Six Sigma - Measuring Performance

Measuring Process Performance - The Six Sigma Way

How choosing the right measures can help your business to make the right improvement decisions

Very often, the temptation in organisations is to gather as much information as you possibly can to identify how all of your processes are performing. However, this leads to “data overload” and in most cases, results in an enormous resourcing effort to gather information that is rarely, if ever, viewed, interpreted and acted upon to drive continuous improvement into the organization.
The over-riding consideration for any business looking to measure its performance should be that “Data Collection Costs Money”. This alone should be enough to ensure that far more consideration is put into any data collection strategy to ensure that the right data, in the right quantities, is gathered to deliver real business benefit.
The first thing I would say to any organisation that is looking to collect data about process performance is –

“If you are not going to do anything with the data you collect, then don’t bother to collect it”.

Developing a data collection strategy is the first important step and should include the following as a minimum:
- What are the objectives of this data collection activity?
- What do I need to measure?
- Is it a measure of performance that allows me to identify opportunities to add customer value?
- Is it a measure of performance that allows me to identify opportunities to add value within the business, which could indirectly lead to added customer value?
- What are the “Operational Definitions” for each measure? This will ensure that the exact boundaries of the measurement are clearly defined and help to clarify these boundaries with everyone involved in both the data measurement and data evaluation after the data collection exercise.
- Where am I going to get this data from?
- Is the information I need available from any Management Information systems I have available
- Is the information available from any manual recording systems
- If the information is not available, how will I go about collecting this data? It is important to remember a general rule of thumb; you should collect at least 25 separate data points before making any inference about trends from the data you’ve collected.
- If I’m not able to collect 100% of the data automatically, what sampling techniques am I going to use?
- Who is going to collect this data? Are the people working within the process going to collect data as part of their process?
- Can I work with a data expert who can gather data on my behalf?

When collecting data about process performance we should always try and collect “continuous or variable” data as opposed to “discrete / attribute” data.
1. Continuous data can tell us more about the subtle changes that occur within a process and allow us to apply predictive “Control Limits” more accurately. This type of data is also much more responsive to process changes and allows more discrimination within the measurements than is available when measuring via “Discrete” data.
2. Discrete data should only be collected when “Continuous Data” is not available.
If we use an example to explain the difference between these two types of measures, discrete data tells us whether something is either “Hot” or “Cold”, whereas continuous data will tell us exactly how hot or cold something is. It will also be able to tell us about small changes in the measurement being taken.

Variation within processes can happen at various points, especially when looking at an entire “end-to-end” process. The points at which variation in a process occur are a good starting point when deciding where to take these measurements from.
A good way of identifying potential areas of variability is to complete a “S.I.P.O.C" analysis. S.I.P.O.C stands for:
- Suppliers
- Inputs
- Process
- Outputs
- Customers

Variation in Suppliers, the Inputs they provide to the process and the process performance itself, can all have an impact on the quality of the Output produced at the end of the process. This Output is received by the customer and therefore, it is vital that this output matches the requirements of the customer.

Measures of Suppliers, Inputs and Process tend to be what are known as “Leading” indicators, i.e, we can predict the output of the process by understanding the variability within these first three elements of the end-to-end

process.

Measures of Outputs are known as “Lagging” indicators, i.e, they only tell us what has already happened, as the output as already been produced and therefore, is likely to either meet the customers requirement, require some level of rework or will be a reject.

Once you’re data has been collected an evaluation of the data collected should be undertaken to ensure that:
- The data collected reflects the requirements of the measurement plan and fits within the bounds of the Operational Definitions
- The right amount of data has been collected within the specified sampling plans. Too little data will make it impossible to draw any accurate conclusions around the performance of the process

The final stage when measuring process performance is to analyse the data collected for any trends or patterns.

Presenting the information in graphical format is a powerful way of highlighting any trends of performance that highlight problems within processes. Once highlighted, actions to improve these trends can be tied to a specific data point on the graphs. Collecting data should be a planned activity, with thought, care and attention applied to the process.

A blanket capture of all information available will only lead to confusion and will mask the real issues within processes and prevent them from being highlighted, as the overwhelming volume of data will make analysis difficult, laborious and time consuming. When this happens, data collection becomes short lived and ultimately, data stops being collected and the Status Quo prevails.

When looking to improve processes, the first and most important step is to determine the “Baseline / Current” performance of the process.

This baseline can only ever be determined by data collection. Once a baseline has been established then the extent of the improvements achieved by any solutions implemented can be easily measured.

The most important thing about improvement measures is that the performance indicators used to determine the baseline should be the same performance indicators used to measure the effectiveness of the solution.

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