Three Types of Action

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Dr. Deming once observed that "Virtually uniform product can be achieved only through the careful study of variation in the process and action by management to reduce or eliminate that variation." Process behavior charts (also known as control charts) provide a way to do this.

Prior to the Industrial Revolution manufacturing consisted of making things by hand. Each part was custom made to fit in with the other parts in each assembly, with the result that every product was unique and expensive.

As early as 1793, Eli Whitney had the idea of the interchangeability of parts. While this idea was revolutionary, it was also hard to implement. The problem was how to make the parts interchangeable. Try as one might, the parts would not turn out to be identical. Therefore, manufacturers had to be content with making them similar. If the parts were similar enough, they would fit (most of the time) and the product would work (more or less). Since the economic benefits of this approach were so great for both the producer and the consumer, it became a way of life in the industrialized world. Specifications were developed to define how similar the parts had to be in order to fit, and all variation was classified as either permissible (within the specifications) or excessive (outside the specifications).

The objective of the specification approach was clear—it was a guide for defining the difference between a "good" part and a "bad" part. But it did not tell the manufacturer how to make "good" parts, nor did it help him to discover why "bad" parts were being produced. All you can do with specifications is sort the "good" stuff from the "bad" stuff at the end of the production line. Thus, manufacturing became an endless cycle of fabrication, inspection, and rework, with some good product escaping every now and then.

Of course, the customer needed more good product than was leaking out of the manufacturing process, and so the manufacturers began to write "deviations" from the specifications in order to get more "good" stuff to ship. And this is the origin of the perpetual argument about how good the parts have to be. Manufacturers seek relaxed specifications, customers demand tighter specifications, and the engineers are caught in the middle.

This conflict obscured the original and fundamental issue—how to manufacture parts with as little variation as possible. The original ideal had been to make parts that were essentially identical. But how can we do this? A state of virtually uniform product can be achieved only through the careful study of the sources of variation in the process, and through action by management to reduce, or to eliminate entirely, sources of extraneous variation. Shewhart's Charts provide a way to do just this.

Shewhart's Control Charts allow you to characterize a given process as being predictable or unpredictable. A predictable process is operating as consistently as possible, while an unpredictable process is not operating as consistently as possible. And this distinction is the beginning of the journey of continual

improvement.

When your process is unpredictable it will display excessive variation that can be attributed to "assignable causes." By the very way the charts are set up it will be worthwhile to look for any assignable cause of unpredictable process changes. As the charts guide you to those points in space and time that are connected with the unpredictable process changes they help you to discover ways to improve your process, often with little or no capital expense.

On the other hand, when your process is predictable it will be a waste of time to look for assignable causes of excessive variation. There is no evidence of the presence of assignable causes, and looking for such will simply be a waste of time and effort. When a process is already operating as consistently as possible, the only way to improve it will be to change it in some fundamental manner.

A predictable process is operating up to its potential. An unpredictable process is not operating up to its potential. Are you getting the most out of your process?

Perhaps this is why new technologies rarely work as well as they are supposed to work. If you are not able to operate your current process, whose idiosyncrasies you know, up to its potential, then how do you expect to get the most out of a new technology.

Shewhart's Charts give you the means of identifying the *Voice of the Process*. This is distinctly different from specifications which are, at best, the *Voice of the Customer*. Thus, we need to distinguish between three different types of action:

1. Specifications are for taking action on the *product*:
   to separate the good stuff from the bad stuff after the fact.
2. Shewhart's Charts are for taking action on the *process*:
   to look for assignable causes when they are present,
   with an eye toward process improvement,
   and to refrain from looking for assignable causes when they are absent.
3. Actions to align the two voices are desirable:
   while this has been tried in the past,
   the lack of a well-defined Voice of the Process
   has made alignment difficult to achieve.

These three types of action have different objectives. All are valid, all are reasonable, but the first and the third are strictly concerned with maintaining the *status quo*. Shewhart's Charts are the one tool that will facilitate the *continual improvement* of both process and product.

W. Edwards Deming said that the first and third types of action may be summarized as "Burn the toast and scrape it." Shewhart's Charts allow you to quit burning the toast.

So, unless you like to eat charcoal…