
Three Questions for Success

The necessity of using operational definitions

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All improvement efforts require a framework. No matter what we are doing, we all need some way to align our efforts and focus on a specific objective. In my 40 years in this business I have seen many different models offered as frameworks for improvement. Most of these have been variations on two basic forms. First, back in the 1980s, there were various versions of Plan, Do, Study, Act. More recently, we have had DMAIC models. This column will reveal the three fundamental questions that form the basis for all of these models. Answer these three questions and you will have a roadmap for success. The many different improvement models simply dress up these three questions up with different details.

The Ideal

The first question is: What do you want to accomplish? Until you have a clearly stated objective, you risk everyone running off in different directions, working on their own pet projects, and not cooperating for the common good. Whether it is a specific project with a limited scope, or the general day-to-day operations of your organization, a clearly stated purpose or objective is important to help focus the thoughts and efforts of everyone involved.

Any situation in which this question remains unanswered will rapidly deteriorate into chaos. However, merely specifying your objective will not be enough.

The Methodology

The second question is: By what method will you accomplish your objective? While it may be necessary to have a goal, merely having a goal is, by itself, not sufficient. Remember the old saying, "If wishes were horses then beggars would ride." Until you have a plan for achieving your objective, it will be nothing more than a dream. Moreover, your plan will need to identify the discrepancies between the goal and the current state of affairs, and it will also need a methodology for moving toward the goal.

The Judgment

The third question is: How will you know when you have accomplished your objective? If you are going to have a goal, and if you hope to move toward that goal, then you will also need some way to measure how far you have come and how far you have yet to go. Of course, the greatest obstacle to knowing when you have accomplished your objective is the fact that data always vary. Any measure you might use will go up or down from month to month. If you do not know how to separate routine variation from a signal that a change has occurred you will not know if you have made any progress toward your goal.

THE HISTORICAL CONTEXT FOR THE THREE QUESTIONS

Walter Shewhart discussed these three questions in the context of making a product. He referred to them under the headings of (1) specifications, (2) production, and (3) inspection. W. Edwards Deming talked about these three questions in terms of (1) having a criterion, (2) having a test method for determining compliance to the criterion, and (3) having a decision rule for interpreting the results of the test. Regardless of the nomenclature, these three questions define the essence of how to get things done. Until we can answer the second and third questions, all of our targets, all of our goals, and all of our plans are merely wishes and hopes. To turn dreams into reality we have to have some specific method for making them come true, and some way to judge when they have come true.

In his second book, *Statistical Method from the Viewpoint of Quality Control*, Shewhart returned to the idea embodied in these three questions and showed how a process behavior chart (1) defines an *ideal*, (2) provides a *methodology*, and (3) allows us to make a *judgment*.

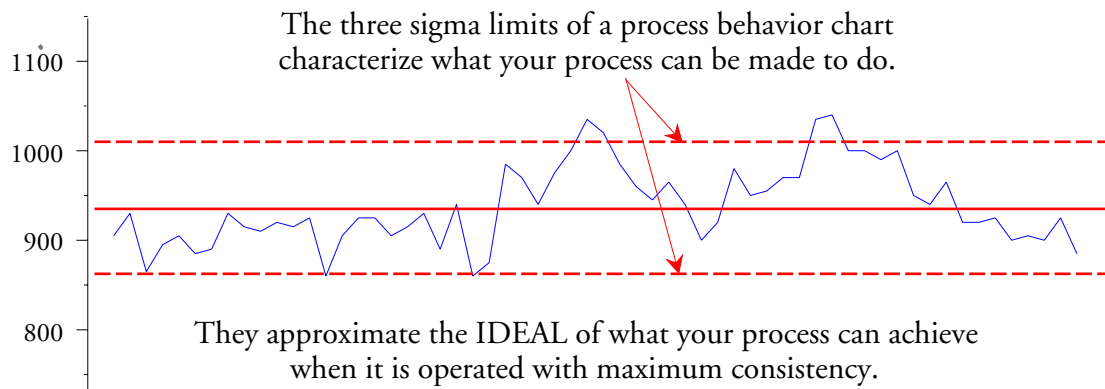


Figure 1: What do you want to accomplish?

Specifically, in Figure 1 the natural process limits on an X chart define the process potential. They define what a predictable process has produced and what it is likely to continue to produce. When a process is operated unpredictably these limits approximate what that process can be made to produce. To use Shewhart's word, the natural process limits approximate the *ideal* of what the process can do when it is operated up to its full potential. They define what any process can accomplish.

In Figure 2 the running record of the individual values defines the actual *process performance*. Whenever a point goes outside the bounds of the natural process limits it identifies a departure from the routine, a change in the process, and the presence of an assignable cause of exceptional variation. By identifying these points the process behavior chart provides us with a *methodology* for when to look for assignable causes. When we can identify an assignable cause and move it from the set of uncontrolled factors to the set of controlled factors we will be removing a significant source of variation from the product stream. By removing sources of variation from the product stream we are not merely maintaining the status quo, but are rather tightening up on the process variation and improving both the predictability of the process and the consistency of the process outcomes. So the process behavior chart

gives us a *methodology* for actually moving our process toward the *ideal*.

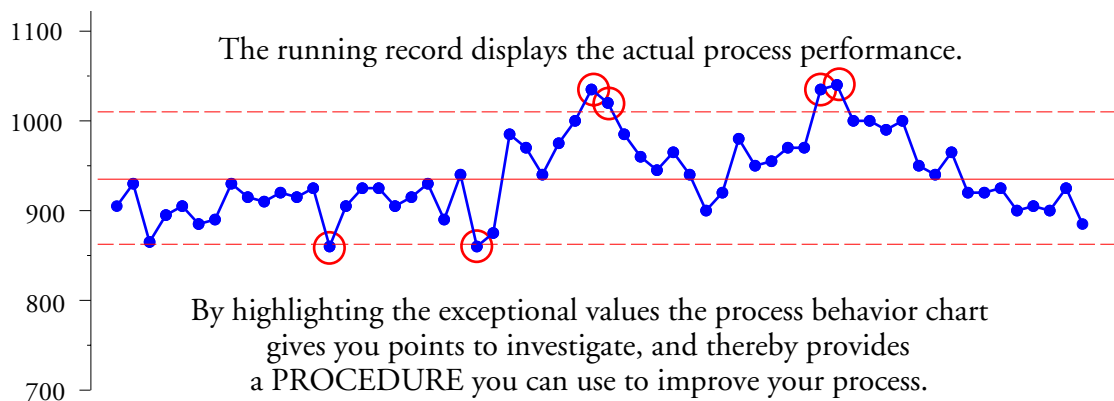


Figure 2: By what method will you accomplish it?

Finally, in Figure 3, by combining both the process potential and the process performance on the same graph, the process behavior chart allows us to *judge* how close our process is coming to operating up to its full potential. The absence of points outside the limits tells of a reasonable degree of predictability. For an unpredictable process, the number of points outside the limits and the extent to which they fall outside the limits will quantify the degree of unpredictability.

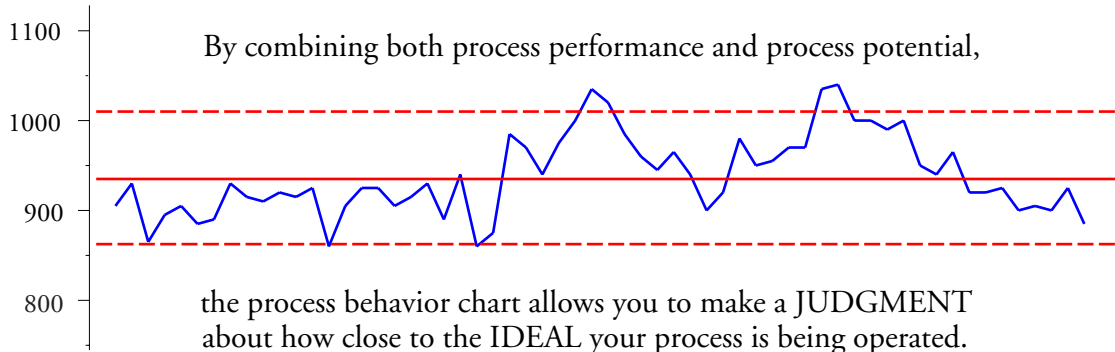


Figure 3: How will you know when you have accomplished it?

SUMMARY

The general framework defined by these three questions has been called an *operational definition*. Operational definitions allow you to get down to business. When you have the answers to the three questions you have what you need to succeed. Leave one of the three questions unanswered and all you will have is the basis for an argument.

As may be seen above, the process behavior chart provides us with an operational definition of how to get the most out of any process. When you use a process behavior chart in this way, it becomes the locomotive for your improvement efforts. You do not have to work on improving the measurement

process first. You do not have to first do a FMEA to think of everything that might go wrong. You do not have to brainstorm to find a problem to work on. You simply listen to your production process and let it tell you what to fix and when to fix it. When you successfully fix a problem the chart will show this success. When you fail to fix a problem the chart will continue to nag you.

For more on how this works see my columns on "Two Routes to Process Improvement" from May 5 and 6, 2010.