How Analytics, Dashboards and Intelligence are Transforming Manufacturing

Analytics and Dashboards are useful tools for manufacturers especially when they are role based for the users.

AT A GLANCE

- Manufacturers are driven by on-time delivery and high customer satisfaction while measuring and ensuring quality.
- The need for accurate analytics is increasing rapidly.
- Manufacturers gain business intelligence through real-time analytics.

THE PRODUCT AND PROCESS QUALITY RACE NEVER ENDS

Today's supply chains are in a race to deliver the highest quality products in the shortest, most economical time possible to win the chance to sell again. With such an intense focus on quality, speed and cost, only the suppliers most effective at translating data into decisions are going to win new business and grow.

This white paper is for manufacturers who want to win the race of continual product and process quality improvement. And the fastest way to keep improving is to select the most valuable key performance indicators (KPIs) and metrics of performance that can guide their organizations to better manage time-to-market, compliance, and the continuous need to reduce cost of quality.

One of the most important metrics of all, overall equipment effectiveness (OEE), is critical for suppliers to focus on. This metric provides insights into the overall health and stability of production systems and

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assets and can signal when a specific production asset, subsystem or assembly needs to have periodic maintenance completed.

High performance manufacturers rely on OEE to keep their entire manufacturing strategy aligned and optimized to customer requirements. One of the best ways to make OEE continually improve is to create a unified, strategic quality management system that successfully ingrains quality-driven analytics, KPIs, and metrics into the company's organizational culture.

Manufacturers' ability to accomplish more begins with a unified, single view of quality and inventory across their entire manufacturing, quality management, inspection, delivery, and service operations. Legacy systems that tend to perpetuate mediocre performance and practices need to be stripped away, leaving only the most essential processes necessary to excel. It's time for a good housecleaning at many manufacturers who have let legacy systems build up and clog performance, draining profits away from total company performance. Analytics and manufacturing intelligence can help suppliers' slice through legacy systems' roadblocks to improve supplier quality and production performance.

ACCELERATING QUALITY AND COMPLIANCE WITH ANALYTICS AND DASHBOARDS

When analytics are used to measure quality corporate-wide, manufacturers stand a better chance of breaking down silos that keep their companies from achieving more. Too much reliance on just measuring the performance of a given department, division, product line or program virtually guarantees mediocre performance.

Silos of excellence get created and fed when quality management stays in just one department or place over time. As the OEE metrics show, the greater the breadth of quality management and engraining of quality as a core metric of how a company measures itself, the greater the performance on customer-centric metrics as well

> *Breaking down silos of excellence and the systems that fuel them takes more than just speeches and calls for change by senior management. Nothing changes organizational cultures faster than reality-based reporting of actual performance results. It's been Oracle's experience that the more transparent any leadership team is in publishing performance results; the faster cultures change. Add in analytics and metrics that measure – and reward collaboration – and the culture of any business will change fast. And if manufacturers are ever going to achieve the highest potential, they are capable of as businesses, they must choose the path of reality-based results and be bold enough to publish them to the entire company. That makes change real.*

HOW SUPPLIERS PROGRESS TO MASTERY OF ANALYTICS AND DASHBOARDS

From manufacturers who dabble with analytics to those that have a degree of mastery that often surpasses analytics systems designers, there is a clear hierarchy of analytics and dashboard maturity in this industry.

Those that dabble in analytics and dashboards have just begun looking at how advanced constraint modeling, legacy system and database integration can improve their performance as suppliers.

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Suppliers at an intermediate level of expertise have successfully created rules and constraint engines that deliver greater insights and intelligence than standard off-the-shelf applications do. They have also created a more unified system of record that provides quality management reporting across multiple departments of an organization. Nearly 20 percent of all quality management reporting and data are in real time. Suppliers at this intermediate level of maturity have successfully created a quality management and compliance strategy that breaks down the silos keeping their manufacturing operations from having a more compressive view of performance. Visiting a supplier at this level of maturity provides a glimpse into how to best manage metrics to deliver real organizational change. Trending diagrams and Statistical Process Control (SPC) charts are located in break rooms and throughout facilities. There is a clear view into operations from flat screen monitors in break rooms. And the highest performing teams are clearly provided recognition for their contributions to greater quality, improving time-to-market, and streamlining compliance.

The most advanced stages of suppliers have real-time dashboards that provide quality management and compliance metrics, combined with financial measures of performance. Suppliers at this highest stage of maturity are attempting to gain insights into how time-to-market, cost of quality, and compliance can improve financial performance over time. Often suppliers who have advanced to this level of maturity also have the ability to gain real-time shop floor performance data and financial performance metrics. This plant floor to top floor visibility is enabled on cloud platforms that scale securely across suppliers' global manufacturing operations. At this stage of supplier maturity, cloud computing becomes a critically important technology to enable greater visibility into each area of maintenance, production, and service. Choosing the right KPIs and metrics can accelerate the maturation of suppliers to this level, providing valuable financial insights into financial performance in the process.

SELECTING THE RGHT KEY PERFORMANCE INDICATORS (KPIs) AND METRICS

Choosing the best possible KPIs and metrics needs to start at the strategic level, concentrating on just the most critical analytics. Often suppliers will balance their dashboards with leading and lagging indicators of performance. This provides a more continual view of performance over time. It also, as one supplier told Oracle, provides a better alignment of financial performance metrics that tend to be more lagging in nature, to true quality management and production performance.

One of the most valuable takeaways Oracle has learned in providing the Oracle Manufacturing Cloud is the need to keep the maximum number of metrics on a dashboard to six at the most. The KPIs and metrics need to provide a glimpse into each step or phase of the project as it is completed and moves on to delivery.

The following are a series of KPIs and metrics most often found on suppliers' dashboards:

- Customer Complaints – This is easy to capture and powerful in ingraining the need for greater quality management throughout an entire organization. Great suppliers use this as a means to further change processes on an ongoing basis and keep improving. Benchmarking customer complaints is a highly effective strategy for also providing everyone involved in quality management, compliance, inspection, logistics, and service with feedback.

- ECO/ECN Change Rate – Engineering Change Order/Notice change rate is an indicator of how well a given project is progressing relative to original plan. This metric can also provide a glimpse into

whether a more advanced production strategy needs to be put into place including build-to-order, configure-to-order, or engineer-to-order.

- Overall Equipment Effectiveness (OEE) – measures the current state of machinery on the production floor and in advanced dashboards is used for defining Maintenance, Repair and Overhaul (MRO) metrics and visibility.

- On-Time Shipment Rate – measures how often a given order has been completed on time and the accuracy of the shipment itself. This is one of the components of the perfect order as well.

- Perfect Order Performance – an excellent indicator of how effective supply chain integration is within a supplier relative to distributed order management and logistics. The perfect order metric is often used in high velocity supply chains to determine order fulfillment accuracy and performance.

- Product Compliance – This can be measured using Corrective Action/ Preventative Action (CAPA) and Non-Compliance/Corrective Action (NC/ CA) measures of performance. Using a cloud-based platform and series of applications to capture this data ensures greater accuracy as each department is entering their specific data in real time and there is greater visibility company-wide as well.

- Supplier Defect Rate – Relying on supplier audits and quality sampling techniques, the highest performing suppliers' chart this daily based on inbound components, subassemblies, assemblies, and materials to ensure only the highest quality items make it into production. This is an excellent measurement of overall supply chain performance and how effective supplier quality levels have been ingrained into all suppliers that are part of the broader network.

GANING A 360 VIEW OF SUPPLIER QUALITY AND PERFORMANC MANAGEMENT

The following series of KPIs and metrics provide a complete view of a supplier's business over time. At Oracle, our customers use these metrics to evaluate overall Enterprise Resource Planning (ERP) performance as well.

AREAS OF MEASUREMENT	BASELINE: WHAT TO MEASURE	PERFORMANCE EVIDENCE
Company Specific	Project Costs and Expenses	Use as a baseline for defining ROI
	Number of Orders per Year	Determine configuration's impact on Inventory Turns
	Current Inventory and Costs	Inventory Turn Savings
	Customer Data	Lifetime cost per customer; avg deal size by customer
Sales	Order Cycle time	Order cycle time reduction of 65%or more recorded with mfgrs contacted

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	Cost Of Sales	Days Sales Outstanding reduction from 60 to 29 days on avg.
	Cross Sell and UP sell Revenue	Increase of 33% on aggregate
	Average sales price per order	Increase from 9% to 26%
Quote and Ordering	Average Cost to Complete an Order	95% cost reduction per order
	Special Pricing Requests	Over 100% ROI on automating special pricing request
	Bad or Incomplete Orders	Incomplete order reductions of 20%
Customer Service	Number of Customer Complaints	98% reduction in cost of simple requests
	Revenue Lost to Churn	60% cross selling is used with quote to order
	Number of Calls on Order Status	Median level per 500 per week to 70

ANALYTICS SERVES AS A FOUNDATION FOR MANUFACTURING INTELLIGENCE

Breaking out of organizational silos needs to start with analytics, KPIs and metrics of performance and continue with manufacturing intelligence. Gaining greater visibility across the KPIs and metrics needs to be used over time to create a knowledge base of how supplier activities and programs are performing.

Creating a context of KPIs and metrics of performance needs begins by aligning them to roles in your company. Defining benchmarks for supplier performance that are shared, not soiled, is key. Once analytics and metrics are defined, the data question and consolidation gap every supplier has needs to be addressed.

Many manufacturers turn to cloud platforms to better integrate data acquisition and consolidation company-wide. Cloud-based quality management and compliance systems can also accelerate the level of learning going on in a supplier, enabling greater collaboration and communication. In the best-run manufacturers, communication and collaboration are more valuable than cash – because the tight integration of the supply chain and enterprise leads to fewer order errors and higher performance.

Building a manufacturing intelligence layer using a cloud platform also makes it possible to better capture and capitalize on the lessons learned from the OEE metrics captured, minimize the cost of poor quality (COPQ) and better define to the machine level quality performance metrics essential for profitable operations.

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