

## Data Driven Decision Making and Organizational Excellence

By Jonathon L. Andell

Andell Associates, Consultants in Quality

602-689-6041

[jandell@hotmail.com](mailto:jandell@hotmail.com)



*“... when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind...”*

*Lord Kelvin*

The Malcolm Baldrige National Quality Award and numerous state awards describe a number of criteria for organizational excellence. This article addresses how a key aspect of Statistical Thinking, called Data-Driven Decision Making, provides crucial support for many of the Baldrige criteria.

### **Statistical Thinking and Data Driven Decision Making**

A Special Publication of the American Society for Quality’s Statistics Division lists the following Principles of Statistical Thinking:

All work is done in a series of interconnected processes

All processes vary

Understanding and reducing variation are keys to success

The first principle reflects what Deming called “systems thinking:” processes are interconnected and interdependent, often in complex ways not obvious on the surface. The second principle admonishes us to see beyond mere averages: the unhappy customer experiences not the mean, but rather the serious departure from average. This leads us to the third principle: before we can improve, we first must convert data into meaningful knowledge based on understanding the nature and sources of variation.

Figure 1 shows a model of how the three principles dovetail into a cohesive approach.

Figure 1

Stages of Process Understanding			
Process Variation	Statistical Thinking	Statistical Analysis	Data Driven Decision Making
Data			
Analysis			
Knowledge			
Decision			

There are two important things to glean from Figure 1:

1. Omitting any of the three principles compromises decision making
2. The common element shared by all three principles is data. However, we shall see, not just any data will achieve the intended outcomes

### Obtaining Dependable Process Data

Not just any data will do. To quote Albert Einstein: “Not everything that can be counted counts and not everything that counts can be counted.” This certainly applies to process data. Mainly we need data that dependably reveals how well our process meets its customers’ needs. However, getting such data is less trivial than it might appear. Here’s the 50,000-foot view of the job:

- Determine what needs to be measured, based on the following:
  - What the process delivers, and to whom
  - What the deliverables must do for them
  - What kind of data will tell the truth about meeting those needs
- Determine whether existing data streams provide this data dependably (don’t count on it)
- If new data must be obtained, roll out operational definitions
- Validate your measurement system
- Establish an appropriate sampling scheme

Ideally, statistical thinkers, whatever their official job title, should be included in developing both data streams and data systems, possibly even taking a leadership role in the task. Failure to do so actually has been known to result in data systems that are more impediments than aids in obtaining valid process data.

Done correctly, the four-step process described here is a non-trivial effort. However, in the context of customer-focused process management, it’s a wise investment. Without confidence that we have relevant and dependable process data, all subsequent analyses and decisions are at risk.

### Common Cause vs. Special Cause Variation

*“To know and not to do is not to know.” – Chinese proverb*

After the ground-breaking television documentary entitled “If Japan Can, Why Can’t We?” the expression “Statistical Process Control,” or SPC, became a popular buzz word. Although to purists SPC has a narrow definition, the term popularly came to encompass virtually all aspects of turning data into decisions.

For now, though, let us focus on the narrow definition of SPC: making process decisions based on whether the process exhibits common cause or special cause variation. Thousands of people observed Dr. Deming conducting “The Red Beads,” and subsequent practitioners have propagated the lessons to many thousands more. The key lessons of The Red Beads are:

- Common cause variation is an inherent characteristic of the process as currently operated. Only a fundamental change in the design and operation of that process will change its behavior.
- A process exhibiting common cause variation will not respond to slogans, exhortations, threats, consequences, counseling, training, or any other individual-event response. All such “fixes” constitute a waste of resources.

It is frustrating to hear decision makers insist that they understand common cause vs. special cause variation, even as they relentlessly invoke special cause responses to common cause situations. This explains the adage at the start of this section. Putting it as bluntly as possible: ***Invoking special cause responses to common cause situations constitutes bad process management, bad human management, and just plain bad management.***

If this comes across as overly harsh, consider the opportunity awaiting those who make the transformation. Instead of consuming people’s time with attending extra meetings, “counseling” individuals, or preparing reports, explanations, action plans, etc., those resources can do the real work of the organization. It’s like increasing head count by 10% at zero cost!

Please indulge one final admonition: avoid the trap of insufficient data points. This rears its ugly head in two common ways. One is comparing pairs of numbers: the current quarter against some other quarter. The other is the thirteen-month cycle, in which anything prior to the same month last year simply “rolls off” the chart. Both manifestations lead to bad information, and thus to bad decisions.

The best practice is to seek a reasonable number of observations, rarely less than 20 or more than 100 – based on an effective sampling scheme. This gives us a good likelihood that the sources of variation will become self-evident, and that ensuing decisions will reflect good process management.

## **Conclusions**

Customer-focused process management depends upon: 1) data that dependably reveals how well our processes meet customer requirements, and 2) a means of interpreting the data that leads to the right decisions.

The techniques of statistical thinking and data driven decision making provide the basis for making this happen. Once we have good data and good decisions, we are poised to reflect the words of General Electric’s former CEO Jack Welch:

*“One thing we have discovered with certainty is that anything we do that makes the customer more successful inevitably results in a financial return for us.”*