 = 4	24
Total	**35**	**7**	**42**

Expected sales for the three-month period would then be 42 (6 + 12 + 24). Therefore, the store should try to have this quantity in inventory on October 1.

Another factor that should be considered in demand forecasting is whether or not stock outs that prevented a customer request from being fulfilled affected sales during the review period. Forecasting requires measurement of customer demand for a particular item, the number of pieces that customers wished to purchase, not just those orders that you were able to sell. If information is available, such requests should be added to actual sales for the review period in order to reach a more realistic estimate of demand for the coming months.

In some businesses, accurate records are maintained of all unfulfilled customer requests. This permits management to establish more accurate demand figures in determining inventory replenishment requirements and making decisions to add new items to inventory.

7. Establishing Inventory Guidelines

In our earlier example of a ski boot inventory, it was assumed that the shop desired to maintain a three months' supply. But how is such a figure derived? Why not one month, or two months, or even six months?

In some cases, product shelf life may be the determining factor. If the grocer stocked more than a two days' supply of muffins, they would lose their freshness, and the grocer would lose customers. Delivery is immediate. The grocer gives the order directly to the bakery truck driver and the driver fills the order in minutes.

More often, there are many other factors to consider. Take the case of the retailer who may require two weeks to receive delivery from suppliers on most items. On an emergency basis, the retailer may be able to replenish inventory more promptly, but only by forfeiting quantity discounts or incurring extra delivery charges. For most items, it is better to accept normal delivery, taking full advantage of all available discounts and minimizing freight charges.

The length of time between order placement and receipt of goods is called lead-time. If the lead- time were two weeks, would it be sufficient to establish a minimum inventory level of a two weeks' supply? Probably not. If no order was placed until the supply of a certain item reached two weeks, there would probably be just enough stock on hand to cover expected sales until the order arrived. However, if

anything went wrong (and it usually does), there would be a stockout before the order was received. An unexpectedly large request from a customer might not be filled because of insufficient inventory. A strike, shipping delays, manufacturing problems, or unforeseen weather conditions could seriously delay the arrival of the merchandise so that the stockout could last for several weeks. Therefore, most businesses maintain a safety, or cushion stock as protection against such occurrences.

The size of the safety stock will depend upon the number and extent of the factors that could interrupt deliveries. Suitable guidelines would have to be based upon your own experience in the industry.

Additionally, many items require a basic stock, an amount sufficient to accommodate regular sales, offering customers a reasonable assortment of merchandise from which their selection can be made.

Assume that the lead-time for a particular item is two weeks. The safety stock that the business wishes to maintain is a four weeks' supply. Additionally, a one-week basic stock is required. The desired inventory level would be established as the sum of these factors:

Lead-Time 2 weeks + Safety Stock 4 weeks + Basic Stock 1 week = **Inventory Level 7 weeks**

8. What to Buy?

The desired inventory level should be considered an order point. Whenever the stock of an item falls below this point, it should be ordered.

For example, if a camera shop wishes to maintain a 10 weeks' supply of film in inventory and average sales of a particular film type are 50 rolls per week, the order point would be 500 (50 x 10) rolls. When inventory drops below 500 rolls, more film should be ordered.

9. How Much to Buy?

The quantity of film to purchase would depend upon the usual time between orders, called the ordering interval. In this way, sufficient supplies would be maintained so that inventories between orders would average out to the desired level.

A stock equal to expected sales during the camera shop's two-week order interval should be added to the order point in order to determine the order ceiling.

Order Ceiling = Order Point + Order Interval Sales Order Ceiling = 500 + (50 x 2) = **600**

An order quantity could then be determined as follows, assuming 450 rolls are on hand:

Order Quantity = Order Ceiling - Stock on Hand = 600 - 450 = **150 rolls**

If an order for 50 rolls had already been placed, but not yet received, the present order should be reduced by the 50 rolls on order. The new order would then be 100 (150 - 50) rolls.

10. Review

Let us review the steps involved in establishing order quantities using a hardware store as an example. The store desires to maintain a basic tool stock equal to one week's sales and a safety stock of one week's sales. Lead-time for order placement and delivery is two weeks. Orders are placed every four weeks.

A desirable inventory level, or order point, is then calculated as follows:

> **Order Point (Weeks)**= Lead Time + Basic Stock + Safety Stock = 2 + 1 + 1 = **4 weeks**
>
> *or 12 (4 x 3) saws*

Whenever the supply of any tool drops to a four weeks' supply or below, an order should be placed.

To determine the order quantity, you must first calculate the order ceiling:

> **Order Ceiling (Weeks)** = Order Point + Order Interval =4 + 4 = **8 weeks**
>
> *or 24 (8 x 3) saws*

Assume that an order is being prepared for saws. Average weekly sales are 3 saws and the stock on hand is 10 saws. This is below the order point of 12 (4 x 3) saws.

The order quantity would then be calculated as follows:

> **Order Quantity** = Order Ceiling – Stock on Hand = 24 – 10 = 14

The hardware store should order 14 saws. If any are already on order, the outstanding order quantity should be subtracted.

11. Other Ordering Considerations

No business can be run by formulas alone. But formulas can be useful in guiding decisions. Before straying from them, you should be sure to have good and sufficient reason.

One common reason for straying from the ordering formulas previously described is the availability of quantity discounts and price specials. Naturally, you want to take advantage of these potential savings whenever possible. However, if quantity discounts force you to order far more than you need, the discount you earn may later be lost when you are forced to close out the merchandise at distress prices.

12. Maintaining Control

Systematic review of inventory purchases is the most effective means of preventing overstocks and avoiding lost sales. The availability of accurate inventory and sales records, combined with your own judgment, can guide you to sound purchasing decisions.

Periodic Inventory Changes

Inventory levels are constantly changing. As goods are purchased or produced, inventories increase. As goods are sold, inventories are reduced. To determine the inventory at the end of any period, you begin with the inventory on hand at the beginning of the period. Then, the ending inventory can be calculated as follows:

Opening Inventory + Additions for the period - Deductions for the period = **Ending Inventory**

For example, a wholesaler of furniture has 100 mattresses in inventory on April 1. During the month, 50 mattresses are received and 2 are returned from customers. Total additions to inventory for the month would be:

50 Productions + 2 Returns = **52 Total Additions**

Sales of mattresses during the month are 40 and 1 must be scrapped because of warehouse handling damage. Total deductions from inventory would then be as follows:

40 Sales + 1 Scrapped = **41 Total Deductions**

The closing inventory on April 30 can then be calculated as follows:

Opening Inventory	April 1	100 units
Additions to Inventory	April 1-30	+ 52 units
Deductions from Inventory	April 1-30	- 41 units
Closing Inventory	**April 30**	**111 units**

Additions to inventory normally include the following:

- Purchases
- Returns from customers Deductions from inventory normally include:
- Sales
- Returns to vendors
- Scrappage
- Pilferage
- Inventory adjustments

Inventory Valuation

Inventory calculations, based upon units, are useful when determining the inventory of a particular item. More often, however, you will want to know the dollar value of inventory, particularly your total inventory. Total inventory can be evaluated in total dollars only since it usually includes a mix of various items such as apples and oranges, which cannot be added together.

Valuation at Cost

In most businesses, inventories are valued at cost. For example, an appliance retailer purchases hair dryers for $7.50 each and sells them for $13.50 each. The value assigned to each hair drier in inventory would be $7.50.

The exception to this rule occurs in some retailing activities, where many retailers find it more convenient to evaluate the inventory at the retail price since this permits easier calculation of such figures as markups, markdowns, and expenses as a percentage of sales. When calculating the value of inventory, consistency requires that all factors be evaluated on the same basis. If inventory is valued at cost, purchases must be entered at cost when determining deductions. If inventory is valued at retail, sales and receipts must also be measured at retail.

A school supplies distributor has a beginning inventory on June 1 of $200,000. During the month, sales are $50,000. The cost of these sales is $35,000. New supplies are received with a cost of $40,000. You would calculate the June 30 inventory as follows:

Beginning Inventory	$200,000 (at cost)
Add Production	40,000 (at cost)
Deduct Sales	35,000 (at cost)
Ending Inventory	**$205,000 (at cost)**

Note that sales are recorded at cost, not actual selling prices, to be consistent with the wholesaler's inventory valuation basis.

Recording Inventory

Purpose

To manage your inventory successfully, you should maintain accurate and up-to-date records of sales and stock on hand for every item that you sell. Inventory records tell you what you have. Sales records tell you what you need. Inventory records are used for making the following decisions:

- Purchases for inventory replenishment.
- Scrapping or clearing of obsolete items that are no longer in demand.
- Addition of new items to inventory.

System

The best type of system for your business depends largely upon the number of different items you carry in inventory. A retail bicycle shop might carry 40 or 50 items in inventory, a bookstore might have a few hundred titles, and a plumbing supply house might carry several thousand different items in inventory.

Manual Inventory Control Systems

As a minimum, any business should have a manual inventory control system. Manual systems generally are based upon an inventory control card similar to that shown below.

Inventory Control Card – 3648 Toaster			
Date	**On Hand**	**In**	**Out**
8/01	27	1	
8/02	26	1	
8/04	38		12
8/06	36	2	
8/08	35		1
8/10	32		3

A separate record is maintained for each item in inventory. The stock status is shown for the end of each day. All changes in inventory are shown as in or out. In the "In" column, you would list all orders received from suppliers, returns from customers, etc. In the "Out" column, you would identify all sales, returns to suppliers, etc.

Another useful inventory record is a sales summary such as that shown below. This information is needed for determining the adequacy of inventories and for order preparation. The sales summary can be compared periodically with stock on hand so the items that are not showing sufficient sales activity can be cleared through price reductions, scrapped, or otherwise disposed of. In this way, space and dollars invested in inventory are available for more active and potentially more profitable items.

Sales Summary – 3648 Toaster			
Month	**Sold**	**Ordered**	**Received**
Jan	12	10	9
Feb	14	15	
Mar	7		15
Apr	15	15	15
May	8	15	15
Jun	9	12	12
Jul	10	10	8
Aug			

Physical Inventory

A physical inventory should be taken periodically to be sure that the actual quantities on hand equal those shown on the inventory records. The inventory records must then be adjusted to reflect any difference between "physical inventory" and "book inventory," the quantities shown on the inventory records. The actual quantity of each item on hand must be counted and compared with that shown on the inventory record. Necessary adjustments should be made immediately.

Differences between book and physical inventory arise for many reasons. The most easily understood, of course, is pilferage. Any business naturally wants to maintain an inventory control system to detect this situation as early as possible.

Other reasons for inventory shortages are somewhat more subtle but equally damaging, if not worse. For example, if your receiving procedures are faulty, a receiving clerk may not be counting actual quantities received and comparing them with those on the vendor's packing list or invoice. If the quantity actually received is less than that invoiced to you, you are paying for the difference!

Merchandise may be sold to customers without being billed to them, through oversight or carelessness. In these cases, you will take a loss equal to your cost of the product and also lose the profit that you should have earned on the sale.

Clerks may be accepting customer returns of merchandise that are no longer saleable because of damage, stains, or packing defects. You may be ignoring opportunities to return merchandise to vendors when it arrives in an unfit condition for resale.

Any of these factors can result in inventory shortages. While most businesses take careful steps to guard against theft, relatively few adopt serious procedures for protection from inventory shortages caused by such factors as poor receiving procedures, poor billing procedures, and merchandise damage.

Comparisons of Inventory Ratios

Expressing inventory in terms of turnover rate or equivalent monthly sales permits comparison of your current inventory level with any of the following:

- Industry averages.
- Inventory levels in previous periods.
- Your inventory policies.

Comparison of inventory levels in absolute dollars with similar businesses or with previous periods provides little insight. For example, if your current inventory level is $25,000 and the industry average is $45,000, this does not tell you whether your inventory is too high or too low. However, if you found that your inventory was equivalent to 2 months' average sales and the industry average was 1.5 months' sales, you would know that your inventory is probably higher than needed to support your sales volume.

(Industry averages are available from local offices of your industry trade association or at your public library.)

Comparison of your current inventory supply or turnover rate with your performance in previous periods will also tell you whether or not your inventory control is improving or slipping. Many businesses establish policies for inventory levels based upon expected sales. This information is useful in controlling inventory investment and planning financial requirements.

Assume that a store had a policy of maintaining a 5 weeks' supply of inventory. If the actual inventory reached a 6 weeks' supply, then inventories must be cleared or purchasing temporarily slowed until inventory is reduced to the 5-week level. On the other hand, if inventory declined to a 4 weeks' supply, it would indicate that more merchandise should probably be ordered to avoid lost sales.

Individual Item Analysis

These same analysis techniques can be applied to inventories of individual items so that prompt corrective action can be taken. One common cause of apparently excessive inventories is that many inventory dollars are tied up in slow-moving items that may, in fact, no longer be marketable. Although the total inventory investment appears adequate or even excessive, sales are lost because capital is tied up in slow-moving items. This capital could be more profitably invested in faster moving inventory that would have a far higher sales and profit potential.

These individual problems can be detected by periodic measurement of the months' supply of individual items so that overstocks can be detected and action taken to eliminate the overstocks and free cash for more profitable investment elsewhere. For example, a store might have a total inventory equal to 3 average months' sales. Examination of individual inventory records reveals that many items have supplies equivalent to 12 months' sales or more. Prompt action should be taken to reduce these overstocks.

13. Problem Identification

Ratios of Sales to Inventory

Inventory quantities are often expressed in terms of an equivalent number of days', weeks', or months' sales. For example, a retailer of automotive parts might maintain a two-months' supply of fast-moving items. This means that it has a sufficient quantity on hand to fill expected sales in the coming two-month period. A produce broker, faced with problems of spoilage and high cost refrigerated storage space, would carry a much smaller inventory, perhaps just a few days' supply.

Determining your inventory levels in terms of an equivalent number of days', weeks', or months' supply permits you to do the following:

- Compare your own inventory levels with similar businesses to detect excesses that should be corrected.
- Evaluate the inventory of individual items so that prompt action can be taken to correct shortages or excesses.
- Establish replenishment policies so that inventories can be sustained at realistic levels, minimizing the possibility of lost sales or excessive investments.

Later, we will see how sales-inventory ratios can be used to accomplish the preceding objectives, but first we must consider how the ratios are calculated.

Supply Calculation

To calculate the supply of any item in inventory, you divide the inventory on hand by expected sales or usage in the coming period according to the following formula:

- **Months' Supply** = Inventory divided by Average Monthly Sales, or
- **Months' Supply** = Inventory divided by Average Monthly Usage

If you wished to evaluate your weeks' or days' supply, these expressions would be restated as follows:

- **Weeks' Supply** = Inventory divided by Average Weekly Sales (Usage)
- **Days' Supply** = Inventory divided by Average Daily Sales (Usage)

For example, a sporting goods retailer has 20 tennis racquets of one model on hand and expects to average 10 sales per month in the coming months. The months' supply of tennis racquets in inventory would be calculated as follows:

Inventory divided by Average Monthly Sales = 20/10 = **2.0 Months' Supply**

This same calculation can be made in dollars. If the inventory valuation of the tennis racquets, at cost, is $400 and average monthly sales (at cost) are $200, then the months' supply in dollars would be calculated as follows:

Inventory divided by Average Monthly Sales = $400/$200 = **2.0 Months' Supply**

Turnover

Another common measure of the effectiveness of inventory management is the annual inventory turnover rate. The annual turnover rate is calculated as follows:

Sales divided by Average Inventory = **Annual Turnover Rate**

As before, you must be consistent. If you wish to measure the turnover rate in units for a particular item, you must divide sales in units by average inventory in units.

If you wish to calculate turnover in dollars, both sales and inventory value must be expressed at cost. For example, if your average inventory valuation is $20,000 and your annual sales are $60,000 at cost, the turnover rate would be calculated as follows:

Sales divided by Average Inventory = $60,000/ $20,000 = **3.0 Annual Turnover Rate**

Your turnover rate tells you how many times your average inventory is sold during a year. The higher your turnover rate, the more sales volume you are producing from a given investment in inventory. For example, a turnover rate of 4 times per year would indicate twice as many sales from the same inventory investment as a turnover rate of 2.

14. Summary

Three Rights

The marketing success of many businesses depends upon their ability to provide the customer with the right merchandise in the right place at the right time. The right merchandise is the item that the customer desires; the right place is in your inventory, not a supplier's warehouse; the right time is immediately.

Failure to have the right merchandise in the right place at the right time can often lead to lost sales and, even worse, to lost customers. If they cannot purchase what they want today from your business, you will lose sales, and your competition will gain customers.

Capital Restriction

Maintenance of adequate inventories to meet all customer requirements would be easy if you had unlimited money available to acquire it. Unfortunately, this is rarely, if ever, the case. In most small businesses capital for inventories is limited and inventory levels must be held within these limits. Excessive inventory investments can tie up capital that may be sorely needed for other purposes.

Therefore, the basic problem confronting small business management is to maintain inventory investments at reasonable levels while providing sufficient inventory to meet market demands.

Adapt to Your Own Business

Many of the techniques described are general guidelines that must be adapted to the needs of your customers, your business, and your available capital. If you apply these techniques, liberally sprinkled with your own professional judgment, you will not only be able to detect problems as early as possible, but you will also be able to prevent many potential problems from ever occurring.