CREATING A BETTER
INVENTORY CONTROL PROCESS

Measuring Inventory Health

By Paul Johnson, Vice President of Global Plan Process, Momentive Specialty Chemicals

Overview

The Days of Supply (DOS) measurement is commonly used to measure supply chain efficiency. Its calculation has the three elements that are needed for a metric to be successful:

1. It is easy to understand and easy to calculate

2. It suggests a direction for improvement; either it is too high or too low

3. It provides an aggregated view

While useful in measuring total inventory volume, DOS does not provide a good indication showing how well the inventory matches demand.

Item	Monthly	Case 1 Inventory	Case 1 DOS	Case 2 Inventory	Case 2 DOS
A	50	25	15	30	18
B	5	20	120	15	90
Total	55	45	25	45	25

For example, in the chart above, Item A and Item B are in the same family. In both cases, the DOS is 25 (45/55*30). However, in Case2, a larger fraction of the physical inventory, 78%, will be consumed within the next month, compared to 67% in Case1. In other words, the inventory in Case 2 better matches the demand.

Targeting Inventory Changes

Suppose we have the opportunity to increase inventory by five units. Starting from Case3, we could increase either the inventory of Item A to 35, or starting from Case4, we could increase the inventory of Item B to 20. Based on the chart below, it would be more beneficial to increase the inventory of A.

The total DOS calculation in either case would remain the same; however, the percentage of inventory that will be consumed the next month would be 80% for Case3 and 70% for Case4.

Clearly the **percentage of inventory projected to be consumed in the next forecast interval, or Inventory Velocity (IV)**, is a better measure of how well the inventory matches demand.

Item	Monthly Demand	Case 3 Inventory	Case 4 Inventory
A	50	35	30
B	5	15	20
Total	55	50	50

Different Inventory Velocities

All Stock Keeping Units (SKU) cannot be treated equally. Production, lot size, and other restrictions have an impact on inventory levels. To address this, it is useful to classify SKU's into categories—each with its own Inventory Velocity. Products made in response to a customer request, and high volume products made continuously should have an Inventory Velocity close to 100%. Products that are slow moving but with short lead times usually have a much lower Inventory Velocity.

The appropriate Inventory Velocity (IV) is frequently a function of the supply chain. Products made once a year, for example, should have a target IV considerably lower than those made once a month. For this reason, while it is useful to look at IV as an aggregate measure, it is important to recognize that IV by groups of similar products is a better indicator.

Our experience indicates that typical IV for chemical operations is in the 60 to 70% range. Well run supply chains have an IV between 75 and 85%. Anything higher usually indicates a make-to-order environment or frequent product shortages. Similarly, a supply chain with an IV below 60% usually designates frequent product shortages and shipment delays.

Comparing Inventory Velocities to Days of Shipment

When the inventories are proportional for all products, the IV measure provides the same information as DOS. The basic difference is, IV is insensitive to inventory fluctuation of an SKU if the inventory is likely to be consumed in the next month.

Inventory	10	20	30	40	50	60	70
Days of Supply	6	12	18	24	30	36	42
Inventory Velocity	100	100	100	100	100	80	80

Making Inventory Velocities Useful: Product Substitution

Let's consider some situations that show why using IV as a measure can be particularly useful. In many situations, some products can be substituted for others with relatively little effort: a faster semi-conductor chip for a slower one, a higher-grade product for a lower one, one package type for another, and for sheet products,

and a slightly wider roll for a narrower one. Therefore, the amount of a product that is likely to be consumed in the next forecast period also depends on how easily it can substitute for other products. Let's illustrate this through an example: Product C has a demand of 20, but product B can be substituted for C. In this case, the IV for our example is 100% because all the excess for B can be consumed by the demand for C.

Product	Monthly Demand	Case 5 Inventory
A	50	25
B	5	20
C	20	5
Total	75	50

In actual practice, the IV is usually calculated by means of a simple Linear Program (LP) that represents the substitution rules. However, the example above illustrates why a simple DOS calculation may not suggest the right inventory strategy or direction.

Making Inventory Velocities Useful: Alternate Locations

Inventory needs to be at the right place to satisfy customer demand. In a global business, inventory of an SKU located in Singapore is unlikely to be used to satisfy a demand in Cleveland. However, the inventory in Columbus or even in Atlanta might be expedited readily.

Just as alternate products can be considered in calculating Inventory Velocity, alternate locations can also be rolled into the calculation. In such a case, inventory at an alternate location is treated as an alternate product. Not only will analyzing the inventory in this way provide a metric, it will also provide a mechanism to identify inventory imbalances that can be directly addressed.

Another useful analysis with IV is netting the demand from inventory at the product level. If you sort this data in descending order, you have all the slow moving inventory. You cannot focus on fixing all the inventory problems overnight; therefore, this Pareto list of slow movers is the place to start. You could set a target of working on the top 10 slow movers each month. Of course, it is also helpful to track each month to see how many repeaters from earlier months make your 10 list.

ABOUT US

Since 1993, Arkieva tools have been used in more than 200 unique applications around the globe, and most of our clients leverage Arkieva software to support collaborative planning teams in North America, Europe, and in Asia.