



Effective Inventory Analysis

By Jon Schreibfeder

>> Compliments of Microsoft Business Solutions



Contents

2	Effective Inventory Analysis
2	Customer Service Level
3	Number of Stockouts
3	Inventory Turnover
4	Turn Earn Index
4	Gross Margin Return on Investment (GMROI)

>> **Helping Distributors Maximize Business Potential Through Education and World-Class Technology**

From Microsoft Business Solutions

Our goal is to help distributors reach their maximum business potential by delivering connected solutions designed to meet unique business processes through trusted partnerships and ongoing service.

This report is the sixth in a series of white papers designed to help forward-thinking distributors increase efficiency, customer service and profitability with smart inventory management strategies based on tried and proven methods and best practices.

The author, Jon Schreibfeder, draws from decades of experience helping more than 1,000 distributors achieve better inventory management. A popular speaker at distribution conferences, Mr. Schreibfeder has literally “written the book” on this topic, with *Achieving Effective Inventory Management* now in its second edition.

As a leading provider of specialized distribution and business management systems, Microsoft Business Solutions is pleased to sponsor this series. We are committed to serving the success of companies in the distribution industry through education and world-class technology.



>> Effective Inventory Analysis

Inventory is the largest and probably the most important asset of many distributors. More money is probably tied up in inventory than in buildings or equipment. And inventory is usually less "liquid" than accounts receivable. That is, it is harder to turn inventory back into cash to pay employees and expenses. If distributors do not have this money invested in the right amount of the right products, they cannot provide the service to customers necessary to be successful. It is crucial that every distributor develops and uses a comprehensive set of tools that allows them to closely monitor the performance of their investment in inventory. In this document we will discuss several simple measurements that will help ensure that you are maximizing the profitability and productivity of your investment in inventory.

Customer Service Level

The customer service level measures how often you have the items you've committed to stock when your customers want them. It is the most important measurement because if you do not have what your customers want, when they want it, they will probably look for it elsewhere. The customer service level is calculated with the following formula:

$$\frac{\text{Number of line items for stocked products shipped complete by the promise date}}{\text{Total number of line items for stocked products ordered}}$$

Notice that we measure line items shipped complete. That is, when the entire quantity ordered is delivered by the date promised to the customer. If the customer orders ten pieces, and you ship ten pieces, you get credit towards the customer service level. But if a customer orders 25 pieces, and you only ship 24 pieces before the promise date, you get no credit. Why no "partial credit" for shipping 24 out of 25 pieces?

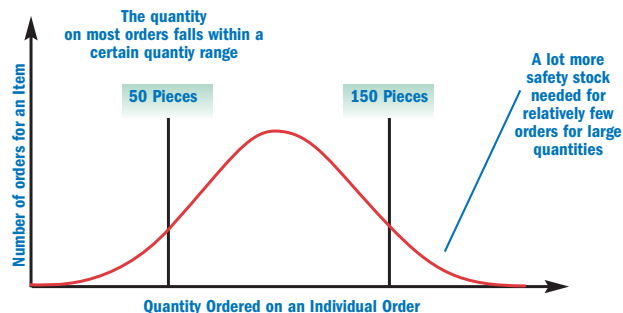
- > **If the customer wanted 24 pieces, he or she would have ordered 24 pieces. They want 25! The customer has to find that last one somewhere else. Probably at your competitor's warehouse down the street.**
- > **Even if your customer doesn't immediately need all 25 pieces and can wait for you to receive more in a replenishment shipment, your failure to have all 25 pieces in stock causes them to experience the cost of processing two stock receipts (and your warehouse to absorb the cost of filling two orders for the single transaction).**

When calculating your customer service level, we only include sales of stocked items that are filled using warehouse inventory. We don't include sales of other kinds of products such as:

- Special Order Items** > Items that you do stock, but are specially ordered to fill specific customer requirements.
- Direct or "drop" shipments** > Material sent directly from a vendor to your customer.

Shipments of these types of items do not reflect how well you stock material to meet your customers' immediate needs. Distributors who include special order items and direct shipments when calculating a customer service level tend to overstate how well they are serving their customers from warehouse inventory.

Sure, you would probably like to be able to fill 100% of customer requests for stock items out of your warehouse inventory. But this is often not practical. To understand why, let's look at a graph that compares the number of customer orders for a popular stock item against the quantity ordered on each order:



For example, the quantity ordered of a specific stocked item falls between 50 and 150 pieces. But you might have a few orders for more than 500 pieces. Do you want to always have enough inventory on hand to fill these few orders for an unusually large quantity? You probably can't afford to maintain enough stock to fill unusually large sales of every stock item. That's why most distributors are satisfied with a 95% customer service level. That is, 95% of the time they have the entire quantity requested of a stock item.

Number of Stockouts

Some distributors have trouble accurately measuring their customer service level. An alternative is to monitor both the number and length of stock outs, particularly of fast moving "A" ranked products. After all, if you do not have a product in stock, it cannot be immediately supplied to a customer. And "A" ranked products are those that are requested most often by customers.

The reason we track both the number of times a product is out of stock and the length of each stockout is that each measurement can identify a different problem. If the number of stockouts is high, you are continually receiving shipments of the product but the quantity is quickly used or sold. *Your buyers are not ordering enough of the product on each replenishment order!* On the other hand if you are out of an item for an extended length of time, the problem is probably associated with a longer than anticipated lead time from the supplier. *Your buyers need to work to improve the reliability of their source of supply.*

Inventory Turnover

Inventory turnover measures the number of times we sell or "turn" our average inventory investment. In other words it determines the number of "opportunities to earn a profit" you experience each year from your investment in stock inventory. Inventory turnover is calculated by dividing annual cost of goods sold from stock sales over the past 12 months by the average inventory value over the same 12 months:

$$\frac{\text{Cost of Goods Sold From Stock Sales Over the Past 12 Months}}{\text{Average Inventory Value Over the Past 12 Months}}$$

As with the customer service level, non-stock sales and direct shipments are excluded from the cost of goods sold figure in the numerator of the equation. These special sales are not filled from inventory and including them in the calculation would exaggerate turnover. We use the cost of good sold over the past 12 months to avoid distortions in turnover throughout the year. If we used "annualized" year to date figures (i.e., year to date figures projected for the entire year) and the first several months were the "slow" period of the year, we would underestimate inventory turnover. On the other hand if the first several months comprised the popular season, turnover would be overestimated during these months. Using the cost of goods sold over a "rolling" 12 months eliminates this effect of seasonality in our calculation. The average inventory value in the denominator of the turnover equation is the calculated by taking the average of the ending inventory value over each of the past 12 months.

The "cost basis" used to calculate the cost of goods sold and inventory value is usually average cost, but replacement or standard cost can be also be applied. By using the same 12 months history and cost basis in the numerator and denominator of the turnover equation, we obtain an accurate measurement that can be used to track improvement in inventory performance over time.

Customer service level and stockout analysis reveal how well you are meeting your customers expectations. That is how often you have what they need or want available for immediate delivery. Turnover is different. It is a gauge of profitability. Let's look at an example: Suppose you sold \$10,000 worth of a product in the past 12 months and the average value of the inventory of the product was \$1000. The result is 10 inventory turns ($\$10,000 \div \$1,000$), or 10 opportunities to earn a profit from the \$1,000 average inventory investment. But should you always strive to maximize your inventory turnover or opportunities to earn a profit? Not necessarily. You also have to consider your profitability of each of these opportunities. An analysis that combines turnover with profitability is the "turn-earn index".

Turn Earn Index

If a distributor enjoys high profit margins, he can be very successful with low inventory turnover. Many surplus wholesalers justify keeping items in their warehouses for years because they bought material at a very low cost and will eventually sell some of it at a premium price. On the other hand some distributors have very low profit margins. In order to survive they have to have a high rate of inventory turnover.

The turn-earn index combines gross margin and turnover. It is calculated by multiplying inventory turnover by gross margin percentage:

$$\text{Turn-Earn Index} = \text{Turnover} * \text{Gross Margin}$$

For example, if a distributor has an average gross margin of 25% and experiences six inventory turns he has a turn-earn index of 150:

$$6 \text{ Turns} * 25\% \text{ Gross Margin} = 150 \text{ Turn Earn Index}$$

A distributor with an average 10 % gross margin has to turn her inventory 15 times to achieve the same turn-earn index:

$$15 \text{ Turns} * 10\% \text{ Gross Margin} = 150 \text{ Turn Earn Index}$$

But if a distributor has a relatively high gross margin of 50%, he only needs three inventory turns to attain the same turn-earn index:

$$3 \text{ Turns} * 50\% \text{ Gross Margin} = 150 \text{ Turn Earn Index}$$

Most distributors try to have an overall turn-earn index of at least 120. That is turning inventory over three times with a 40% gross margin or four times with a 30% gross margin.

Gross Margin Return on Investment (GMROI)

A similar measurement to the turn-earn index is gross margin return on investment or GMROI. The GMROI represents the amount of gross profit earned for every dollar of the average inventory investment. It is calculated by dividing gross profit dollars by the average inventory investment:

$$\frac{\text{Gross Margin \$}}{\text{Average Inventory Investment \$}}$$

Note that though the turn-earn index and GMROI both measure profitability against inventory investment, they are two different metrics. Compare the turn-earn index and GMROI for an item with the following characteristics:

Annual Sales	= \$10,000	Turn-Earn Index =	Gross Margin	* Annual Turnover	
Annual Cost of Goods Sold	= \$ 7,500		(\$10,000 - \$7,500) ÷ \$10,000	* \$7,500 ÷ \$2,000	
Annual Gross Profit	= \$ 2,500		25%	* 3.75	= 93.75
Average Inventory Value	= \$ 2,000	GMROI =	Gross Profit \$	÷ Average Inventory Value	
			(\$10,000 - \$7,500)	\$2,000	= 125.00

The turn-earn index is not better than the GMROI (or visa versa). These measurements just use different scales, like Fahrenheit and centigrade temperatures. Be sure not to confuse one with another. GMROI will always be greater than an equivalent turn-earn index. Our minimum turn-earn index goal of 120 is equivalent to a GMROI of 160.

There are literally hundreds of measurements to evaluate inventory. A distributor can drown in the analysis reports produced by many computer systems. The customer service level/stockout analysis, inventory turnover, and turn-earn index/GMROI provide clear concise examinations of the current state of this large, critical investment. Each can be applied to a single item, specific product line, the entire stock of a warehouse or a distributor's entire inventory. They also can be used to measure the improvement in inventory performance over time. Without meaningful analysis, can you tell if you are making progress?

>> Leap Ahead with Microsoft Business Solutions for the Distribution Industry!

Microsoft Business Solutions offers an integrated set of specialized distribution and business management systems that are specifically designed to meet the needs of the distribution industry. You'll find deep functionality in our solutions such as inventory, order and purchasing management, sales forecasting, e-commerce and warehouse management. These distribution-focused modules integrate smoothly with dozens of business management systems to meet the diverse needs of your business, including accounting, customer relationship management (CRM), human resources/payroll, supply chain management, distribution and more.

It's all designed to help you improve profitability by streamlining and connecting every step of your operations – from inventory and sales order management through forecasting and financial reporting. And it comes packed with tools to help dramatically reduce costs, eliminate time-consuming processes and allow 24/7 access to information across your entire organization.

With Microsoft Business Solutions for the distribution industry, you can build a total enterprise solution that's simple and affordable. It will empower you to:

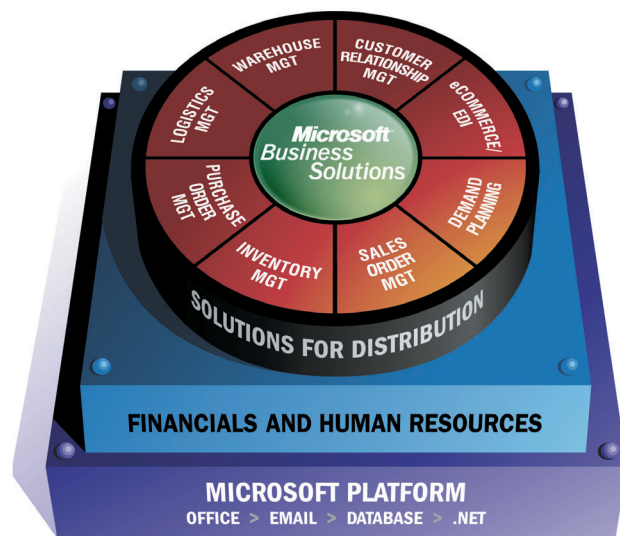
- > **Make smarter, faster business decisions**
- > **Improve employee and business productivity**
- > **Gain a competitive advantage**

>> It's a Safe Choice – It's Microsoft.

You can rely on Microsoft to provide the foundation and resources to support your company's important goals. With more than 200,000 customers worldwide, Microsoft Business Solutions is a proven performer in thousands of distribution-focused companies.

With Microsoft Business Solutions, you no longer have to be a large organization to enjoy the big-league advantages of powerful business-driving applications. From small, networked systems to large client/server solutions, Microsoft Business Solutions can be customized to your needs. We can do this by leveraging a range of proven, world-class distribution management systems.

Backed by the finest support services in the industry, these products are based on industry-standard Microsoft technology. They share a common code set and connect easily into the Microsoft development platform, so leveraging information across applications and the Internet is now simple and effective. And they're fully compatible with familiar Microsoft productivity tools such as Microsoft Office. Easy-to-use and fully customizable, Microsoft Business Solutions products deliver superior integration capabilities with other systems to help you achieve a truly interconnected experience.



Microsoft Business Solutions for the distribution industry connect easily with the Microsoft platform – a highly versatile environment that scales to meet nearly any business software protocol. From Windows®-based applications to specific industry programs, Microsoft integrates seamlessly with your existing and future enterprise systems, providing solid and reliable performance.

>> You don't have to wait to get a head start!

With the Microsoft Capital program, you may already qualify to have your complete distribution solution financed. There's a certified Microsoft Business Solutions partner near you – ready to customize your solution to meet your unique requirements.

Call toll-free for more information on how Microsoft Business Solutions can move your business to the head of the pack: 888-477-7989, option 1.



Microsoft *Business Solutions*

WINNING STRATEGIES FOR **THE DISTRIBUTION INDUSTRY**

Microsoft Business Solutions

One Lone Tree Road
Fargo, ND 58104-3911
E-Mail: mgpinfo@microsoft.com
Phone: (888) 477-7989
Fax: (701) 281-6868

© 2003 Microsoft Corporation. All rights reserved. Microsoft and Microsoft Business Solutions are either registered trademarks and/or trademarks of Microsoft Corporation in the United States and/or other countries. Microsoft Business Solutions ApS is a subsidiary of Microsoft. The names of actual companies and products mentioned herein may be the trademarks of their respective owners.

The information contained in this document represents the current view of Microsoft Corporation on the issues discussed as of the date of publication. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information presented after the date of publication.

This White Paper is for informational purposes only. MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS DOCUMENT.

Complying with all applicable copyright laws is the responsibility of the user. Without limiting the rights under copyright, no part of this document may be reproduced, stored in or introduced into a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), or for any purpose, without the express written permission of Microsoft Corporation.

Microsoft may have patents, patent applications, trademarks, copyrights, or other intellectual property rights covering subject matter in this document. Except as expressly provided in any written license agreement from Microsoft, the furnishing of this document does not give you any license to these patents, trademarks, copyrights, or other intellectual property.

Unless otherwise noted, the example companies, organizations, products, domain names, e-mail addresses, logos, people, places and events depicted herein are fictitious, and no association with any real company, organization, product, domain name, email address, logo, person, place or event is intended or should be inferred.

© 2003 Microsoft Corporation. All rights reserved.

Microsoft, Outlook and Windows are either registered trademarks and/or trademarks of Microsoft Corporation in the United States and/or other countries. Microsoft Business Solutions ApS is a subsidiary of Microsoft. The names of actual companies and products mentioned herein may be the trademarks of their respective owners.

LOWP-DISO-EA00000 (5/03)

Microsoft[®]