WHITE PAPER

Mind Your KPIs

Top Metrics Product Companies Should Be Monitoring

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What do Coke, Ford and Google have in common? For one, they've each had epic product failures that likely could have been avoided. Google had Google Glass (and dozens of other false starts), Coke had New Coke and Ford had the Edsel. Each had the marketing know-how, the customer relationships and the money and each failed to get the data they needed about the market for their product. The bigger and more egregious the failure, the more likely it could have been prevented by disciplined use of data.

Conversely, when manufacturers, distributors and retailers consistently make profitable decisions, you can bet there are teams constantly pouring over data to understand supply chains, sales forecasts, process efficiencies and customer trends.

Collecting good, timely data with careful analysis to guide proper business decisions is critical to thriving in business today. And we're not just talking about how enterprise-scale companies succeed. Every company can and should collect data to inform business decisions.

With that in mind, we've collected a set of key performance indicators (KPIs) that every product company should be monitoring consistently. Most organizations will need to go beyond what we're presenting here to understand the unique circumstances of their own suppliers, processes and customers, but starting with this set will form a solid foundation for developing the right KPIs for any organization.

Table of Contents

CHAPTER 1

Demand Planning and Procurement

Many of the metrics here depend on historical data. Knowing what you sold last month is helpful in understanding what you expect to sell this month. Knowing what you've sold each month for the last few years is a lot more helpful. With more data, your forecasts should become more accurate over time since you can spot seasonal trends and changes in customer demands. While sales leaders will typically be responsible for sales forecasts, finance teams can track forecast accuracy.

The formula looks like this:

Forecast Accuracy = 1 – (actual sales – forecast) / actual sales

It's not too hard to see that if sales and forecast are the same (your sales leader got it exactly right), you'll get a forecast accuracy of 1 since the actual sales minus forecasted sales will be zero. Here are a few examples:

Forecast = 1000 units. Actual sales = 920 units

Forecast Accuracy = 1 – (920 – 1,000) / 920 = 1.087 - our forecast was too high by 8.7%

Had actual sales been higher, say 1,200 units, then

Forecast Accuracy = 1 – (1,200 – 1,000) / 1,200 = 0.83 - our forecast was too low by 16.7%

***Related:* Forecast Error Percent =** 100 *(actual sales – forecast) / actual sales

Ideally, forecasts get more accurate with time as your sales leaders have more data to work with. It's an easy matter to graph the forecast accuracy each month and hopefully see that it's consistently closer to 1.0. If forecast errors are increasing, you'll want to find out why.

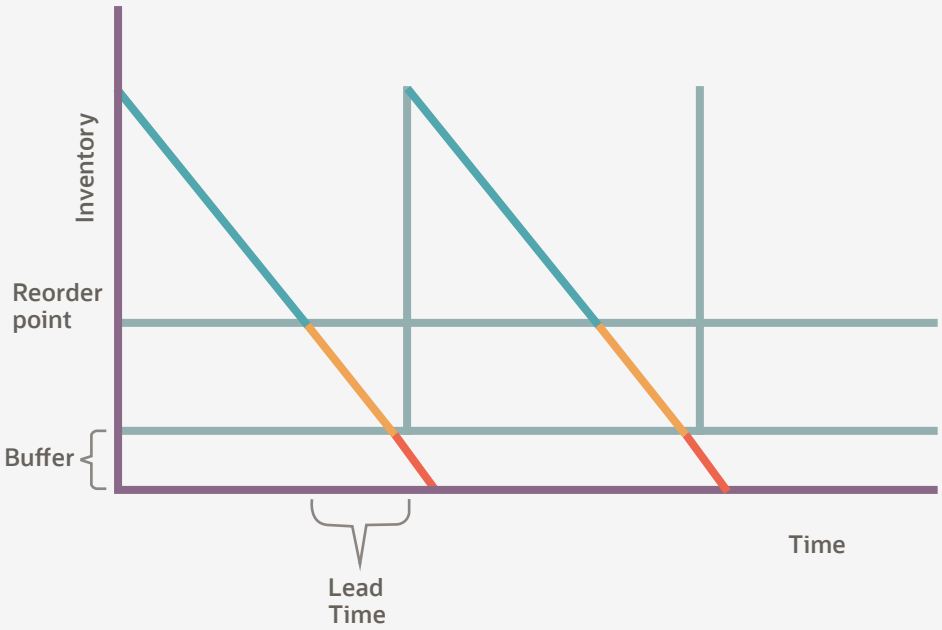
Over time, you'd expect that forecast errors average out to about zero—some periods you sell a bit more than expected, some less. If forecasts are consistently too high or too low, it's a sign that the forecast process needs revisiting.

The same reasoning can apply to any forecast such as supply chain demands.

Without a good handle on forecasting, other significant problems follow. From allocating shelf/warehouse space to ordering new stock or raw materials and subassemblies, everything hinges on

accurate forecasts. Once you've got some historical data on forecast accuracy, you can jump further down the statistics rabbit hole to calculate standard deviations as a way of measuring the severity of forecast inaccuracy. What's more important is digging into the root cause of inaccuracies. Is it one or two salespeople who consistently overestimate what they'll sell, or is it something harder to predict like order size variability?

Another variable to track is the lead time between orders and delivery. The average lead time is calculated as the sum of the days it took to get n orders divided by n. This simple average helps you understand when you need to reorder stock. The chart below shows a simple example with a linear demand on inventory.



Average Lead Time = sum (lead days(1) lead days(n)) / n

Using the average lead time along with the variability in lead time will let you determine a good reorder point. The linear consumption example shown here and the fact that we're using a single supplier for our inventory makes the calculation easy. Using a diverse set of suppliers adds some complexity as each will have its own lead time to manage.

As firms look to diversify supply chains, lead times aren't the only things that vary. Quality will also differ from supplier to supplier and from order to order. Calculating and tracking the defect rate is fairly simple.

Defect Rate = 100 * fails/tests

Determining an adequate sample size to test is harder. The size of the sample will depend on the cost of testing and the time it takes, as well as the ramifications of defects in the finished product. If a $2 part is integrated so tightly into a $1000 assembly that a failure in that part would cause the entire assembly to be junk, then more careful testing is called for versus the case where the $2 part can easily be swapped out. Similarly, if it's expensive or time consuming to test a component, or the tests available don't necessarily reveal defects, then testing large sample sets may be prohibitive.

The sample size will also go up if the defect rate is highly variable from lot to lot. If destructive testing is required—say determining if the sheer strength of a bolt meets design requirements—then small batch testing will obviously have to do. If small batch testing shows flaws, more testing and working with the vendor to learn if there's been a change in its manufacturing process is called for.

A single defect may mean that a part is considered failed, but a single test likely will not find all possible defects. A complex subassembly could have hundreds of possible defects which are only discoverable using a variety of tests.

The math behind determining sample size is beyond the scope of this white paper because it takes a solid understanding of statistics to understand what's going on. You can use tables to determine how much testing you'll need to do in order to obtain certain confidence levels.

Quality control in manufacturing will be very different from quality control in retail, since quality testing will have to happen throughout the manufacturing process.

CHAPTER 2

Production Quality and Inventory Management

Selling products is good and therefore turning over inventory is good. But a good inventory turnover ratio is very dependent on your industry. Think egg farmers versus cattle ranchers. It's useful to look at overall inventory turnover in a quarter or year as well as turnover on a product-by-product basis. Overall inventory turnover is an indication of the company's health. The higher the turnover rate, the healthier the company should be, provided you're hitting the proper margins.

Inventory turnover = total cost of goods sold / average inventory

or

total cost of goods sold / ((beginning inventory + final inventory) / 2)

Let's say you moved $100 million in goods over the course of a year and your average inventory on hand clocks in at $8 million.

100 million / 8 million = 12.5 turns

When working at the product level, it's just as valid to look at units vs. cost of goods sold (COGS).

Speaking of (COGS), there are many ways to determine it. For retailers and distributors, the most straightforward approach is:

COGS = starting inventory + purchases − ending inventory

That's what accountants will need. However, that calculation misses indirect costs like stocking, shipping, picking, packing and some fraction of facilities costs like rent/mortgage, utilities and insurance. Whether or not you include these costs will depend on your goal for the calculation. The fully encumbered cost of products is useful in determining pricing and unit economics, but it's also harder to get right. The more variable costs are, the more you'll want to track them. Likewise, the more closely associated costs are with individual products, the more appropriate it is to include it in your COGS calculation. Packaging costs and shipping costs as well as core product costs are usually easily associated with each product.

On the other hand, adding in fractional costs like utilities, rent and insurance may not provide much insight. Viewing them as overhead and looking at overhead cost reduction projects separately is likely a more fruitful way to manage those costs.

For manufacturers, there's value in looking at COGS in a few different ways. First, it's more likely that a product will have dedicated salaries to add into the mix. Depending on the nature of the product and how many products the company produces, you may want to include the cost of sales (including marketing) and support.

Cost of Goods Sold = total direct costs + indirect costs

Direct = product / parts + labor to make

Indirect = costs to maintain like stocking, packaging, shipping, a fraction of facilities costs (rent/mortgage, utilities, insurance), support and quality control

However you decide to look at COGS, make certain that others understand what went into the calculation and what didn't, and why you decided to calculate the number that way. Since COGS will show up in many other calculations, you'll need to understand what's appropriate to include. For example, gross margin calculations shouldn't include overhead items like insurance and rent.

Related to inventory turn is days inventory on hand (also called days inventory outstanding). Generally, the lower the number, the better the company is at selling its stock. Dropping too low could be a concern for stockouts, but overall, lower is what you're after.

Starting with an average calculation gives you a yearly or quarterly benchmark to work against. That's good to know, but of course won't show seasonality or other event-driven demands.

Days Inventory On Hand = average inventory / average sales per day

Calculating actual days inventory on hand monthly can be a helpful way of checking on forecast accuracies. If your forecasts are on point, you should have good control of your stock on hand—at least within the limits of your facilities.

Holiday demand, for instance, can push past your production or warehousing limits. Monthly calculations will show how this has gone in the past and help with future planning. The monthly days inventory on hand might be calculated as:

MDIoH = (days in the month * (starting inventory + ending inventory) / 2) / cost of goods this month

Here's what it might look like with numbers:

(30 * ($8M + $10M) / 2) / $20M **= 13.5 days**

Here too, manufacturers have different challenges than retailers and distributors. Their inventory must account for more than just the finished product on hand. It'll also include raw material on hand as well as work in progress. Depending on what the calculation will be used for and how long production takes, you may or may not want to include materials and work in progress as part of your inventory.

CHAPTER 3

Warehousing and Order Fulfillment

Moving inventory isn't what it used to be. Technology can substantially help with maintaining accurate stock numbers and delivering the right products to the right customer at the right time. From barcodes and readers to RFID and warehouse automation, there's a lot of ways to ensure that orders are filled accurately and quickly. However you're picking, packing and shipping orders, you'll want to track your performance.

Let's start with picking accuracy. Even highly automated picking systems will occasionally get it wrong. It might be a misplaced barcode or a miscount or something else, but whatever errors occur, it's critical to understand frequency and causality. The formula for picking accuracy is:

Picking Accuracy = 100 * error free picks / total picks

Getting to a 100% accuracy is not achievable—stuff happens. And, at some point, improving picking accuracy will cause a decrease in throughput. So, it's important to know your throughput rates before and after implementing any corrective actions. Customers will forgive the occasional wrong order, as long as it's rare. Moving accuracy from 99.5% to 99.9% may be prohibitive and may slow delivery times.

When customers place an order, they're happiest when it's fulfilled promptly. That's not always possible. In some cases, you'll be able to fill orders shortly after receiving them, but not immediately out of existing stock. In other cases, you may have to let the customer know that some or all of the order is backordered.

The order fill rate is the number of orders that could be filled immediately from existing stock. It's a straightforward percentage:

Order Fill Rate = 100 * orders filled from existing stock / total orders

If you have 200 orders and fill 190 from stock, your order fill rate would be 95%.

But leaving those 10 customers without any product might not be the best business move. Depending on how your product is used by your customers, you might provide some partial shipments so that everyone has at least some of what they need on time. If you can fill the rest of the order before the customer would be due to order again, their business may go on uninterrupted.

Let's say that the typical customer orders 10 cases of widgets. So, rather than completely filling 190 orders, you might send just nine cases to 90 of those customers. That gets everyone something—so you can say you've got an order fill rate of 100%, but for 90 customers they'll be waiting for another case to complete the order. For those customers, their case fill rate would be 90%. It's likely that you'll develop business rules on how to manage partial inventory shipments. Getting 90% of an order might work for most customers, but it'll mean you've got to ship twice to 90 customers—which could be expensive.

Maybe some customers could live with half an order now and the other half in another week or two. You're 100 cases short of fulfilling all orders completely. So, how many customers would you need to accept half orders? 100 short / 5 cases to ship means 20 customers would need to take half orders.

Customers don't love backorders. They can throw off production schedules or otherwise disappoint end customers. Consistent stockouts will send customers looking for alternatives. Tracking backorders is therefore critical to understanding whether the business is meeting the needs of customers. You can look at backorders as the opposite of your fill rate. If you fill 90% of orders out of existing inventory, then 10% are backordered. That basic measure gives you a top line view, but really doesn't paint the whole picture.

If you generally fill backorders in a short period of time, say less than a week, customers might not care. Particularly if you warn them that you'll be a few days late. When delays stretch into weeks or months, it's clearly a much bigger deal. Tracking the days required to fill backorders each month helps track whether you're meeting customer needs. If your business rules have you making partial shipments, then tracking stockouts on a per product basis may be a better way of showing where attention needs to be applied. Either way, long term inventory issues will show up.

One of the benefits to using an online ordering system is that it can show customers your inventory on hand. Arming customers with your inventory data lets them better manage their inventory and play a part in managing your stockouts.

CHAPTER 4

Customer and Sales Metrics

If you're doing well against the KPIs we've described so far, it's likely that customers will be happy with your products and service. But customer satisfaction shouldn't be taken for granted. Most businesses will employ both direct and indirect measures of satisfaction. A simple five question survey once a quarter can usually give you enough data to see trends in customer satisfaction. Your sales team should be regularly talking to customers—they can ask and record the answers to the same five or so questions as well as get verbatim feedback on your products and service. The critical thing is that the process is consistent and that the data is tracked and analyzed. That's usually hardest to achieve when the sales team is collecting the data. Employing an outside firm is one way to get the data you want though there's obviously cost associated with that, and customers may be more willing to answer a call from their sales rep.

Most ecommerce systems will include a means of gathering customer feedback which can be shared publicly or kept private. Watching what the competition is doing here is wise. If they're showing customer comments on products and services, you may want to too. If they aren't, maybe you should, seeking a competitive advantage.

When industry data is available, the metric often used is Net Promoter Score or NPS. It asks one question:

How likely is it you would recommend our company to a friend? With ten being extremely likely and one being not likely at all.

Those who give you a ten or nine are your promoters. Fence sitters are sevens and eights. Detractors are those who gave you a six or less.

NPS = % promoters – % detractors

The value can range from +100 to -100. The average score in consumer goods is +43 and median is +50. Industries with a high NPS include education and training, and digital marketing agencies. At the bottom of the heap are cable, satellite TV and internet service providers (but you knew that already).

Using indirect measures of customer satisfaction may be just as useful as they're often less subjective than poll responses would be. Return rate should be tracked from both a customer perspective and product perspective. And if your products are delivered on a subscription basis, then customer churn rate should also be tracked.

Return Rate for Product = value of product returned / total sales

For customers, the below formula gives the overall return rate for all products.

Return Rate for an Order = value of returned goods / total order value

If the rate starts to go up, you'll want to know why. Return rates vary widely by industry and geography. Depending on the product sector, Germans return as much as 70% of their ecommerce purchases. Their average order is also higher. Buy three, keep the one you like and return the rest, would seem to be their philosophy. In other parts of the world and in other sectors, it can be less than 10%.

Tracking return rate on a product-by-product basis is also essential. Here it's probably more useful to compare the return rate of similar products. If you've got a 30% return rate on medium shirts of a particular style, but 10% the smalls and larges, it's clear there's an issue with the mediums.

Churn rate applies best to subscription businesses but can also apply to non-subscription businesses if purchases are regular enough. The idea is to track companies that cancel their subscription or stop ordering as a percentage of total business.

Churn = 100 * customers lost in a period / (customer at start of period + customers gained in period)

One challenge with this churn rate formula is that it treats new customers the same as old customers. Losing a customer after a month is not as bad as losing one who's been with you for a while. Depending on how your business goes, it may make sense to calculate churn for customers less than a year old separately from customers who've been with you more than a year.

If churn suddenly starts heading up, it could be a sign of quality issues, someone else offering a competing product for cheaper or simply changing market dynamics. Whatever the cause, it's important to find out since new customers are much more expensive to attract than existing customers are to retain.

Returns could be indicative of quality control issues or changing competition or market dynamics. Calculating and tracking average order value is a great way to arm your sales team with data on customer trends.

Average Order Value = total revenue / number of orders

This stat is widely tracked on a per industry basis, making it relatively easy to determine how your company does versus the competition. However, there's plenty of variability within industry segments. In apparel, shoe prices can range from $25 up to hundreds per pair, so knowing that the average order is around $120 might not be all that helpful. Looking at aggregate sales over a quarter can tell you generally how your company is doing, but looking at per product and per customer data is likely to be more actionable.

If your business is in transition from relying mostly on a direct salesforce to focusing on ecommerce, you'll want to see how average order size differs between the two. Similarly, you may want to track item count in each online order versus in your brick and mortar stores or from your direct sales team. Throw in order frequency (orders per month or per quarter) and you'll begin to develop a view of how customers behave differently depending on the sales channel they use.

CHAPTER 5

KPIs Drive Better Decision-Making

Every company should develop a set of KPIs and track them consistently, but be aware—finance teams are always more interested in KPIs than executives and other line of business managers. Developing better KPIs is a priority for finance but moving the needle with non-finance leaders requires some KPI interpretation.

One of the reasons it's so important to repeat and record your chosen KPI calculations is that it's often the change in the KPI that's important to business.

For example, if you tell your executives that the average order is $1,000 for Widget A and $1,200 for Widget B, you're not likely to get much interest. However, if you tell them that the average order is up 10% for Widget A and down 15% for Widget B in the last quarter, you'll get much more interest.

If you don't yet have a plan for collecting data and calculating KPIs, make one. Be prepared to revisit the plan regularly. At least twice a year it's important to ask yourself which KPIs are most used, and which aren't turning out to be all that useful. Where are you missing insights, and how can you get them? What have other executives wanted to know or what should they have known to manage the business better? The set we've provided here is a great starting point that should be accompanied by a plan for communicating the data to help business leaders make more informed decisions.

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