

Enterprise-Level Strategies for Leveraging Big Data



5 must-have elements for your innovative
Quality Management system

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Leverage Your Valuable Quality Data

Using Manufacturing Intelligence, manufacturers today have the opportunity to leverage Big Data from batch, discrete, or continuous process environments to drive strategic decision-making and control the quality, consistency, and cost of produced goods. But although manufacturers realize the importance of end-to-end data visibility, they continue to operate in an environment without any shared approach to quality, environments, and standards.

A total enterprise quality system allows manufacturers to leverage Big Data to ensure that quality practices are maintained throughout the entire product life cycle. Big Data is no longer a trend or buzzword; manufacturers who are using their vast stores of data to ignite quality improvements through analysis and action are seeing next-level transformation that differentiates them from the pack.

Why is it important to be able to get this full view of data? Because although a wide array of sources contribute to product quality, not all sources are contained within the four walls of one single plant. In reality, anyone who touches any part of product design, development, and testing plays an important role in ensuring quality. Quality contributors include suppliers, sister plants, and even commodities distributors across the globe.

That's why enterprise visibility is at the forefront for many manufacturers aiming to bolster continuous improvement. In fact, Aberdeen Group's research regarding supply chain visibility revealed that as many as 44% of survey respondents cited the growing complexity of the supply chain as their top business pressure.¹

Because it's critical for manufacturers to be able to assess data from both inside and outside their four walls, organizations are increasingly looking to innovative technology and enterprise quality systems to achieve end-to-end supply chain visibility. With an enterprise-wide view of quality, manufacturers can transcend their toughest challenges and ensure integrity of their products and their brands.

Through a centralized, single data repository — a quality hub — manufacturers can bring real-time manufacturing product and process data from multiple sources into a single repository for reporting, analysis, visual summaries, and data synchronization between enterprise-level and plant floor systems.

¹ Aberdeen Group, *Supply Chain Visibility Excellence: Mastering Complexity and Landed Costs*, 1 March 2012, Analysis by Bob Heaney.



5 Must-Have Guidelines to Increase Global Competitiveness

So how do you build this essential quality hub? At a high level, an enterprise-wide quality system needs bring all data together into one place for the entire organization. There are many nuances and functionalities needed in a useable system, but it's important to consider five key strategies when evaluating the features and functionality of the system:

- 1. Centralize quality data in a single, secure, and easily accessible repository.**
- 2. Streamline the process for collecting data and integrating disparate plant-floor systems.**
- 3. Enable real-time monitoring and analysis for live data and historical data from any plant or supplier in the world.**
- 4. Simplify management of workflow with automated and event-based tasks and reminders.**
- 5. Ensure sophisticated reporting capabilities to support the needs of users at all levels.**

These strategies will help you take control of Big Data and join the ranks of some of the globe's most innovative and competitive manufacturers.

Through a quality hub, manufacturers can bring real-time manufacturing product and process data from multiple sources into a single repository for reporting, analysis, visual summaries, and data synchronization between enterprise-level and plant floor systems.

Pro Tip: What to look for in a quality hub

When considering what is most important in a centralized data hub that can truly set your quality efforts and data collection apart, take into account some of the following features:

- › A highly functional statistical analysis engine
- › An engine that can process and efficiently manage data from a variety of sources
- › A statistical engine that delivers multiple tools, reports, and analysis
- › A centralized repository that reveals opportunities for overall quality improvement

1. Centralize Quality Data in a Single, Secure Repository

One of the most essential components of an enterprise-level Quality Management system is a centralized Unified Data Repository in which all data is written. The database resides in an enterprise-accessible, secure data center that controls access for any number of user roles. The inner core of the hub should be a highly functional statistical analysis engine that can process and efficiently manage data from any number of sources. The statistical engine delivers a wealth of tools, reports, and analysis that reveal opportunities for overall quality improvement.

Single repository for data

The quality hub data model requires all data to be tagged with an enforced universal data description. At a minimum, what universal descriptions should be included? Consider data descriptions such as:

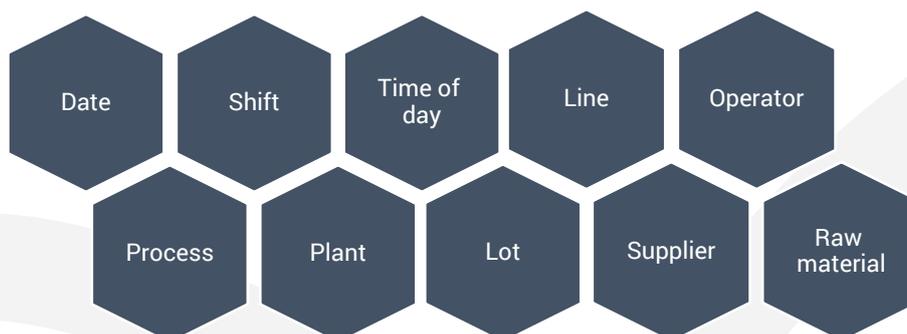
- › Part
- › Test name
- › The process (operation) that produced the test
- › Site designation (for multi-site deployments)
- › Supplier data (when suppliers are included)

Likewise, using a universal naming convention for products and processes will help streamline data collection as well as analysis on an organization-wide level.

Real-time access and traceability become a reality with universal naming convention standards at multiple sites and among suppliers. Each data value is tagged with a company, site, part, test, process, time stamp, operator/employee who entered data, and other descriptive information. As a result, you have instant access to live and historical analysis.

Data summary

Drill-down features allow large sets of data to be subdivided into ever smaller sub-sets:



Immediate, system-wide setups and changes

In manufacturing environments, any system user interface needs to be efficient and user-friendly. That is, the setup needs to include live, on-the-fly selectable links to the database so a single setup can be used to access any number of parts, processes, and tests from the centralized data hub. User interfaces that are unique to a part of process serve no purpose in an enterprise quality hub because the number of setups will become too massive and unmanageable. The logic of “one change, global updates” needs to be a part of your user-interface creation.

Preparing for Analysis

What are some of your requirements for bundling data and making new data available? Make a checklist like this:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Easy and intuitive | <input checked="" type="checkbox"/> Free from constraints |
| <input checked="" type="checkbox"/> Automatic | <input checked="" type="checkbox"/> Easy to access |
| <input checked="" type="checkbox"/> Efficient | <input checked="" type="checkbox"/> Simple to pull valuable, relevant data |

2. Streamline the Process of Collecting Data and Integrating Disparate System

Data acquisition is a critical link between operations and decisions made by leadership and executives. As the birthplace of Manufacturing Intelligence, data acquisition is imperative to ensuring that what is collected is useful for real-time and continuous improvements.

The real cost of paper and pencil

The practice of entering data on paper forms and then entering it again into spreadsheets is limiting. In addition, the perception that this low-tech method produces any cost savings is unfounded. Automated data entry moves data from the source of measurement directly into the quality hub.

To eliminate human error and increase productivity levels, all paper forms should be converted into software interfaces that write the responses to the quality hub. This method ensures inclusion of required process data, such as receiving inspection, in-process, finished goods inspection, and final tests. In addition, for maximum efficiency, safety, pre-operation, or compliance checks such as Hazard Analysis & Critical Control Point (HACCP) checks should be converted into electronic format.

The resulting elimination of “data islands” can be the single largest contribution toward a true enterprise quality system.



3. Enable Real-Time Monitoring & Analysis

To improve operations across your plant and throughout your organization on an enterprise level, staying in front of problems on the plant floor is essential. As live data flows into the hub, visual indicators identify when data contains information that can be used to reduce scrap and rework. When you see the improvements and cost reduction occurring on one line, multiply those results across multiple plants, then across your entire organization. The realization of legitimate savings quickly becomes obvious.

Rather than reacting to recalls, customer complaints, or problems in the field after issues have occurred and product has been shipped, quality problems can be dealt with the moment they occur – and before they cause significant issues. Additionally, best practices that lead to significant improvement at one plant can extend across your entire enterprise.

Instantaneous updates and access

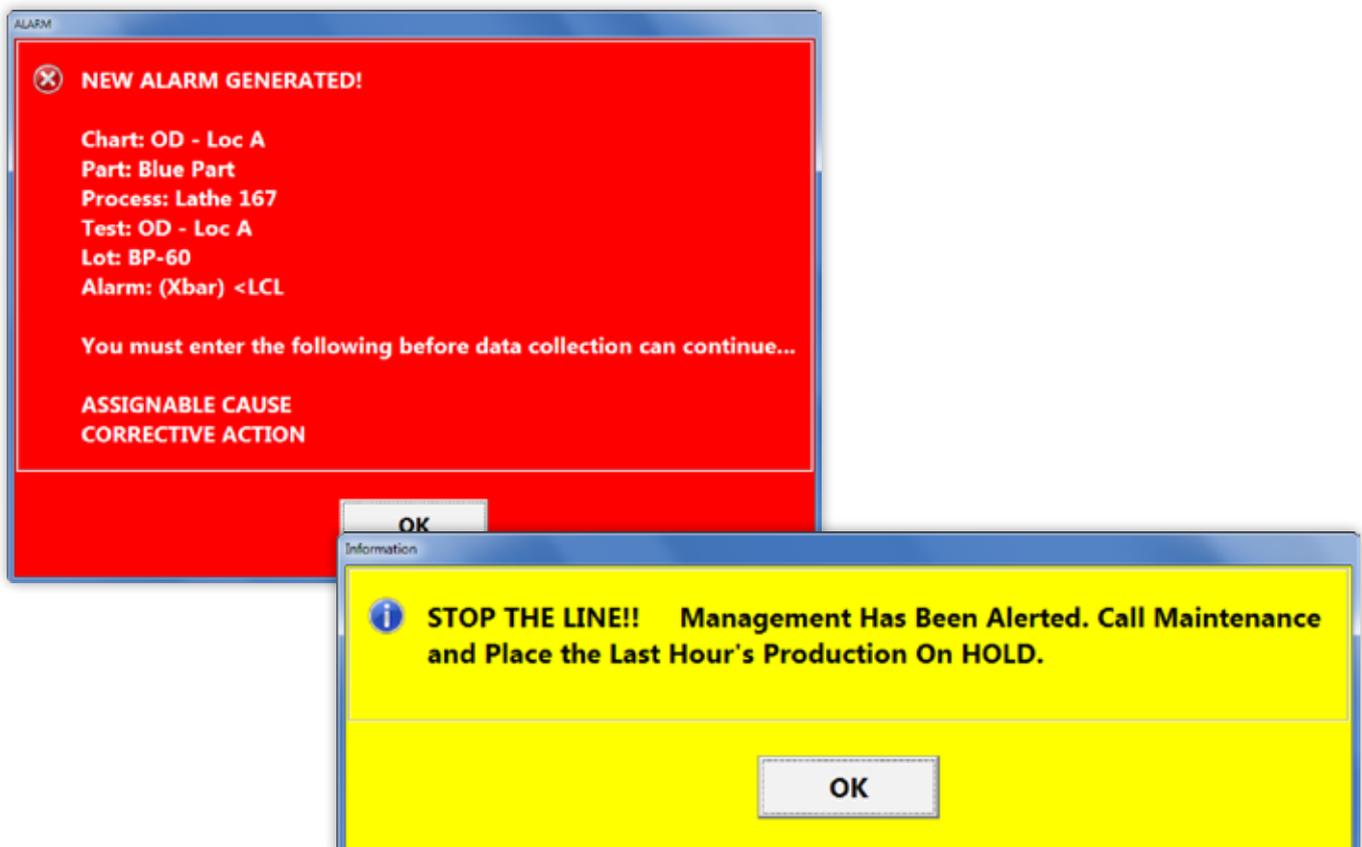
Charts and reports need to automatically update whenever new data arrives. These charts and reports must be accessible to anyone who has proper access privileges, anywhere, and anytime. If users can access their network, they should have access to the quality hub.

Statistical control charts and visual cues

The statistical tools must model the data's personality. A platform that just collects the data you need will no longer suffice. Instead, a Quality Management system that helps you transform that data into analysis and action with visual charts and dashboards will transform the way your organization deals with quality. Instead of responding to problems, visual analysis and charts promote proactive action.

Automatic and remote monitoring capability

Assigning specific personnel to watch all process streams and communicate issues globally is at best, inefficient. A total enterprise quality system supports the ability to monitor data streams that are being written directly into the quality hub. When non-conformances or statistical anomalies are detected, the software automatically notifies the appropriate people so they can, in turn, access the hub to visualize the data stream and take immediate corrective action.



4. Simplify Management of Workflow with Event-Based Tasks & Automation

In order to ensure that the right people take the proper actions in a timely manner, the quality system needs to include reminders and count-down timers for when data must be collected. These workflow management functionalities need to alert users when specific data collections are needed.

Process alarms and automated alerts

When out-of-specification issues arise, workflow management features can automatically escalate data collections, validations, or confirmations to be entered – even from workstations upstream or downstream from where the problem occurred. Quality managers and other professionals should be automatically alerted and even asked to validate that corrections have occurred.

Dynamic sampling workflow

A quality system should have the ability to remind users to collect data in either pre-set or dynamically based changes in the manufacturing environment. These alerts should trigger a non-human response. Instant and accurate access to process signals and significant trends is vital to the success of any agile quality system.

IT considerations: Simplified data flow

The benefits of an enterprise-wide Quality Management system reach not just C-level executives, quality managers, and plant floor operators, but also affect IT departments. For IT managers, an end-to-end quality system helps simplify data flow.

A quality system that standardizes data in a single location allows IT managers to easily and efficiently maintain multiple sites. When an IT professional receives a request to pull data for analysis, a single, centralized hub eliminates the time and frustration of extracting data from multiple repositories. And in the best case, end users can create their own reports on demand, without taxing IT resources.

Furthermore, a scalable system that is built to support future company growth eliminates the need for IT personnel to continuously revisit and upgrade existing technology. This gives IT managers room to focus on more pressing projects instead of spending time and resources updating antiquated software and searching for new solutions.

With such a system in place, quality professionals can work with IT staff instead of relying on them for basic technical fixes and data acquisition across disparate systems and databases. An end-to-end quality hub, made possible by advancements such as cloud computing and mobile technologies, naturally offers benefits such as advanced enterprise-level security measures, built-in disaster recovery, and extensive global reach.

A true enterprise quality system significantly improves the ability of IT staff to focus on strategic projects instead of putting out fires and fighting outdated, inherited systems. IT team members benefit from time-savings, and the organization benefits from the visibility gained by extending technology infrastructure and quality systems beyond the four walls of a single plant, across the enterprise, and throughout the supply chain.

5. Ensure Sophisticated Reporting Capabilities

Retained data needs to be treated as historical records that describe how a process behaves under various input conditions. With an enterprise-level quality hub's advanced reporting suite, users can leverage Manufacturing Intelligence to continuously improve operations now and in the future.

Actionable insight

Enterprise dashboards and reports — accessible via laptop, smartphone, or tablet — are essential because they provide high-level executive views into quality performance. A quality hub gives users the ability to interact with data, thus delivering insight to all parts of the organization. Ideally, data is accessible from virtually anywhere, at any time, and extends Manufacturing Intelligence beyond the four walls.

Customizable reports and visualizations

By offering the ability to create custom reports and visualizations, a quality hub allows the user to take a more analytical role in the organization. With an infinite number of ways to organize and view data, users can use this information for their own purposes, or even to better, to inform colleagues and consumers.

Multi-level data mining

The robust analytical capabilities of a quality hub allow users to “slice and dice” data in countless dimensions, such as by line, product, geographic region, and even supplier. Reports serve many customers and purposes, so they need to be flexible, with the ability to incorporate as much detailed or high-level information as necessary for the intended audience.

Turn Data into a Competitive Advantage

Manufacturers reside in a more competitive business environment than any industry. Manufacturing is about making things; it is tangible, and the products have meaning and purpose in peoples' lives. There is a pride and dignity in a manufacturer's work — an opportunity to do something better than anyone else, to increase the margins, to create real value.

This tradition drives a need to constantly improve the processes that power the manufacturing engine. A company's products reveal exactly what they are, and in the global marketplace quality, cost, and service are the only things that matter. The world's most profitable manufacturers understand this concept. They don't cut corners on quality because they've seen how a higher standard of quality reduces costs and positively impacts service through improved customer satisfaction, fewer warranty claims, and a mitigated recall risk.

The competitive advantage is in the numbers

Every organization is collecting data but without a central organizational structure, the data is just bits and bytes that cost money to collect and store but provide no enterprise-wide value.

Successful companies are leveraging modern technology to gain Manufacturing Intelligence and a true understanding about what, where, when, why, and how their products are being produced. They are using statistical methodology to create a competitive advantage to win business over those who believe what they are doing now is good enough.

It's time to turn “good enough” into “nobody's better.”



About InfinityQS International, Inc.

InfinityQS International, Inc.[®] is the global authority on enterprise quality. The company's Manufacturing Intelligence solution delivers unparalleled visibility across the enterprise, from the shop floor to the boardroom, enabling manufacturers to re-imagine quality and transform it from a problem into a competitive advantage. Powered by centralized analytics, InfinityQS solutions provide operational insight to enable global manufacturers to improve product quality, decrease costs and risk, maintain or improve compliance, and make strategic, data-driven business decisions.

Headquartered near Washington, D.C., with offices in Seattle, London, Beijing, and Shanghai, InfinityQS was founded in 1989 and now services more than 40,000 active licenses with more than 2,500 of the world's leading manufacturers, including Kraft Foods, Ball Corporation, Boston Scientific, Graham Packaging, and Medtronic. For more information, visit infinityqs.com.

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