

6 Ways Companies Solve Problems with Data Analysis

No matter what business you're in, you need to solve problems. And using data analysis to understand those problems leads to the most successful solutions—no matter what business you're in.

Not long ago, analyzing data could be a very difficult challenge, but modern statistical software makes it easy to graphically and statistically explore your data, and use the results to make major improvements.

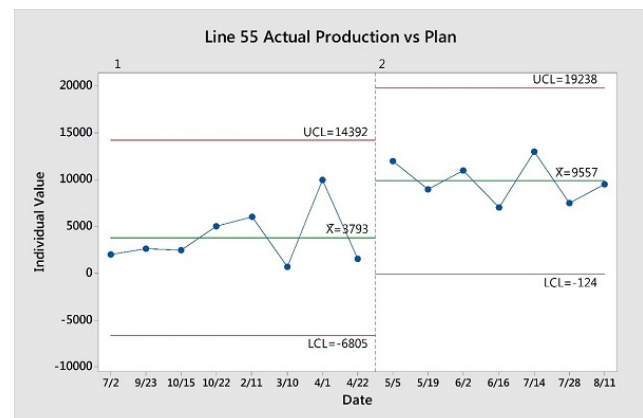
You're going to see how six very different businesses, with very different problems, used data to identify and implement solutions.

We hope their stories inspire you to solve problems with data, too.

For more details about how these businesses use data analysis to solve problems and improve quality, read their complete stories at www.minitab.com/success.

1. Reducing Downtime

To meet consumer demand for more beer varieties, Anheuser-Busch InBev expanded its operations to offer more than 200 brands. But pausing, changing, and restarting the production line to make all of these different beers created excess downtime, which began to limit the bottom line.



Control charts were used to establish limits and ensure results were sustained in the future.



Anheuser-Busch InBev wanted to reduce production line downtime to more efficiently brew a greater variety of beer.

To understand the causes of the downtime, a project team started by gathering an array of process data. They used Pareto charts to identify the biggest contributors, histograms to understand process behavior, and control charts and other graphs to compare multiple shifts and breweries. They found that the core causes of excessive downtime included a standard operating procedure for line conversion that was far from optimal. And with hypothesis testing, they found significant differences in how different shifts executed the line-change process. They also discovered these issues were consistent across facilities and processes.

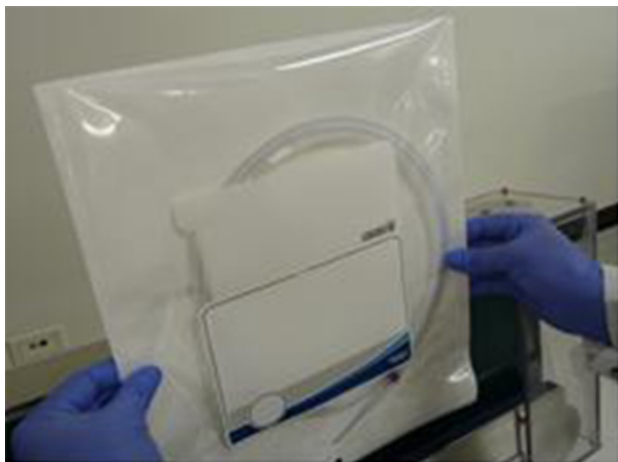
The team created solutions based on the core causes of the downtime, validated the solutions in a pilot test, and then applied the solutions across many facilities. These data-driven improvements reduced planned downtime by 34%, cut the time it took to resume production by 40%, and slashed related costs by more than \$430,000. Shorter downtime also meant the line conversion process required less energy, providing additional savings.

Read the full case study at www.minitab.com/Case-Studies/Anheuser-Busch-InBev/.

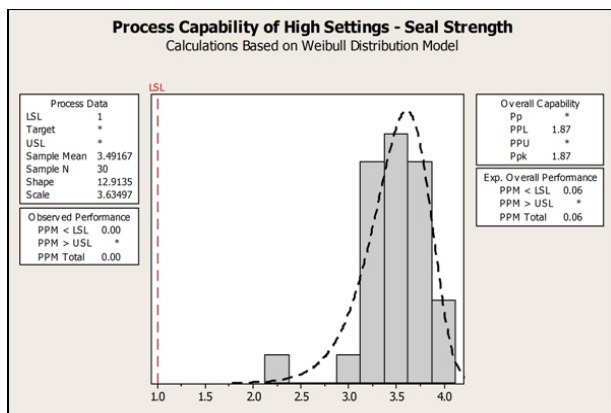
2. Validating Process Changes

Medical device manufacturer Boston Scientific's facility in Heredia, Costa Rica, set out to improve the packaging for guidewires used during surgical procedures such as catheter placement or endoscopic diagnoses.

Using smaller packaging for their guidewires would substantially reduce material costs, but the company needed to prove that the new pouches would work with their sealing process, which creates a barrier that keeps the guidewires sterile.



A project team at Boston Scientific's Costa Rica facility needed to analyze data that would validate the pouch-sealing process for packaging the guidewires used for medical procedures. Above, the guidewires are shown loaded in a pouch, ready for sealing.



The team performed process capability analysis, which helped them to prove that the proposed temperature settings would allow them to achieve end production goals.

To ensure that the seal strength for the smaller pouches met requirements, they evaluated the process and identified several important factors, such as the temperature of the sealing system. They then used a statistical method called design of experiments (DOE) to determine how each of the variables affected the quality of the pouch seal.

The DOE revealed which factors were most critical. Armed with that knowledge, the team devised optimal process settings to ensure the new pouches had strong seals. To verify the effectiveness of the improved process, they used capability analysis, which demonstrates whether or not a process meets specifications and can produce good results.

The analysis showed that guidewires packaged using the new, optimal process settings met, and even exceeded, the minimum seal strength requirements.

With the new pouches, Boston Scientific saved more than \$330,000. "At the end of the day," a key team member noted, "the more money we save, the more additional savings we can pass on to the people we serve."

Read the full case study at www.minitab.com/Case-Studies/Boston-Scientific/

3. Increasing Patient Satisfaction

Healthcare providers place great emphasis on patient satisfaction. In the United States, a survey called the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) measures overall patient experience. Scores depend on the percentage of positive responses for categories including communication with doctors and nurses, clarity of discharge information, overall hospital rating, and more.

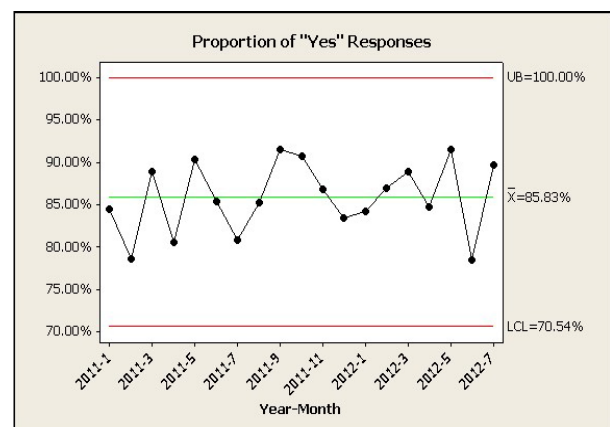
The Riverview Hospital Association in Wisconsin used data analysis to identify patient groups who scored lower on patient satisfaction, allowing the hospital to target improvement efforts to specific patient populations.

The hospital assessed baseline performance by plotting outcomes from the previous 24 months, and found the average positive monthly response rate was 85 percent. A project team set out to exceed a preset benchmark of 91 percent.

To understand the factors underlying low scores, the team analyzed patient data collected as part of the HCAHPS survey, including age, gender, length of stay, primary language, education level, and more. The team used charts, histograms, and an analysis of variance to reveal patterns and trends in the data.



Riverview Hospital Association relies on statistical analysis to make data-driven improvements to patient satisfaction and the quality of care.



With control charts, the Riverview Lean Six Sigma team assessed and monitored baseline positive customer satisfaction response rates over several months.

Visualizing the data helped the hospital take a very large problem—improving overall patient satisfaction—and make it manageable. By identifying which patient populations scored lowest in satisfaction, the project team was able to direct their improvement efforts to those patients who tended to be most dissatisfied.

"Historically, health organizations try to increase patient satisfaction through staff training and other large-scale solutions," says a key team member. "With a data-driven approach, we are able to better target improvements."

When the hospital compared survey responses collected after their improvements to those collected earlier, the increase in average positive responses was statistically significant, and surpassed the 91 percent benchmark.

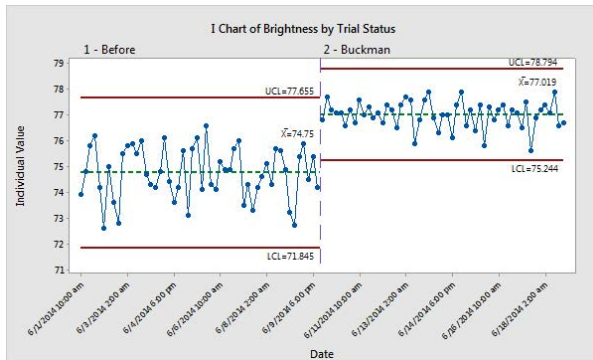
Read the full case study at www.minitab.com/Case-Studies/Riverview-Hospital-Association/

4. Driving Sales

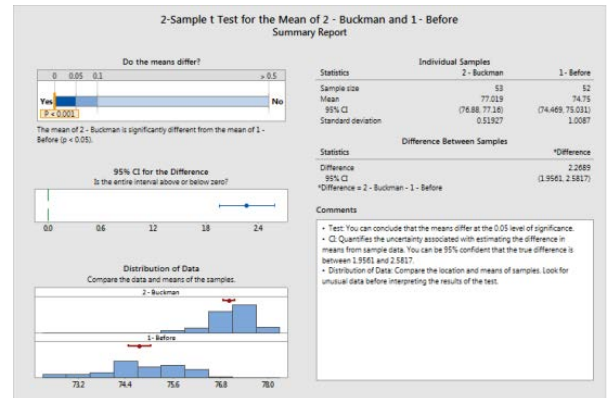
Buckman, a global chemical company, began a quality initiative in response to a challenge many companies encounter: solid sales growth, but a relatively flat operating profit. "We were adding activities and costs that superseded any of the benefits we received from increasing sales," said a key Buckman team member. "So the widening sales-versus-profit gap became the battle cry for our continuous improvement initiative."

The company focused its efforts on the technical field sales associates—a role Buckman knew was critical to driving sales. These associates, who have backgrounds in chemistry, biology, or engineering, work directly with Buckman's customers to help them assess their processes and look for improvement opportunities. Analyzing customer data is a key part of their selling process.

To enable the sales associates to better help their customers improve processes, Buckman developed Lean Six Sigma courses, which linked appropriate statistical tools to each step of the associates' selling process. For example, they learned to perform statistical analyses such as process capability—which can help determine whether a process is capable of producing output that meets customer requirements.



The control chart with stages above shows the impact that a product had on the process average.



To determine if there was a statistically significant improvement resulting from a Buckman product, associates are taught to run a 2-sample t-test to assess the difference between the two means.

Tools such as control charting, hypothesis testing, capability analysis, and regression help associates effectively and efficiently complete their job activities. Buckman has trained more than 500 field sales associates worldwide to date. "Since implementing the field statistics training, we have examples of where we've sold new business or protected existing business because of our improved data analysis skills," noted a key team member.

Read the full case study at www.minitab.com/Case-Studies/Buckman/

5. Improving Inspections

Burley makes bicycle trailers that set the worldwide standard for safety, durability, and design. While they've always rigorously tested and inspected their products, they wanted more insight into the production process to drive more effective improvements.

A review of historical inspection data revealed discrepancies between what inspectors at Burley's headquarters considered a defect versus what inspectors at an overseas manufacturing plant flagged as a defect. These discrepancies resulted in unnecessarily high scrap rates, which caused extra costs to be incurred during the production process.



In terms of durability, stability, structural integrity, and other criteria, Burley's products more than live up to their name. The company analyzes process data to make sure their products meet or exceed quality and safety standards.

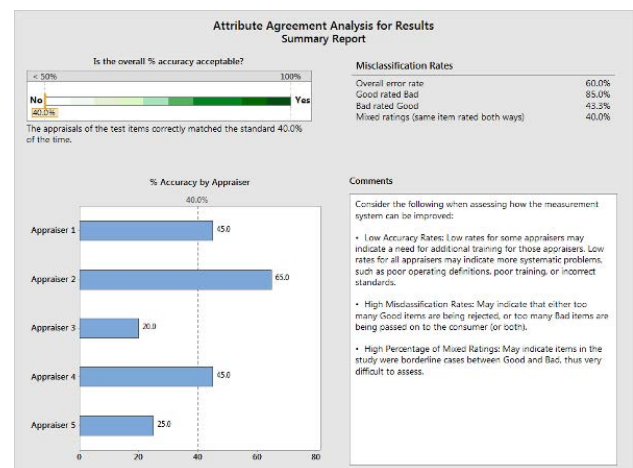
The analysis also pinpointed areas where improvements could be made through training, developing clearer standards, and other actions. "We were able to identify where the evaluations had great variation, look closely at those types of defects, and determine how to make sure we were all treating the same defects consistently regardless of experience level," noted a key team member.

Consistent assessments and continual measuring and monitoring of process performance data ensure that Burley's reputation for outstanding quality and durability remains strong.

Read the full case study at www.minitab.com/Case-Studies/Burley/

To understand the extent of the disparity between inspectors, they ran an attribute agreement analysis, which evaluates how consistently appraisers rate items using qualitative classifications such as Pass/Fail, or on a 1-5 scale.

The analysis confirmed that the evaluators at Burley's headquarters and those at the production facility were not all evaluating the same items the same way.



Attribute Agreement Analysis shows how well appraisers agree with each other and with established standards.

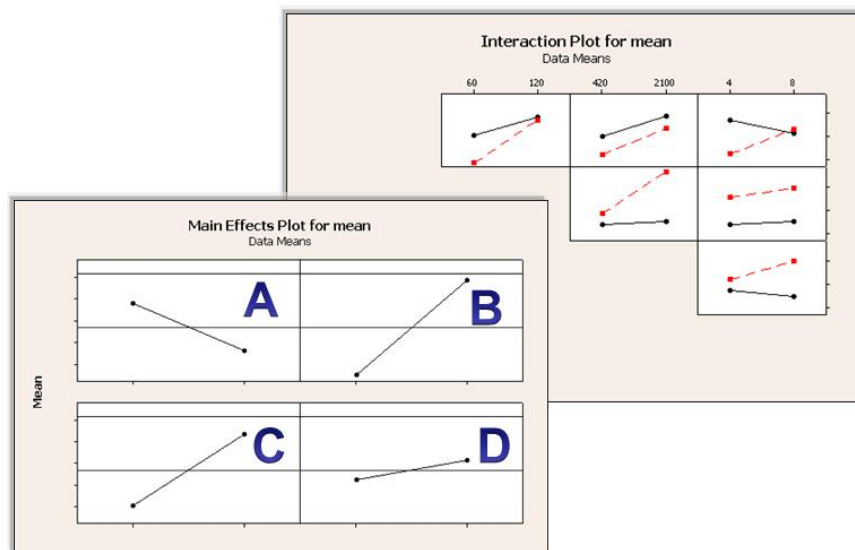
6. Optimizing Customer Service

Edward Jones, a full-service financial brokerage firm with nearly 7 million clients, needed to figure out how their staff could continue to meet rising service demands while maintaining, or even surpassing, the firm's high standards for customer service.

All Edward Jones service associates were being trained on multiple skills, and all skills received the same priority. The associates also needed to respond to and accommodate frequent resource changes and additions.

Using DOE, a project team created a series of experimental runs, or tests, that provide insight into how multiple variables affect an outcome, or response. The team could then use statistical analysis to determine what factors are important and identify the optimum levels for these factors.

The team selected four key factors—associate rating, after-call work, shift hours, and training hours—then collected and analyzed the data for the experiment, and assessed the best mix of each of the four factors.



Main effects and interaction plots indicated that cross-training associates so they were well-versed on all skills was actually a detriment and revealed that consistency was mainly attributable to associates with a higher skill level.

They learned that cross-training all the associates on all skills wasn't effective, and that getting calls to the right people with the right skills at the right time would produce the optimal customer experience.

By assigning associates who have certain skills to the most appropriate areas, the service division at Edward Jones has increased the capacity of their existing team by over 10%. They also improved all of the call-center metrics they set out to fine-tune—including average handling time, average speed to answer, and the time it takes employees to complete after-call work.

Read the full case study at www.minitab.com/Case-Studies/Edward-Jones/

The success of these and many other projects show how you can use data analysis to make dramatic and demonstrable impacts in your organization.

For more information about data analysis and quality improvement, visit www.minitab.com/success/