



THE FIVE MOST IMPORTANT SUPPLY CHAIN METRICS

Whitepaper



OVERVIEW AND INTRODUCTION

It's a well-known management axiom that you can't improve what you don't measure. This concept has been attributed to such varied sources as management guru Peter Drucker, Sir William Thomson, also known as Lord Kelvin, and W. Edwards Deming, father of Quality Circles. The truth is that although almost everybody agrees on the concept, nobody really knows who said it first.

Agreeing that measurement of key processes is important is the easy part. The hard part is agreeing on the most important supply chain metrics and the best way to calculate and calibrate the results. One of the biggest mistakes people make when they begin using KPIs is focusing on too many supply chain metrics. The second most-common mistake is not connecting the chosen metrics to the company's strategy.

THE VALUE OF SUPPLY CHAIN METRICS

There are hundreds of possible metrics and KPIs available, but try to limit the ones you use to five or fewer. Using too many metrics is confusing and makes it hard for your team to focus on priorities. Too few metrics may not provide enough information to help guide the business. The key is to use metrics that work together to point you toward challenged areas.

Your ERP, supply chain, MES and quality systems gather and store hundreds or thousands of data points every day. In companies that use disparate business systems, it may be difficult or impossible to get a cohesive picture of a process because the data points are stored in different databases and may use different schemas. This makes it hard to correlate information across the entire supply chain and complicates or compromises using metrics. Too much data, not enough data or data that's hard to get at — all complicate choosing the right metrics for your business.

Used judiciously in the right metrics, the data from your business systems can show you how your company is performing against your overall strategies. Using a few well-chosen KPIs can function as an early warning system, providing insight into current or potential problems that may affect revenue or customer satisfaction.

Consider KPIs to be like a GPS system for your business. You want just enough guidance to get you to your destination without getting lost. Too much information distracts you and makes it hard to concentrate on where you're going. Too little information leaves you wondering if you're on the right path.

Regardless of the systems you use, the reality is that there are five simple metrics that can show the health of any company's supply chain. They work together to help you understand how your business is operating and to pinpoint areas that need attention.



THE BIG FIVE

1. DIFOT

DIFOT, which stands for “delivery in full and on time,” is a measurement of perfect orders. Your performance here is probably one of the ways your customers measure your performance and decide if they want to keep doing business with you. DIFOT is one of the most important KPIs you can use because it will be an early warning of problems in other areas.

You should strive for a high DIFOT, meaning that most of your orders go out correctly, with no back orders, and by the scheduled delivery date.

DIFOT will show you if your warehouse is performing efficiently, and it is also an indicator of inventory accuracy and production’s performance to schedule. A high back-order rate will show up in DIFOT, alerting you to a potential forecast of scheduling problems. A downward trend in DIFOT is cause for immediate concern, since it points to an ongoing or developing problem.

2. Forecast Accuracy

Forecast accuracy is defined by APICS (an educational community for supply chain professionals) as a “measure of forecast usefulness.” It is usually calculated as the average difference between the forecast value and the actual value. An accurate forecast is essential to an efficient supply chain, since it is the road map for all inventory and production planning.

Forecasts that are too high result in excess inventory, tying up working capital in unproductive goods that increase the potential costs due to loss, damage or obsolescence. Forecasts that are too low result in too little inventory, stretching out lead times and causing unhappy customers. Too little inventory may also result in overtime, unnecessarily increasing costs of production and possibly causing the use of an excess of premium freight. Forecasts that are just plain wrong mean you will not have the products your customers want and that you will be increasing inventory of unneeded goods.

Aberdeen research shows that best-in-class companies have 57 percent higher forecast accuracy than less-performant companies do. They are also more likely to precisely calculate the inventory levels necessary to support a given service level.



3. Supplier Performance

Without reliable suppliers, you cannot hope to keep your plant operational, nor will you be able to satisfy customer delivery needs consistently. Poor supplier performance also increases costs in many ways. Late delivery increases downtime because of lack of necessary materials, and that may cause increased overtime expense to make up for lost production time. Poor quality causes rework or scrap. Although you won't be able to measure it directly, your supplier's performance may adversely affect your customers' perceptions of your company, resulting in lost sales and reduced revenue.

According to Aberdeen Research, 86 percent of top performers prioritize supplier assessments, while only 46 percent of other companies do. The report goes on to say that measuring quality and delivery performance is an "absolute requirement." Of best-in-class companies, Aberdeen reports that 82 percent measure supplier delivery performance.

You should measure every supplier on delivery performance, but don't measure against your requested date. Compare the actual date received with the supplier's committed delivery date. While you are starting this process with suppliers, you may want to set up an acceptable tolerance of a day or two that you will still consider "on time."

You also need to measure quality. This is most often calculated as a ratio of the number of good pieces received to the total quantity received. Some companies simplify the metric to the percentage of rejected lots. Although many companies don't, include non-conforming lots that you rework or decide to use as-is in the "poor quality" category, since this causes your company to bear the burden of rework and provides a clearer picture of the supplier's reliability.

One of the most important parts of measuring supplier performance is communicating your expectations and the supplier's achievement against the goals. Some companies have periodic discussions with suppliers; others send out monthly or weekly reports. Still others provide an online portal so the supplier can check their own performance.

Whichever method you choose to communicate the results, be sure to include trend information. Seeing a downward trend in quality may help the supplier identify process problems, and it may provide insight to your team about how seriously this supplier takes its commitment to your company.

When you notice a slowdown in throughput or DIFOT, look at supplier performance metrics to be certain you are getting the service you deserve from your suppliers.



4. Inventory Accuracy

As discussed above, high-performing companies calculate the inventory necessary to support their planned service levels. However, those calculations are wasted effort if inventory accuracy isn't high. Most ERP and supply chain experts recommend that inventory accuracy should be at least in the high 90s. Otherwise, it is impossible to plan production or give promise dates with any degree of consistency.

Low inventory accuracy may indicate an overcrowded warehouse or one without the right equipment for the material in stock. It could also indicate poor procedures, lack of training or the need for updated data collection equipment.

When inventory records are not accurate, it increases costs. It is likely that inventory will be too high, but much of the material will be unneeded.

Low inventory accuracy will adversely affect production efficiency and throughput, customer satisfaction, and DIFOT and product cost. It may also result in the need for additional storage space to house the excess materials.

5. Throughput

Throughput can be calculated on a money or unit basis per interval of time, but either way, it is an important signal about the performance of production and the supply chain. You can select any time interval that makes sense for you. Short cycle times such as a day or a shift give you fast insight into potential problems, but they may also introduce "nervousness" if your cycle time is longer than the chosen interval.

Conversely, a month is usually too long an interval. Many operations will smooth out over the course of several weeks, and using a long interval makes it hard to identify problems that could be intermittently affecting throughput.

When you measure throughput in units, your result is relatively easy to capture and compare to goals, but it may not provide the insight you need. Measuring throughput in money requires a calculation, but it may provide better insight.

The formula is revenue received minus totally variable costs divided by the time interval units. Here's an example:

| | |
|------------------------|----------|
| Revenue per week | \$10,000 |
| Totally variable costs | \$3,000 |
| Throughput | \$7,000 |

$$(\$10,000 - \$3,000) / 1 \text{ week} = \$7,000$$

Using throughput based on revenue to measure production is more effective than the traditional efficiency and utilization metrics for most companies. Both efficiency and utilization can be easily increased by keeping jobs running after the requirement has been filled or by cherry-picking available work for the easy orders. However, this practice can result in excess inventory, late deliveries and unhappy customers. Basing throughput on revenue ensures that production works on orders that can be shipped and billed right away rather than stockpiling inventory.

The throughput metric can show you have problems in production or your supply chain. Low throughput points to either a problem in the manufacturing process or material shortages. Looking at throughput along with forecast accuracy, inventory accuracy and supplier performance results will show you where to start your investigation.

CONCLUSION

While there are literally thousands of metrics that can be used to measure a company's performance, these five key performance indicators used together will point you toward the areas that are experiencing problems or those where improvements will have the greatest impact on improving efficiencies. Using a single technology platform that incorporates ERP, MES and Quality data will have the greatest success in providing a cohesive picture of the supply chain to deliver results that help meet your strategic objectives.

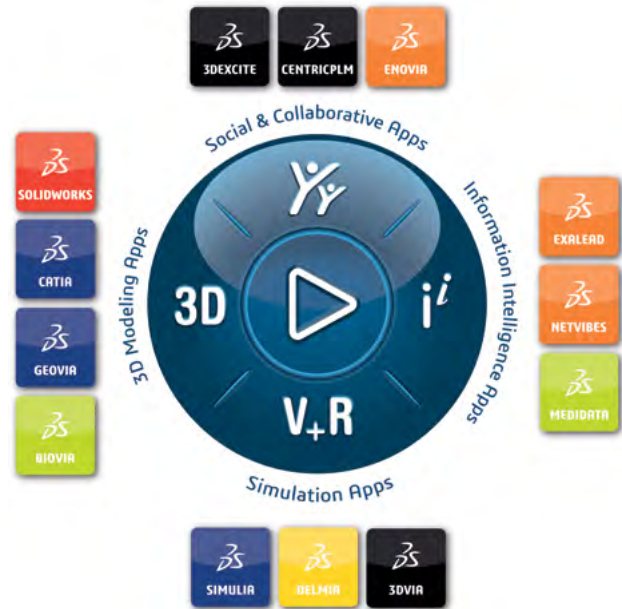
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