

Using Process Knowledge to Analyze Results (Outcomes)

Purpose: Understand variation in system output to direct true improvement and learning efforts.

Premise: Using SIPOC model to initiate action will assist leadership in avoiding tampering and lead to true system-wide improvement.

- 1. Determine presence of either common or special cause variation.**
 - a. Stable system output is predictable; absence of special causes.
 - b. Unstable system output is unpredictable; presence of special causes.
- 2. Test for identifying presence of special cause variation.**
 - a. 1 or more points outside the control limits.
 - b. 6 or more consecutive points all going up or all going down.
 - c. 8 points all on the same side of the centerline.
 - d. 14 points all on the same side of the centerline.
 - Ignore any points that fall on the centerline
 - ** If two points in a row have exactly the same value, do not count the second point as part of the system.

Principles of the Common Cause Strategy

1. In a stable system, fundamental changes in the process are required to change the amount of variation.
- 2. Common causes of variation can hardly ever be reduced by attempting to explain the difference between high points and low points.**
3. All the data are relevant, not just high points or low points, not just points out customer requirements or managerial limits, and not just points we don't like.
4. The ultimate goal is to move the center of the highway to a more desirable location, i.e., where outcomes affect optimal customer satisfaction and reduce the width of the highway, i.e., where the range of variation is at minimum.

Basic Methods for Improving a Stable System

1. **Stratify** data that have been gathered over a series of cycles of the process
 - a. To stratify data means to group the data points based on different factors.
 - b. To stratify data, collect information on potential stratification factors, such as time of day, discipline, employee, departments, type of service or condition, and so on. Then analyze data using other tools such as pareto charts, scatter diagrams, concentration diagrams, cause and effect diagrams, etc.
2. **Disaggregate** the process by dividing the full process into component pieces. Monitor and improve the pieces.
 - a. Special causes that were buried as common causes in the full process may now become visible.
 - b. In addition, the total set of common causes will be much smaller in any component of the process than in the process as a whole.
 - c. Process managers of the components can be responsible for within-component improvement.
3. **Experiment** with changes you think will influence the process.
 - a. Consider changes that will help verify your theories about causes of variation.
 - b. Consider changes you think will improve the process.
 - c. See if these changes signal a special cause either by changing the range of output or by changing variation, e.g., (the centerline).

Principles of the Special Cause Strategy

1. It is almost impossible to improve a system riddled with the presence of special cause variation. It is, by definition, unpredictable.
2. The first step in dealing with a system containing special causes is to stabilize the system by preventing the recurrence of special causes in the future. Once stabilized, then resort back to the common cause strategy for improvement of the system and learning.

Basic Method for Improving and Unstable System

1. **Plot timely data** so that special causes are signaled quickly. An approximate figure now is often more useful than a more precise figure two weeks later.
2. **Take action to contain the problem** when a special cause is signaled. By containing the problem within the company and in the field, customers will not have to suffer too much from your unstable process. Ideally, there should be a well-developed plan for immediate remedies that covers:
 - a. Who should be informed?
 - b. How the existing output should be checked.
 - c. Any temporary process Band-aids to be used until more permanent fixes are found.
 - d. Whether customers should be contacted and by whom.
3. **Search for the cause by finding out what is different.**
 - a. What was different on that occasion from the other occasions? What occurred? What did not occur? When? Where? With whom?
 - b. Look for deep causes. Ask “why” five times.
 - c. Request that people closest to the process, which are often in the best position to know what’s going on, begin searches for special causes. They may need help from managers or technical resources along the way.
4. **Develop a more permanent remedy** targeted at the identified special cause.
 - a. Work on the source of the special cause to prevent recurrence.
 - b. Verify effectiveness of any changes.
 - c. Assure changes are maintained.

Note: For additional information on these methods, see *Model 5: The Language of Variation* of the Joiner Fourth Generation Management books received in the Leader Development I course.