

Keep Calm and Demand Plan

E-BOOK



Not a Sprint, but a **Marathon**

Assuming supply chain disruptions recede, it will take some time before things return to normal. In the interim, planners and buyers have moved into high gear in their efforts to align supply with demand.

The infamous bullwhip effect is not helping. The bullwhip effect is a supply chain phenomenon describing how small fluctuations in consumer demand can cause progressively larger fluctuations in demand as they creep up the supply chain.

Are organizations along the supply chain reacting to consumers stocking up because of real or perceived shortages? If so, this exaggerated demand is causing unnecessary and costly inventory investments. A Reuters report published in June 2022¹ shows that increases in U.S. wholesale inventories are not supported by stronger sales.

To avoid late and/or short customer shipments, buyers are increasing safety stock (i.e., buffer inventory). Procurement professionals are struggling to keep the chief financial officer (CFO) happy as more and more cash is tied up in inventory without the expected increase in revenues.

Preserving desired customer service levels while experiencing supply chain disruptions is no easy task. If your organization is new to demand planning and forecasting, stay the course. Moving a reactive practice toward a more mature and collaborative model is not a sprint, but a marathon. One step at a time will get you there.

Know your **A, B and Cs**

Which products are the most important to your business? A classification tool that allows for a selection of factors based on weight will quickly classify items based on their impact to your organization with A items being the most important, B less so and so on.

An experienced planner equipped with the right tools digs deeper using descriptive analytics with a special focus on A items then onto B items followed by C items. This allows for a better interpretation of the item's contribution to revenue.

If you have not removed a few C items from your stock inventory in a while, then more time must be dedicated to eliminating slow-moving inventory. Inventory that does not turn over impacts cash flow and profits.



¹ Mutikani, Lucia. [U.S. Wholesale Inventories Increase Strongly; Sales Growth Slows](#). Reuters@. June 8, 2022

Understand Demand Versus Sales Statistics

It is imperative to capture complete, detailed customer demand coupled with the power to mine this valuable data. Demand represents customers' willingness and ability to buy product. Sales are a measure of your organization's willingness and ability to provide product. In other words, demand is what your customers ordered, while sales are what your organization ultimately sold.

When looking at historical data as a predictor of future events, demand statistics typically offer a more accurate representation. In many industries, the difference between demand and sales signifies lost opportunity. This is not true for all products in all markets. It will be important to explore why that gap exists and adopt demand shaping and/or supply strategies accordingly. Furthermore, this exercise will lead to a greater understanding of the factors that influence demand.

Categorize Items by Demand Pattern

Visualizing data provides valuable insights into customer buying patterns. Start simple with a univariate time series at the stock keeping unit (SKU) level. A linear graphic will reveal a demand pattern. Non-seasonal items will fall into one of four demand patterns: smooth, erratic, intermittent or both erratic and intermittent. Identify the items that fall into each pattern.

Next identify and tag seasonal items. These will need to be managed separately. Ideally, you have access to three years of history to identify a decent seasonal factor.

How do you balance demand and sales?

If you know how much demand a product will have at a specific price point, you will know exactly how many units to stock to maximize sales and minimize cost.



Use the COV and SD Metrics

	Values	Value X - Mean	(Value X - Mean) Squared
	10	-0.20	0.04
	16	5.80	33.64
	15	4.80	23.04
	5	-5.20	27.04
	10	-0.20	0.04
	12	1.80	3.24
	10	-0.20	0.04
	8	-2.20	4.48
	7	-3.20	10.24
	9	-1.20	1.44
Sum	102.00		103.60
Mean	10.20		10.36
Square root of mean			3.22
SD	3.22		
COV	31.36	$(3.22/10.2)*100$	

Coefficient of variation (COV) and standard deviation (SD) are must-have metrics that planners use to recognize product risk and rightsize safety stock. These metrics measure data dispersion.

Take the following 10 observations: 10,16,15, 5,10,12,10, 8, 7 and 9. The illustration shows the calculation of the SD and the COV for these values.

Step 1 – Calculate the sum of the values: 102.

Step 2 – Calculate the mean: 10.20.

Step 3 – Subtract the mean from the value for each observation.

Step 4 – Calculate the squared value for each observation.

Step 5 – Calculate the sum of the squared values: 103.60.

Step 6 – Calculate the mean: 10.36.

Step 7 – Calculate the square root of the mean: 3.22.

	Values	Value X - Mean	(Value X - Mean) Squared
	100	-2.00	4.00
	160	58.00	3364.00
	150	48.00	2304.00
	50	-52.00	2704.00
	100	-2.00	4.00
	120	18.00	324.00
	100	-2.00	4.00
	80	-22.00	448.00
	70	-32.00	1024.00
	90	-12.00	144.00
Sum	1020.00		10360.00
Mean	102.00		1036.00
Square root of mean			32.19
SD	32.19		
COV	31.46	$(32.22/10.2)*100$	

Now let's multiply these 10 values by 10. The COV remains 31.56% while the SD deviation is now 32.19.

SD factors into how much safety stock to maintain. Although other factors will apply in determining safety stock thresholds, having visibility on an item's SD provides more context at the SKU level while COV allows a planner to group items with a similar deviation expressed as a percentage.

Demand patterns change over time, so it is good practice to recalculate COV and SD monthly, especially when evaluating items with shorter life cycles.

Measure Forecast Accuracy

The most popular method of measuring forecast accuracy is to calculate the mean average percentage error (MAPE). MAPE is a statistic which offers a prediction of forecast accuracy on past data whereby actual demand is compared to what had been forecasted.

Calculate MAPE at the SKU level over several observations. A high percentage is an indicator of uncertainty hence your supply strategy must consider this metric. Make sure to track MAPE over time and verify whether the error percentage is trending higher or lower.

When buying a product that has a long lead time, how much to buy should be based on forecasted requirements. The potential to misalign supply with demand is greater with long lead times, so be cognizant of the risk of over/under buying by considering the MAPE metric.

Improve Forecast Accuracy

Establish a formal internal process designed to improve forecast accuracy.

Are you using the best forecast algorithm? Let your system do the work by evaluating the algorithms that would have resulted in the lowest MAPE over a period of observations. There are many forecast algorithms to choose from. Use simple forecast algorithms to start with because even the simplest algorithm can yield the best forecast.

Your statistical forecast is a predictor of the future based on past demand. Take the time to incorporate business intelligence to improve forecast accuracy. Also, it may be necessary to cleanse historical demand of outliers that have the potential to skew the forecast.

If possible, benchmark your forecast accuracy with companies within your industry. Improving forecast accuracy is time well spent. A study by a company specializing in demand planning showed that for every 1% of improvement in forecast accuracy, organizations report a 1-2% drop in inventory levels.

Formula

$$M = \frac{1}{n} \sum_{t=1}^n \left| \frac{A_t - F_t}{A_t} \right|$$

M = mean absolute percentage error

n = number of times the summation iteration happens

A_t = actual value

F_t = forecast value

Hindsight to **Insight**

Examining why things happened will lead to conversations on what could be. Regular consultations with Sales will add tremendous value. Planners need to prepare for new markets, customers, products and contracts. Encourage Sales to gather intelligence from important customers. In other words, do not limit your inventory forecast to quantitative inputs, seek qualitative inputs as well.

Marketing programs are designed to grow the business while promoting customer loyalty. Marketing programs shape future demand; therefore, the inventory forecast must be adjusted accordingly to better align supply with projected demand. And for the same reasons, planners need to cleanse historical demand of peaks resulting from a marketing program.

Forecast accuracy affects fill rates, revenue and gross margin. In reality, there are items that can't be forecasted but are deemed critical. Repair parts often fall into this category. The supply strategy for these items will require a careful review of demand history to determine how much to stock.

Continuously Reexamine Supply Strategies

Most planners and inventory managers are responsible for hundreds of SKUs. Evaluate A items monthly, B items at least every three months and C items at least every six months.

Your supply strategy review should include the following metrics: order fill rate, MAPE, COV, SD, gross margin return on inventory investment (GMROI), inventory turnover and average supplier lead time as compared to promised lead time.

Armed with these metrics, a planner can determine whether to adopt a procure to stock or procure to order strategy. When procuring to stock, these metrics help planners determine when and how to buy as well as establish safety thresholds in line with the risk of stockout and desired customer service levels.

Your supply strategy review should include the following metrics:

- *Order fill rate*
- *Mean average percentage error (MAPE)*
- *Coefficient of variation (COV)*
- *Standard deviation (SD)*
- *Gross margin return on inventory investment (GMROI)*
- *Inventory turnover*
- *Average supplier lead time*



Be Aware of **Distribution Capacity**

Consult with warehouse operations to gain an understanding of labor and capacity constraints. Changes to a SKU supply strategy may impact the warehouse. For example, a decision to order more frequently affects receiving activities and increases acquisition costs. Order by the pallet when appropriate. Also, keep in mind that increasing safety stock on large items may require a slot reassignment.

Reap the **Rewards**

Demand planning is being recognized as the cornerstone to a mature supply chain. To maximize the benefits of demand planning, establish a formalized cross-functional process within your organization.

Benefits include the following:

- Lower acquisition costs.
- Lower carrying costs.
- Less money invested in inventory.
- Higher customer service levels leading to higher customer retention.

Be a demand planning champion within your organization. Keep planning and reap the rewards.

[Speak to a Demand Planning Expert Today](#) 

Glossary

ABC classification

ABC classification is a ranking system for identifying and grouping items in terms of how useful they are for achieving business goals.

Demand

Demand represents a customer's willingness and ability to buy a product.

Inventory turnover

Inventory turnover is a financial ratio showing how many times a company has sold and replaced inventory during a given period.

Standard deviation (SD)

Standard deviation (SD) is a summary measure of the differences of each observation from the mean.

Bullwhip effect

Bullwhip effect is a supply chain phenomenon describing how small fluctuations in demand at the retail level can cause progressively larger fluctuations in demand at the wholesale, distributor, manufacturer and raw material supplier levels.

Fill rate

Fill rate is the percentage of orders that you can ship from your available stock without any lost sales, backorders or stockouts.

Mean average percentage error (MAPE)

Mean average percentage error (MAPE) measures accuracy of a forecast system. It measures this accuracy as a percentage and can be calculated as the average absolute percent error for each time period minus actual values divided by actual values.

Stock keeping unit (SKU)

Stock keeping unit (SKU) is a number used to differentiate products and track inventory levels.

Coefficient of variation (COV)

Coefficient of variation (COV) is a measure of relative event dispersion that's equal to the ratio between the standard deviation and the mean.

Gross margin return on inventory investment (GMROI)

Gross margin return on inventory investment (GMROI) is an inventory profitability evaluation ratio that analyzes a firm's ability to turn inventory into cash above the cost of the inventory.

Sales

Sales is a measure of an organization's willingness and ability to provide product.

Supplier lead time

Supplier lead time is the amount of time that normally elapses between the time an order is received by a supplier and the time the order is shipped.

About **Tecsys**

Since our founding in 1983, so much has changed in supply chain technology. But one thing has remained consistent across industries, geographies and decades – by transforming their supply chains, good organizations can become great.

Our solutions and services create clarity from operational complexity with end-to-end supply chain visibility. Our customers reduce operating costs, improve customer service and uncover optimization opportunities.

We believe that visionary organizations should have the opportunity to thrive. And they should not have to sacrifice their core values and principles as they grow. Our approach to supply chain transformation enables growing organizations to realize their aspirations.



www.tecsys.com

info@tecsys.com

Phone: 514-866-0001

Toll Free: 1-800-922-8649

Copyright © Tecsys Inc. 2022

All names, trademarks, products, and services mentioned are registered or unregistered trademarks of their respective owners.