

The GMROI Hoax

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Executive Summary

- The metric GMROI is one of the foundations of inventory management for distribution firms in almost every line of trade.
- The underlying strength of GMROI is that it brings a return on investment perspective to inventory management. It also focuses on two levers to improve performance—increasing the gross margin percentage or increasing the inventory turnover ratio.
- GMROI is seriously biased in terms of measuring return on investment. It always overstates the performance of items with a low gross margin percentage and understates the performance of items with a high gross margin percentage.
- GMROI assumes that the two levers, gross margin and inventory turnover, are of equal strength. In fact, gross margin is demonstrably stronger.
- It is possible for an item to have an exceptional GMROI when it is actually unprofitable.
- Direct Product Profit (DPP) is a much more valuable tool than GMROI for comparing the financial results of individual items, merchandise categories, departments or merchandise suppliers.
- GMROI has the advantage of being easy to understand and easy to use. These advantages are not enough to offset the inadequacies of the metric.

The GMROI Hoax

Gross Margin Return on Inventory (GMROI) is one of the basic tools used by distributors to make decisions about gross margin and inventory performance. It is most frequently used to evaluate individual SKUS, but is also employed with regard to product categories or departments. On occasion it is also used to examine the performance of specific suppliers.

The enthusiasm for GMROI rests on the fact that it allows firms to make merchandising decisions from a return on investment perspective. Distributors use Return on Assets, Return on Equity, or EBITDA to Total Assets to evaluate total company performance. GMROI provides a vehicle for taking the return on investment perspective to the SKU level as well.

The reality is that despite its widespread use, GMROI is a seriously-flawed metric on which to base merchandising decisions. It produces biased results which can lead directly to bad decisions and misguided actions. The fact is that GMROI favors unprofitable items over profitable ones. GMROI does calculate return on investment, but does so inaccurately.

This white paper will address four different aspects of the GMROI issue:

- **The GMROI Formula**—An examination of how GMROI is calculated as well as a discussion of the fundamentals of the ratio.
- **Evaluating Inventory Performance**—A review of how GMROI is utilized as an inventory planning tool.
- **Computational Bias**—A discussion of the serious problems associated with using GMROI as an evaluative measure.
- **A New Tool for Decision Making**—Some suggestions as to how GMROI might be supplanted in distributor decision making by a much more sophisticated and accurate metric.

The GMROI Formula

GMROI is specifically designed to evaluate SKU performance from a return on investment perspective. In that way, inventory can be managed the same as the total firm—with an eye towards the highest possible return on a specific level of investment.

In many instances firms are not actually using GMROI even though they may refer to it as such. They are using a closely-related concept called the Turn & Earn Ratio (T&E). It is useful to understand both ratios fully before beginning to evaluate their effectiveness.

While GMROI (as well as T&E) is used mostly to evaluate individual SKUs or departments, it is easiest to understand the formulas by examining them at the total firm. That is done in **Exhibit 1**.

The results presented in the exhibit are for a typical distributor. It must always be kept in mind that distributors come in all sizes and with widely varying operating parameters. However, everything that is said about the firm in the exhibit is true of all distributors.

The exhibit presents a simplified income statement and a partial balance sheet (assets only). The highlights are that the firm generates \$20.0 million in revenue, operates on a gross margin of 25.0% of revenue and brings \$500,000 to the bottom line. This is a pre-tax profit margin of 2.5% of sales.

On the investment side, the firm has \$6.25 million of total assets. Of that total, \$2.5 million, or 40.0% of its total investment, is in inventory. Clearly, managing inventory should be an essential component of improving overall profitability.

At the total firm level, return on investment is most frequently measured using Return on Assets (ROA). For the sample company, the ROA is 8.0%. The firm produces \$500,000 in pre-tax profit on an investment of \$6.25 million.

Even though GMROI is designed to be used primarily at the SKU level, a total firm figure is typically calculated. This overall figure is then used as a target for the performance desired from individual SKUs. Most frequently, the thought process is to bring low GMROI items up to the total firm figure.

In focusing on SKUs, there are some serious data limitations. This reality necessitates two important shortcuts for calculating return on investment:

- **Profit**—All of the expenses are ignored. This profit calculation stops at gross margin. This conscious oversight is due to the historical, but not necessarily contemporary, difficulty of assigning expenses to individual SKUs.
- **Investment**—Inventory replaces total assets as the only investment category. There is no appropriate way to trace other investment categories to individual SKUs.

The sample firm produces \$5.0 million in gross margin while requiring an investment in inventory of \$2.5 million. The GMROI calculation is simply the gross margin dollars divided by inventory dollars. The result is 200.0%, \$2.00 or 2.0 (different distributors may employ any of the three methods of presentation). However presented, the firm generates \$2.00 of gross margin for each \$1.00 invested in inventory.

Exhibit 1
Total Firm Performance
For a Sample Distributor

Income Statement	Dollars	Percent
Net Sales	\$20,000,000	100.0 %
Cost of Goods Sold	<u>15,000,000</u>	<u>75.0</u>
Gross Margin	5,000,000	25.0
Total Expenses	<u>4,500,000</u>	<u>22.5</u>
Profit Before Taxes	\$500,000	2.5 %
 Partial Balance Sheet		
Cash	\$125,000	2.0 %
Accounts Receivable	2,000,000	32.0
Inventory	2,500,000	40.0
Other Current Assets	<u>100,000</u>	<u>1.6</u>
Total Current Assets	4,725,000	75.6
Fixed Assets	<u>1,525,000</u>	<u>24.4</u>
Total Assets	\$6,250,000	100.0 %
 Return on Assets		 8.0 %
 Inventory Turnover (x)		 6.0
 GMROI		 200.0 %
 Turn & Earn		 150.0 %

The T&E Ratio is slightly more involved. With it, Inventory Turnover (the “Turn” component) is multiplied by the Gross Margin Percentage (the “Earn” component). The result is a slightly different return on investment measure. Unlike GMROI it has no absolute meaning. Instead, it has only a relative meaning; namely higher is better than lower.

For the illustrative company the Inventory Turnover rate is 6.0 times. This is Cost of Goods Sold (\$15.0 million) divided by Total Inventory (\$2.5 million). When the gross margin percentage of 25.0% is multiplied times the turnover of 6.0x, a T&E of 150.0% results.

The fact that the 200.0% GMROI and the 150.0% T&E are not identical is nothing more than a minor irritant. In both calculations there are two essential, underlying ideas. First, higher is better than lower. Second, the firm has two tools at hand to

improve GMROI or T&E¹. Namely, the firm can improve its gross margin percentage or improve its inventory turnover. Both actions are equally desirable in the GMROI analysis.

Evaluating Inventory Performance

GMROI, as mentioned before, can be employed at the individual SKU level all the way up to the department level. It is also frequently used to evaluate different merchandise suppliers.

Regardless of the level of analysis, GMROI is used in two distinct ways. The first is analytical, as a yardstick to measure past performance. The second is prescriptive, as a tool to plan for the future.

- **Absolute Yardstick**—Since the firm is trying to produce as high a return on investment as possible, higher clearly is better than lower. Items with a high GMROI will be viewed favorably by management; items with a low GMROI will not. However, the GMROI figure is simply analytical. It does not indicate what should be done to improve performance.
- **Two-Pronged Tool**—GMROI can be broken into its two key components, the gross margin percentage and the inventory investment level. Once done, management then has two different profitability levers, or two parts of one tool, to use as profit-improvement guides. This is how GMROI becomes prescriptive.

Absolute Yardstick

GMROI is somewhat unique among the analytical tools available to management in that it is virtually impossible to set a precise goal. All that can be done is to say that higher is better than lower. As was noted earlier, firms often use the total GMROI figure as a goal. Doing so is entirely arbitrary.

The fact that it is impossible to set a realistic goal doesn't stop firms from doing so, of course. All sorts of distributors have total-firm GMROI goals of 150%, 200% or even higher. Items that don't achieve the total-firm result are viewed with disfavor.

Setting a GMROI goal is a comforting exercise. It creates an aura that the firm is taking action to improve product performance. Unfortunately, setting a GMROI goal is also futile.

¹ Using the phrase "GMROI or T&E" complicates the narrative. To keep from disrupting the flow of the discussion, GMROI will be used to denote both ratios. A distinction will be made only when there are major differences between GMROI and T&E.

To understand the challenge, it is useful to consider a SKU that has the same exact gross margin percentage and inventory turnover rate as the total firm. As was shown in Exhibit 1 that means a 25.0% gross margin and an inventory turnover of 6.0 times. Its GMROI is 200.0%.

Since GMROI ignores expenses, it is impossible to say whether a 200.0% GMROI is good, bad or ugly. If the total costs of selling, handling and processing the item are 15.0%, then the item is profitable. However, if those costs total 25.0%, then the item simply breaks even for the firm. Finally, if the costs are 30.0%, then the firm actually is losing money. However, in all three instances the GMROI is 200.0%.

Given the inability to set a meaningful GMROI goal, it is necessary to fall back on the basic tenet of GMROI: namely, higher is better than lower. If a SKU with a 200.0% GMROI can be turned into one with a 250.0% GMROI, then things appear to be moving in the right direction.

Dangers in Aggregation—Even the “higher is better than lower” rule has some limitations. It really should only be applied to individual SKUs within a very narrow merchandise classification. That is, for SKUs that all have a somewhat similar expense structure.

When the rule is expanded to compare items in different merchandise groups, the lack of an expenses analysis becomes a serious issue rather quickly. SKUs in different merchandise categories almost certainly have different cost structures associated with them. GMROI cannot properly address this issue.

The aggregation problem is especially pronounced when GMROI is used to evaluate different suppliers. To take an extreme example, the costs associated with a supplier of peat moss are different than the costs associated with a supplier of electronic components. GMROI simply is not equipped to make such comparisons.

In summary, as an absolute yardstick, GMROI should be limited to two specific cases. First, SKUs with very similar expense structures (all within a narrowly-defined merchandise category, for example) can be compared directly on the basis of their GMROI.

Second, year-to-year changes can be evaluated with some degree of confidence. If an items GMROI improves from 100.0% to 150.0% during the next year, then things are getting better. However, the firm still will not know if the SKU is good, bad or ugly. It is simply an improvement.

Two-Pronged Tool

Looking across a wide range of SKUs within a distribution organization, it soon becomes obvious that gross margin and inventory turnover are inversely correlated. While the relationship is far from perfect, it is pronounced. SKUs with a high gross margin percentage tend to have a low inventory turnover rate and vice versa.

As a result of this relationship, merchandising managers like to decompose GMROI into its two components—gross margin performance and inventory performance. This is why, incidentally, that the T&E ratio (Gross Margin % times Inventory Turnover) has supplanted the actual GMROI ratio in a great many distribution businesses. It is easy to grasp the resulting figure and its two components simultaneously.

With two components, management can begin to make decisions about how the GMROI on different SKUs can be increased. Again, management has a two-pronged tool (or two different financial levers) to work with in increasing the GMROI for every SKU. It can increase the gross margin percentage or it can increase the rate of inventory turnover.

In practice, the idea of a two-pronged tool quickly comes to an ignominious end. This is because the gross margin percentage and inventory turnover are not equally-potent financial levers. In fact, they are incredibly imbalanced.

To understand this critical issue it is necessary to go back to the total-firm level once again. This analysis, which is a little more complicated than Exhibit 1, is shown in **Exhibit 2**.

On the income statement, total expenses have been broken down into two categories. The first is the Inventory Carrying Cost (ICC). This is the annual cost of maintaining inventory. It includes items such as interest, property taxes, insurance, obsolescence and shrinkage. These are assumed to be 20.0% of the value of the inventory.²

The partial balance sheet has been replaced by a memo item for inventory. Since GMROI only looks at inventory, nothing else on the investment side of the business will matter in this discussion.

Making Improvements—The first column of numbers is nothing more than where things stand for the firm at the present time. The last two columns reflect two different improvements, both of them at the total-firm level. The first

² A 20.0% ICC is a common figure, so it is used here. For most distributors of non-perishable goods the figure should be substantially lower.

increases the gross margin dollars by 5.0%. The last column decreases the inventory investment by the same 5.0% figure.

Exhibit 2 The Impact of Two Different Financial Actions

Income Statement	Current Results	5.0% More Gross Margin	5.0% Less Inventory
Net Sales	\$20,000,000	\$20,000,000	\$20,000,000
Cost of Goods Sold	<u>15,000,000</u>	<u>14,750,000</u>	<u>15,000,000</u>
Gross Margin	5,000,000	5,250,000	5,000,000
Inventory Carrying Cost (20.0% of Inventory)	500,000	500,000	475,000
All Other Expenses	<u>4,000,000</u>	<u>4,000,000</u>	<u>4,000,000</u>
Total Expenses	<u>4,500,000</u>	<u>4,500,000</u>	<u>4,475,000</u>
Profit Before Taxes	\$500,000	\$750,000	\$525,000
Inventory	\$2,500,000	\$2,500,000	\$2,375,000

In the **5.0% More Gross Margin** column sales remain \$20.0 million, while the gross margin dollars increase from \$5.0 million to \$5.25 million, a 5.0% increase. The expenses remain the same, so the entire \$250,000 increase in gross margin goes directly to the bottom line.

In the **5.0% Less Inventory** column, the first item to note is that the inventory has declined from \$2.5 million to \$2.375 million (\$2.5 million less 5.0% or, less \$125,000).

When inventory is lowered, the sales, cost of goods sold and gross margin all remain the same. The ICC declines as it is 20.0% of the reduced inventory level. The ICC decreases by \$25,000. This figure also goes directly to the bottom line.

The action of increasing the gross margin dollars by 5.0% increased profit before taxes by \$250,000. The action of lowering inventory by 5.0% only increased profit by \$25,000. It is a 10.0 to 1.0 difference. The two levers assumed to be equally potent, in fact have a very different effect on the bottom line.

All of this says nothing about the ability of the firm to actually make the changes, of course. All the financial analysis can do is indicate what would happen if specific changes were implemented.

To summarize, at the somewhat-strategic level GMROI seems to have some serious deficiencies. First, it can't be used across products with differing cost structures. Second, the two performance-improvement levers available to management are not equally powerful, despite conventional wisdom.

It is now time to turn from the strategic level to the operational level. The problems with GMROI are about to get worse.

Computational Bias

The theory behind GMROI remains commendable. It is extremely beneficial to have metrics on the profit performance of individual items. The operational problem with GMROI is that the computations produce a very distorted picture of profitability. Higher may not really be better than lower. It may only be higher. The problem starts with inventory turnover.

Inventory Turnover Bias

Inventory turnover measures how many times during the year the firm sells the equivalent value of its inventory. Given the name of the ratio, it measures how many times the firm turns over its inventory during the year. A turnover of 6.0 times, for example, would mean that the firm sells an amount equal to its average inventory six times per year. Another way of thinking about it is that with six turns, the firm has about two months of inventory on hand at any point in time.

As long as turnover is calculated using actual physical product movement, it is a fine ratio. However, for computational ease, the ratio is almost always calculated using dollars rather than units. This creates a serious bias which will be discussed in detail shortly.

First, it should be noted that criticizing inventory turnover in distribution is somewhat akin to criticizing apple pie and motherhood. Inventory turnover is simply the measure of inventory productivity. Nothing else is even in second place. It is used by a lot of managers who have never even heard of GMROI.

Despite its widespread use, turnover (using dollars rather than units) isn't a very good ratio for analyzing inventory performance. The problem with turnover is reviewed in **Exhibit 3**. The exhibit presents the merchandising results for two SKUs, Item A and Item B.

Before getting too deep into Exhibit 3, assume that only two things are known about the items. First, they both have the same level of inventory investment, in this case \$10,000. Second, Item A generates \$50,000 in sales during the year. Over the same period Item B does slightly better with \$55,000 in sales volume.

At this very preliminary point, absent any additional information, Item B looks to be a better performer than Item A. For the same level of investment, Item B generates more sales volume.

Exhibit 3 Merchandising Results For Two Different SKUs

Factor	Item A	Item B
Net Sales	\$50,000	\$55,000
Cost of Goods Sold	<u>42,500</u>	<u>38,500</u>
Gross Margin	7,500	16,500
Average Inventory	\$10,000	\$10,000
Gross Margin Percentage	15.0%	30.0%
Inventory Turnover	4.3	3.9
(Cost of Goods Sold ÷ Inventory)		

The additional information provided in Exhibit 3 makes the analysis a little more complex but a lot more interesting. Item A appears to be price-sensitive, with a gross margin of only 15.0%. In contrast, Item B is a much higher gross margin item, coming in at 30.0%.

To review, Item B has slightly more sales, a much-higher gross margin (both dollars and percentage) and the same inventory investment when compared to Item A. There is probably no need for a sophisticated analysis to conclude that Item B is more desirable than Item A.

This is where the bias in inventory turnover comes into play in very dramatic fashion. In evaluating inventory performance, the inventory turnover ratio indicates that Item A actually is superior to Item B.

Specifically, Item A produces an inventory turnover of 4.3 times versus only 3.9 times for Item B. The reason is that inventory turnover does not measure how effective an item is in generating sales in relationship to inventory. Instead, it measures the cost of goods sold produced per dollar of inventory.

This means that even if two items have the same sales and same inventory, the item with the lower gross margin percentage will always have a higher rate of inventory turnover. In this example, Item B actually has higher sales than Item A

and still has a lower turnover rate. The low gross margin item is not performing better, it is simply benefits from the built-in bias in the turnover calculation.

Taken to its illogical conclusion, the way to maximize inventory turnover is to completely eliminate gross margin. If an item is sold at cost, its inventory turnover rate will be maximized.

This computational bias should be a fatal flaw. Nevertheless, inventory turnover continues to be the most widely used ratio in distribution to evaluate inventory productivity. It is a classic case of using a ratio because “we always have.”

This inherent problem with inventory turnover also compromises GMROI. Inventory turnover always makes low gross margin items look better than high gross margin ones. As a result, GMROI will also overstate the performance of low margin items and understate the performance of high margin ones. It is the major flaw in trying to measure return on investment with GMROI.

The Bias Carried Over to GMROI

To gain a better perspective on how the inventory turnover bias is perpetuated in GMROI it is necessary to move to **Exhibit 4**. This exhibit presents an SKU analysis of Items C, D and E. These three items all have identical sales levels. However, they are very different in terms of both their gross margin and inventory investment levels.

Item D (in the middle) has been designated as Typical. It has the exact same gross margin percentage and inventory turnover as the total firm. That means a gross margin percentage of 25.0% and an inventory turnover of 6.0 times. Item D's results are a microcosm of the firm.

Item D is flanked by two items with distinct gross margin and inventory investment characteristics. Item C generates 20.0% more gross margin dollars than Item D on the same sales level. However, it requires a 20.0% larger investment in inventory. It is a classic high margin/low turnover SKU.

Item E is the reverse image of Item C. It produces 20.0% less margin than Item D (the typical item), but can generate its sales and margin with an inventory investment that is 20.0% lower. It is in the low margin/high turnover camp.

The Problem With GMROI as an Absolute Yardstick—GMROI is most frequently used to identify problem items. It is a “what should we worry about” sort of ratio. Typically, management worries about the items with the lowest GMROI numbers. The real question associated with Exhibit 4 is whether GMROI actually identifies the right things to worry about.

Before answering that question, it is necessary to distinguish between the pure GMROI ratio and its close cousin, the Turn & Earn (T&E)ratio. As was mentioned early on, a lot of firms use T&E instead of GMROI. In addition a number of firms actually use T&E, but simply call it GMROI.

Exhibit 4 GMROI Results for Three SKUs

Dollars	Item C High Margin High Inventory	Item D Typical Item	Item E Low Margin Low Inventory
Net Sales	\$50,000	\$50,000	\$50,000
Cost of Goods Sold	<u>35,000</u>	<u>37,500</u>	<u>40,000</u>
Gross Margin	15,000	12,500	10,000
Average Inventory	\$7,500	\$6,250	\$5,000
Inventory Turnover	4.7	6.0	8.0
Percent of Sales			
Net Sales	100.0 %	100.0 %	100.0 %
Cost of Goods Sold	<u>70.0</u>	<u>75.0</u>	<u>80.0</u>
Gross Margin	30.0	25.0	20.0
GMROI	200.0 %	200.0 %	200.0 %
Turn & Earn (GM% x Turnover)	141.0	150.0	160.0 %

For firms using T&E, Exhibit 4 points clearly to Item C as a serious problem. Its ratio is only 141.0% (30.0% gross margin times 4.7 turns). However, Item C actually produces the most gross margin dollars of the three items shown.

At the other extreme, Item E would be designated as a super star, because its T&E ratio is 160.0%. It is the sort of item that management might want to emphasize in its marketing programs. The firm would try to sell all it can to enjoy the benefits of its great return.

With the pure GMROI calculation, all three items perform equally. Each one has a 200.0% GMROI. One item should not necessarily be favored over another. However, even this suggestion of parity carries a bias. Item E may well represent a problem that is obscured by GMROI.

It should be remembered from Exhibit 1 that this company has an overall gross margin of 25.0% of sales and a pre-tax profit margin of 2.5%. This means that the total cost of operation for the firm is 22.5% of sales (25.0% - 2.5%).

Making the gigantic leap of faith that all three items have about the same cost structure (assuming they are all in the same, narrow, merchandise category), then any gross margin differences should produce profit differences as well. In fact, their gross margin differences are significant.

Item E could very well be under water. It produces a 20.0% gross margin while its expenses are estimated at around 22.5%. From a GMROI perspective, Item E is just as good as the other two. From a T&E perspective, Item E is a superior item. In either case, the absolute yardstick is not doing its job. Simply put, GMROI completely misses the real profitability issues.

In contrast Item C is likely producing a strong net profit with a 30.0% gross margin and expenses of around 22.5%. GMROI once again fails to recognize this situation.

In summary, the most basic role of GMROI is to serve as an absolute yardstick to distinguish good from bad items. Even at this level GMROI has the potential to be defective while T&E has the potential to be a complete disaster. Neither really qualifies as a sound tool for guiding merchandising decisions.

GMROI as a Two-Pronged Tool—Management does not simply look aghast at the performance of some items and bask in the glory of others; management takes actions to improve results. This is where GMROI more serious problems.

Supposedly the firm has two levers to drive higher profitability—improving the gross margin percentage or improving the inventory turnover. If these levers were equally strong, then either would be appropriate to use. However, the levers are not of equal strength as was noted earlier (Exhibit 2).

In **Exhibit 5** the company is considering two options for Item D, which is representative of the company as a whole. Item D already has a GMROI equal to the that of total firm. However, management has decided to make it an even more profitable item.

The first column of numbers in the exhibit shows where Item D is now. The last two columns present two options for improvement. The first option is to reduce the inventory investment by 10.0%. The second is to increase the gross margin dollars by 10.0%.

At this point it is not necessary to discern how these options will be accomplished, or even if they can be realized. The focus simply is on the profit and GMROI results that are produced if the two plans come to fruition.

Exhibit 5
Two Profit-Improvement Options
For a Single SKU

Item	Current Results	10% Less Inventory	10% More Margin
Net Sales	\$50,000	\$50,000	\$50,000
Cost of Goods Sold	<u>37,500</u>	<u>37,500</u>	<u>36,250</u>
Gross Margin	12,500	12,500	13,750
ICC (20.0% of Inventory)	<u>1,250</u>	<u>1,125</u>	<u>1,250</u>
Direct Product Profit (Gross Margin - ICC)	\$11,250	\$11,375	\$12,500
Average Inventory	\$6,250	\$5,625	\$6,250
Inventory Turnover	6.0	6.7	5.8
Gross Margin Percentage	25.0 %	25.0 %	27.5 %
GMROI	200.0 %	222.2 %	220.0 %
Turn & Earn	150.0 %	166.7 %	159.5 %

Calculating Profit—In looking at profit it is necessary to introduce an entirely new concept called Direct Product Profit. This will be discussed in detail in the next section of this report.

For now Direct Product Profit (DPP) will be defined as gross margin minus the Inventory Carrying Cost. The Inventory Carrying Cost, which was discussed at the total-firm level in association with Exhibit 2, is what it costs the firm to carry inventory for a year, expressed as a percentage of the inventory. It is assumed to be 20.0% of the inventory on hand.

In the Current Column the Inventory Carrying Cost (ICC) is \$1,250 (20.0% of the inventory of \$6,250). When the ICC is subtracted from the Gross Margin a DPP of \$11,250 is produced. Since no other costs are known as of yet, the DPP is the best measure of profitability available. The goal is to increase that number.

In the **10.0% Less Inventory** column inventory is lowered to \$5,625 and the ICC falls to \$1,125 (20.0% of \$5,625). The result is that the DPP increases to \$11,375 or an increase of 1.1%. It is not a gigantic increase, but it is still an increase.

In the **10.0% More Margin** column the gross margin dollars are increased by 10.0%. To keep the exhibit simple, sales are held constant and the gross margin improvement is assumed to be the result of advantageous buying.

The inventory level under this scenario remains the same as it was originally, or \$6,250. This means that the ICC also remains the same. With the increase in the gross margin dollars, the DPP increases to \$12,500, a gain of 11.1%.

In short, there is a much larger profit impact from increasing gross margin than there is from reducing the level of inventory. The two profit levers associated with GMROI are once again exposed as being not even close to equal.

From a GMROI perspective, though, reducing inventory produces a better result than increasing the gross margin percentage. The weaker action in terms of real profit performance actually gets credit for better performance.

The GMROI associated with the inventory reduction is 222.2% versus the original 200.0%. The GMROI from increasing the gross margin is 220.0%. While this is close to the GMROI for an inventory reduction, it is still smaller. The impact on T%E is similar, just with different figures.

GMROI will always make low gross margin items look better than high gross margin items. It will also almost always make the results from an inventory reduction look better than the results from a margin increase. It is an extremely serious bias that negatively impacts inventory investment decisions daily.

A New Tool For Decision Making

It is easy to conclude that GMROI is an inadequate tool for merchandising decision making. Coming up with a replacement necessitates a much higher degree of complexity. However, it is a complexity that can be managed rather easily in an era of “Big Data.”

GMROI originated in the department store industry in the years before World War II. It was developed as a profit tool in an era when computers were still largely theoretical constructs discussed in universities and research labs.

Consequently, it was designed to be as simple and easy as possible to calculate with the manually-intensive computational technology of the time. As an added bonus, it was also relatively easy to understand.

In the seventy-five or so years since the development of GMROI, information technology has exploded. There is the potential for a wide range of new, finely-tuned analytical tools.³ Deciding between current technology and 1940s technology should be relatively easy.

³ For a discussion of analytical tools in distribution, see Thomas P. Gale and Jenel Stelton-Holtmeier (editors), *Distributors Guide to Analytics*, Gale Media, Inc., 2015.

Direct Profit Profitability, discussed earlier, is one such new tool for measuring the actual profit on every SKU, merchandise category or even merchandise supplier. It is not worry free, however. It requires both the analytical skills to set up the profit equations and the computing power to drive the analysis.

GMROI, despite its myriad problems, is elegantly designed. It involves one, easy-to-comprehend, return on investment number. It combines that with two, easy-to-identify, profit levers to improve results. There is no confusion about what is being measured or how to go about making improvements.

Moving to DPP provides the management team with a much better understanding of profit. Offsetting this clear improvement is the fact that improving performance requires reviewing a wide range of profit levers, not just the two in GMROI.

Exhibit 6 reflects both the power and complexity of DPP. The exhibit also continues the relentless march through the alphabet by introducing two new SKUs—Items F and G.

Item F is a tonnage product that generates a lot of sales, but is actually sold at a loss when all its costs are considered.

Item G is a classic niche product with low sales volume and a strong gross margin percentage. The combination yields a strong profit when all of the costs are considered.

There are two important issues with regard to the DPP. The first is the number of expense items that can be assigned to an SKU. The second, is calculating the actual profit that each SKU produces.

Expense Categories—In Exhibit 6 there are five expense categories leading up to DPP. These include the Inventory Carrying Cost (still assumed to be 20.0% of inventory), Commissions, Stocking Costs (receiving merchandise from suppliers and getting on the shelves in the distribution center), Item Picking Costs (pulling items back of the shelves and packaging them for shipment) and Order Processing Costs (largely technology costs with keeping track of orders).

Any number of expense categories could be delineated. The only necessity is that they cannot be arbitrary. They must all be costs that can be traced directly to individual SKUs through the number of times it is ordered and the like.

Actual Profit—DPP reflects the profit on the SKU after considering the direct costs and nothing else. To calculate the actual profit on a given SKU it is necessary to assign overhead costs. Such allocations are always arbitrary.

Exhibit 6
A Direct Product Profit Analysis
For Two SKUs

Item	Item F		Item G	
	Dollars	Percent	Dollars	Percent
Net Sales	\$20,000	100.0 %	10,000	100.0 %
Cost of Goods Sold	<u>16,000</u>	<u>80.0</u>	<u>7,000</u>	<u>70.0</u>
Gross Margin	4,000	20.0	3,000	30.0
Direct Expenses				
ICC (20.0% of Inventory)	500	2.5	500	5.0
Commissions (10.0% of GM)	400	2.0	300	3.0
Stocking Costs	100	0.5	20	0.2
Item Picking Costs	300	1.5	50	0.5
Order Processing Costs	<u>50</u>	<u>0.3</u>	<u>15</u>	<u>0.2</u>
Total Direct Expenses (TDE)	<u>1,350</u>	<u>6.8</u>	<u>885</u>	<u>8.9</u>
Direct Product Profit (GM - TDE)	<u>2,650</u>	<u>13.3</u>	<u>2,115</u>	<u>21.2</u>
Assigned Overhead (15.0% of Sales)	<u>3,000</u>	<u>15.0</u>	<u>1,500</u>	<u>15.0</u>
Profit Before Taxes	-\$350	-1.8 %	\$615	6.2 %
Inventory	\$2,500		\$2,500	
Inventory Turnover	6.4		2.8	
GMROI	160.0 %		120.0 %	
Turn & Earn	128.0 %		84.0 %	

Item F loses money after considering all of its costs. However, the “arbitrary” expenses really get in the way. Overhead is almost always assigned on a percent of sales basis. It is an easy and convenient way to assign overhead costs, but it is still arbitrary.

Since Item F at least covers all of its direct costs and the DPP is positive (\$2,650), there is no need for panic. The challenge is to figure out ways to increase the DPP, not to look to eliminate the item.

In distribution it is typical for a number of items actually have a negative net profit after assigning overhead. The real concern is for the few items that have a negative DPP since they don't cover their direct costs.

For such items, panic is still not necessary, although serious, concerted effort is reasonable to change the situation. At a minimum, though if an item does not cover its direct costs, then efforts to increase its sales only increase its losses.

The DPP world is clearly a lot more complex than the GMROI world. That complexity leads to two enormous advantages for DPP, though. First, unlike with GMROI, actual goals can be set. Second, the firm is no longer limited to two financial levers. There are numerous attack points available to increase profitability, including sales, gross margin and expenses.

Goal Setting—The merchandising manager using the DPP metric is no longer restricted to “higher is better than lower” thinking. Instead, specific profit targets can be set. If the entire firm is producing a pre-tax profit margin of 2.5%, then that can be used as a starting point for goal setting.

In an individual merchandise category, a higher or lower goal can be set. If an entire merchandise category averages a 5.0% pre-tax margin, then individual SKUs might also be assigned a 5.0% profit objective. The SKUs also can be analyzed to see how they can reach that 5.0% level.

Goals can be set on the basis of the DPP percentage in a category rather than the net profit in that category. This allows the firm to avoid the arbitrary issue of overhead costs. Once again, the overall performance in the merchandise category can be used as an initial DPP target for each SKU.

Attack Points—The merchandising team is no longer simply limited to raising the gross margin or increasing the inventory turnover. Now there are numerous options. In Exhibit 6, at least six profit levers are available:

- Increase the sales to spread expenses over a larger volume.
- Raise the gross margin percentage.
- Lower inventory to reduce the ICC dollars.
- Re-think the commission plan to lower sales expenses, especially on low-margin items.
- Adjust the buying pattern so that stocking costs are lowered.
- Change the sales pattern so that order picking costs and order processing costs are both reduced.

While having numerous attack points provides a much more robust decision-making environment, it also creates some problems. The manager who once only had to deal with two options is suddenly confronted with something akin to a smorgasbord. For some managers there may well be confusion and uncertainty because there are literally too many choices.

The complexity issue is compounded by the fact that some of the options work against each other. If items are ordered less frequently to reduce stocking costs,

then inventory levels and the associated carrying cost are certain to rise. The precise nature of the trade-off between the various profit levers may be difficult to determine.

In the future it seems likely that Artificial Intelligence (AI) will be brought to bear to assist the management team in making these changes. AI could evaluate a wide range of different profit-improvement options using pre-set assumptions about how different factors will interact.

Some managers will view DPP as an irritant or even a threat because it diminishes their intuitive merchandising skills. This should not be the case. DPP should be viewed as an adjunct to merchandise skills, not a replacement.

If implemented and supported with proper training, the wide use of DPP should greatly improve the profitability of individual items. When multiplied across a wide range of items, it should lead to improved profitability for the entire firm.

Moving Forward

GMROI was fine tool for the 1940s through the 1980s. It was an acceptable tool until somewhere around 2000. It is now an anachronistic metric which needs to be replaced. There is really no excuse for continuing to rely on a highly-biased, inferior measure of profitability.

If every firm in a specific line of trade continues to use GMROI, then it becomes a classic case of “no harm, no foul.” Everybody will go on making the same decisions in the same outmoded way. Nobody will have an advantage.

However, as individual firms begin to use DPP, they will have a much more powerful set of tools at hand. Those tools are unbiased, allow for constructive goal setting and can be used throughout the firm. Proper implementation can provide a major competitive advantage.

To continue to use metrics such as GMROI when other firms have switched to something like DPP is to continue to manage inventory with 20th century technology when others have joined the 21st century. It is time for something new. Not just different, but demonstrably better.

About the Author

Dr. Albert D. Bates is founder and Director of Research for the Profit Planning Group, a benchmarking and executive education firm headquartered in Boulder, Colorado. He is also a Principal in the Distribution Performance Project, a research group devoted to distribution issues.

Al makes approximately 50 presentations each year on topics such as Improving the Bottom Line, Getting Serious About Profit, Doing More with Less, and Pricing for Profit. He is also a featured speaker at the University of Innovative Distribution.

He has written extensively in both the professional and trade press, including the Harvard Business Review, the California Management Review and Business Horizons. In addition he writes the quarterly Profit Improvement Reports for the firm's trade association clients.

Al received his undergraduate degree from the University of Texas at Arlington and his MBA and doctorate from Indiana University. While at Indiana he was one of the first recipients of the Ford Foundation Fellowship in Business Education.

He is married and has three grown daughters. When he is not traveling giving seminars he enjoys tennis and skiing. He is not particularly good at either one.

Please visit the Distribution Performance Project web site (distperf.com) to read past articles, and chapters of books as well as to download free profitability improvement tools.