

# INVENTORY MANAGEMENT: ANALYZING INVENTORY TO MAXIMIZE PROFITABILITY

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Every company strives to improve profitability. Countless hours are spent in meetings devising ways to lower operating costs while increasing sales and gross margins. Unfortunately, management in many companies assumes that:

- € All material currently in stock is necessary to properly serve customers.
- € Costs can best be reduced by lowering wages, reducing benefits, and squeezing any possible amount from the operations budget.
- € Salespeople should focus on increasing sales dollars and gross margin profit dollars. Buyers should order whatever salespeople request to help them achieve these goals.
- € New warehouse technology is an expense that cannot be easily afforded.

In the quest to maximize return on investment many organizations fail to scrutinize their investment in inventory. This is unfortunate because improving the way you control and manage your inventory may have the greatest potential for improving your organization's bottom line.

## COMMON INVENTORY ISSUES

Distributors often simultaneously suffer from conflicting complaints concerning their inventory:

- € Lots of dead inventory in their warehouse.
- € Frequent stock outs and back orders of popular products.
- € Delays in filling and shipping orders to customers.

They have too much of the wrong products and not enough of the products necessary to provide a high level of customer service. Furthermore the company's warehouse(s) may not be designed and organized to minimize the cost of filling customer orders. How do these inventory challenges affect corporate profitability?

- € Dead stock does not provide a return on investment.
- € Money invested in excess inventory is not available for other opportunities to earn profits.
- € Stock outs result in lost profits since customers' requests for products cannot be filled.
- € Inefficient warehouse operations require excessive labor and equipment.

Few would disagree that addressing these issues is very important. This white paper discusses several ideas to help you improve the profitability and productivity of your investment in stock inventory.

## UNDERSTAND THAT DEAD STOCK IS ONLY WORTH ITS SALVAGE VALUE

When investors buy shares of stock in a company, they do not earn a profit on their investment. It is only when they sell the stock for more than they paid that a return on their outlay is realized. In the same way a distributor does not earn profits until purchased material is resold to a customer at a price that is higher than its cost.

Dead inventory is comprised of stocked inventory items that have had no sales within a reasonable amount of time (often 12 months). It is the equivalent of shares of stock in a bankrupt company. Many companies have invested tens of thousands, hundreds of thousands, or even millions of dollars in material that customers just don't want. The impact of dead stock on a company's return on investment can be devastating. Let's look at a common analysis metric, gross margin return on investment (GMROI). GMROI is calculated by dividing a distributor's annual gross profit dollars by its average investment in inventory:

$$\text{GMROI} = \frac{\text{Annual Gross Profit Dollars}}{\text{Average Inventory Investment}}$$

One of our customers earned \$2,340,610 in gross profit dollars over the past 12 months and had an average inventory investment of \$1,843,000. This resulted in a GMROI of 1.27 ( $\$2,340,610 \div \$1,843,000$ ). In other words the company earned \$1.27 each year from each dollar of its average inventory investment. But 12% of total inventory value (\$221,160) was invested in material that had not had any sales in the past 12 months. This was dead stock worth only its liquidation value. If this dead stock had never been purchased, the company's GMROI would be substantially higher:

$$\$2,340,610 \div (\$1,843,000 - \$221,160) = 1.44$$

This represents a return on investment increase of 13.4% [ $(1.44 - 1.27) \div 1.27$ ]. This dramatic improvement in profitability suggests that it is worthwhile for companies to focus on reducing deadstock. What is the value of your inventory

that has had no sales for 12 or more months? How much would your return on investment increase if this stuff was not in your warehouse?

It is common to deal with dead inventory after the fact, that is, to try to liquidate non-moving inventory for as high a salvage value as possible. But it is far more effective to prevent dead inventory from arriving in your warehouse. Some people are surprised to learn that a lot of dead inventory is dead on arrival. It is comprised of leftover quantities of the initial shipment of a new stock item. This phenomenon is commonly caused by several factors:

Leftover quantities of special order items.

If you have to order more of a non-stock product than your customer is willing to buy or pay for, you end up with leftover inventory that will significantly reduce your profitability on the non-stock sale or even cause you to lose money. Let's look at an example:

A customer wants 15 pieces of a non-stock product that cost you \$10 each and is sold at a 25% gross margin. The product must be ordered from the vendor in a case of 24 pieces. The material is delivered to the customer and as you glance at the invoice, it appears that you've made a nice profit:

Unit Cost	Unit Price	Qty	Item	Extension	GM\$
\$10.00	\$13.33	15	A100	\$199.95	\$49.95

But what will happen to the nine pieces of product A100 that were not sold to the customer? They are not normal stock items and will probably end up as dead stock and be liquidated sometime in the future. If we consider the cost of this future dead stock in the analysis of the transaction, our profit quickly turns into a loss:

Total Cost of Material	Price Extension	GM\$	GM%
\$240.00	\$199.95	..\$40.05	..20%

The situation is even worse if you are paying salespeople commission based on the gross margin. The salesperson makes a commission while the company actually loses money! To prevent this situation from happening, it is necessary to ensure that one of the following actions occurs whenever a non-stock product is placed on order with a vendor:

- € The customer buys the entire quantity of the product that must be ordered from the supplier.
- € The sale price to the customer is based on the total cost of the material that the company must buy.
- € The total cost of the non-stock product purchased is charged against the salesperson's commission.

Ignored customer-specific inventory.

Many distributors stock a product specifically for a single customer. Often distributors don't realize that a customer has stopped buying one of these items until physical inventory time when someone asks, "When was the last time ABC Company bought some of this stuff? We have a lot of it on the shelf."

It is expensive to maintain inventory for the exclusive use of one customer. The product must be purchased on a regular basis in amounts the customer agreed to buy. It is critical for distributors to review the stock status of all customer-specific inventory at least once a month to avoid the possibility of this material silently dying on the shelf.

Leftover quantities of obsolete products.

Introducing new products is exciting. Often the remaining inventory of items made obsolete by the new product is overlooked. When this old inventory is finally discovered, the only way to liquidate this stock is to sell it for scrap value. As part of your policy for introducing new products, be sure to insist on a plan for liquidating the remaining inventory of any obsolete stock. The longer obsolete inventory remains in your warehouse, the less likely it is that you will find a buyer that has a practical use for the material.

**DON'T OVEREMPHASIZE GROSS MARGIN**

•We have to buy a larger quantity to get the lower unit cost; we need the higher gross margin. Have you ever heard this statement in your organization? Many companies focus on maximizing their gross margins. Sales management probably knows their current gross margins and gross margin goals better than they know their spouses' birthdays. But is it proper to place this

much emphasis on gross margin? Is it a true measure of corporate profitability? Again, let's look at an example:

Market conditions require ABC Distributors to sell Product #A100 for \$25.00 each. The product can be purchased in three quantities:

Quantity	Cost per Unit	Gross Margin
50	\$20.00	20.0%
100	\$19.00	24.0%
250	\$18.50	26.0%

Demand for the part is 50 pieces per month. Salespeople pressure the buyer to purchase 250 pieces at a time. They want the 26.0% margin. But will buying 250 pieces at a time maximize the company's profitability?

To determine which purchase quantity results in the most profit to the company, we have to compare the discount received at each purchase level to the cost of carrying a larger quantity of the product for a longer period of time. Assume that ABC Distributors' annual cost of carrying inventory is 24%, or 2% per month (24% ÷ 12 months).\* This means that it costs 24 cents to maintain a dollar's worth of inventory in ABC Distributors' warehouse for an entire year. What is the cost for carrying each possible purchase quantity for the length of time it takes to sell the entire shipment?

First, determine how long it will take to sell the entire quantity and the average quantity you will have on hand during that time period:

Purchase Quantity	Months Supply	Average Qty on Hand	Net Cost per Unit	Average On-Hand Value
50	1	25	\$20.00	\$500.00
100	2	50	\$19.00	\$950.00
250	5	125	\$18.50	\$2,312.50

The average quantity on hand during the time it takes to sell the entire purchase quantity is half the purchase quantity. Why? Because in most cases half the time you'll have more than half the purchase quantity on the shelf, and half the time you'll have less than half the purchase quantity in stock. The cost of carrying each purchase quantity is calculated by multiplying the average on-hand value by the monthly carrying cost by the number of months any part of the shipment will remain in stock:

Purchase Quantity	Average Inventory Value	Carrying Cost per Month	Number of Months Supply	Cost of Maintaining Shipment
50	\$500.00	2%	1	\$10.00
100	\$950.00	2%	2	\$38.00
250	\$2,312.50	2%	5	\$231.25

By dividing the cost of maintaining each shipment by the purchase quantity, we can determine the cost of maintaining each piece in inventory. Adding this amount to the net unit cost, we can determine the total cost of buying each piece and maintaining it in inventory before it is sold:

Purchase Quantity	Cost of Maintaining Shipment	Cost of Maintaining Each Piece	Net Cost per Unit	Total Cost per Unit
50	\$10.00	\$0.20	\$20.00	\$20.20
100	\$38.00	\$0.38	\$19.00	\$19.38
250	\$231.25	\$0.93	\$18.50	\$19.43

Notice that due to the high cost of carrying the 250-piece shipment in stock during the time necessary to sell the entire shipment, the 100-piece, or middle, quantity results in the lowest total cost and therefore the highest profitability.

Many distributors are surprised to learn that inventory turnover is as important to overall corporate profitability as gross margins. Inventory turnover measures the number of times you sell your average inventory investment each year and is calculated with the equation:

$$\frac{\text{Cost of Goods Sold Over the Previous 12 Months}}{\text{Average Inventory Investment Over the Previous 12 Months}}$$

Another way to express inventory turnover is the number of opportunities you have to earn a profit for every dollar you have invested in inventory. For example, if the total cost of goods sold over the past 12 months is \$10,000 and the average inventory value is \$5,000, the annual inventory turnover is 2.0 (\$10,000 ÷ \$5,000). The average value of \$5,000 is sold twice in the past 12 months. If the total sales price of the material is \$13,000, the company earned an annual return of \$3,000 on an average investment of \$5,000. If the company bought small quantities more often and reduced the average inventory investment to \$2,500, it would have earned the same \$3,000 with half the

investment! The remaining \$3,000 could be invested in other products providing other opportunities to earn a profit!

Though a very popular measurement of sales profitability, gross margin is not affected by changes in inventory investment. This unfortunate characteristic can lead to misleading information for management. Capital and operating costs usually are reduced as a distributor's investment in inventory decreases. After all, not as much money is tied up in stock, there isn't as much inventory to keep track of, and less material is subject to shrinkage and obsolescence.

Adjusted margin is similar to gross margin in that annual profit dollars are divided by annual sales dollars. But to attain a more meaningful and comprehensive profitability measurement, the adjusted margin calculation subtracts the annual cost of carrying the average inventory investment from the gross profit dollars:

Adjusted Margin = [Annual Gross Margin Dollars ... (Annual Carrying Cost % x Average Inventory Investment)] ÷ Annual Sales Dollars

In the example above, if the company had an annual cost of carrying inventory of 24% and an average investment of \$10,000, the resulting adjusted margin would be 4.6%:

$$[\$3,000 \dots (0.24 \times \$10,000)] \div \$13,000 = 4.6\%$$

If the average inventory investment was reduced to \$5,000, the adjusted margin would triple to 13.8%:

$$[\$3,000 \dots (0.24 \times \$5,000)] \div \$13,000 = 13.8\%$$

Many distributors have discovered that adjusted margin is one of the best tools available to measure sales profitability while retaining control of their investment in stock inventory.

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## EFFICIENT WAREHOUSING IMPROVES PROFITABILITY

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Inventory is stored in a warehouse or other storage facility before it is used to fill customer orders. The efficiency with which this inventory is stored directly affects corporate profitability. Why? Because receiving material as well as processing and filling customer

orders are costs of doing business. While a single warehouse cost factor might not have a significant effect on corporate profitability, the total extra cost a firm incurs from having inefficient warehouse operations can have a significant effect on overall corporate profitability.

Products should be stored to minimize the cost of filling orders.

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If you pay a warehouse person \$15 an hour (including benefits) and he can fill, pack, and ship an average of 20 pick ticket line items per hour, it costs \$0.75 to pick each line item (\$15 per hour ÷ 20 line items). This is one of the expenses that must be subtracted from your gross profit dollars to determine net profit. If inventory can be stored more efficiently to minimize the cost of filling orders, the same worker might be able to pick 10 more line items per hour (80 more line items per day), reducing the cost of filling each line item to \$0.50 (\$15 per hour ÷ 30 line items). If a warehouse fills 300 orders per day with an average of four line items each, actual savings would be \$300 per day (1,200 lines @ \$0.25 per line), or \$75,000 annually (assuming 250 business days per year.)

How can inventory be stored more efficiently?

Assign the primary pick locations for the products that are requested most often (regardless of quantity) in the most accessible storage locations.

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Most warehouses are organized in a traditional fashion—similar items are stored together in a logical sequence. For example, a particular group of products might be arranged based on the manufacturer's part number or organized by size or color.

But similar products are not necessarily sold or used at the same rate. For most distributors a very small percentage of products account for a large majority of product requests. And many different product lines have some of these Super A items. If products are stored in a traditional fashion, a picker might have to walk the length of the warehouse, passing by many slow-moving items and even some dead stock in order to reach the storage location of a very popular product. And the actual bin where the fast-moving product is stored might be on a high shelf or rack location accessible only by utilizing a ladder or fork lift truck.

If fast-moving products are stored in the most accessible warehouse locations, pickers don't have to travel as far or reach as high to fill customer orders. The majority of picking activity can be confined to a small area of the warehouse. As a result more orders can be picked in the same amount of time.

[Utilize bar coding and other warehouse management technologies to reduce mistakes and improve profitability.](#)

is convinced that the primary key to increasing corporate profitability is to encourage salespeople to increase sales and gross margins. This action is important, but not the only path to success. In fact, effectively managing your inventory investment can contribute as much or even more to your organization's bottom line. You've got nothing to lose and a lot to gain by actively managing what is probably your largest asset. Why not take the first steps in initiating an effective inventory management program today?

How often does one of your customers receive an incorrect quantity of an ordered product or even the wrong item? Realize that every time a picking error occurs, it reduces your company's net profits:

- € The cost of filling the order at least doubles as you have to pick, pack, and ship a replacement order.
- € The on-hand quantity of the product picked incorrectly is not accurate. In other words your computer doesn't have an accurate indication of what is currently available for sale. This may result in promising material to customers that does not actually exist in your warehouse or believing that a product is out of stock when there is actually plenty on the shelf.
- € Your customer is probably not happy with your service and may take future business elsewhere.

Bar coding can confirm that the correct product is picked to fill a customer order as well as deliver other cost-saving benefits, including:

- € Automatic updating of on-hand quantities. This saves time and eliminates costly data entry errors.
- € Continuous updating of on-hand quantities. This provides your salespeople with up-to-the-second stock availability information. Customer inquiries can be answered quickly and with little effort.
- € Cycle counting incorporated into the normal order picking process. Your company can save the expense of conducting physical inventory and after-hours cycle counting sessions.

It is unfortunate that management in many companies

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