

Process Improvements, Measures and Metrics, The Products of Lean Six Sigma

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The business of safeguarding our country is taken with utmost seriousness, and only those products that provide that safety and security are acceptable. Providing our products outside the acceptable parameters of quality, not listening to the "Voice of the Customer" (VOC), or failing to achieve the levels of efficiencies or effectiveness required for our stakeholders will result in a degradation of mission control. These possibilities can be minimized, and held within control limits, by instituting process improvements that will afford measures and metrics to be utilized for monitoring our products.

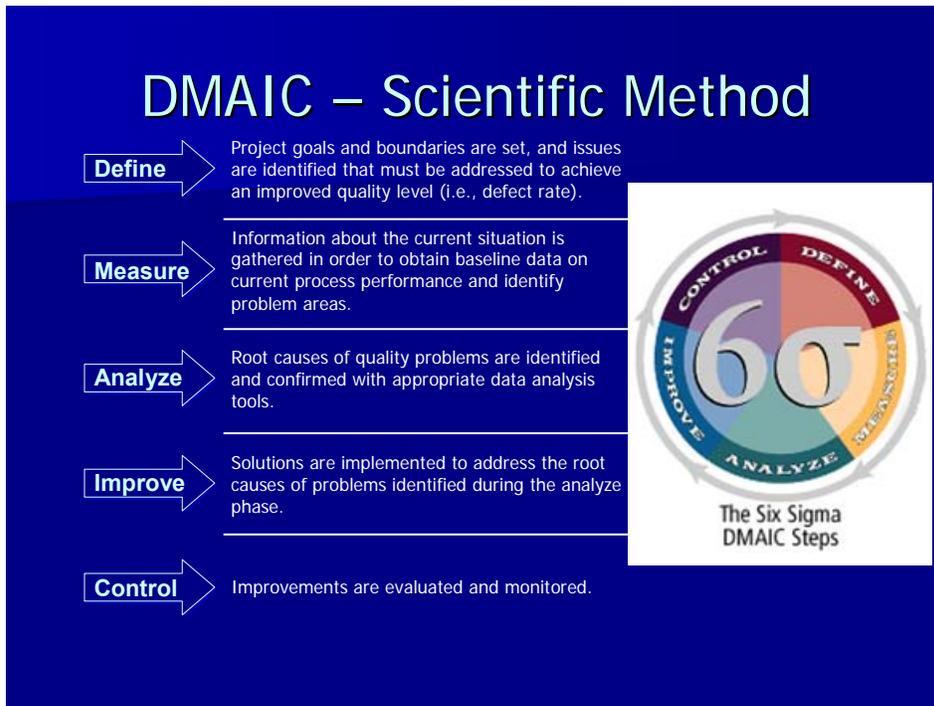
This brief Article is an attempt to introduce the significance of Lean Six Sigma and its methodologies, its potential impacts upon our programs, and its value attained from accumulating measures and metrics from data derived.

Lean Six Sigma is a methodology that provides businesses and entities with the tools to improve the capability of business processes. A process might be a product or service process that an entity or organization provides to its outside customers. Six Sigma had been credited with savings billions of dollars for companies since the early 1900s. This methodology became well known only after Jack Welch, the CEO from General Electric, made it a central focus of his business strategy in 1995. It is reputed that he informed his employees that if they wanted a raise in salary, they should become Six Sigma certified. In statistical terms, the purpose of Six Sigma is to reduce variability (the chance for error or defects) and to achieve very small standard deviations (movement away from defects). The greater the movement from defects, the better for all involved. Lean adds the discipline to diminish the variability of the processes, hence Lean Six Sigma. By this statement, not only is Lean Six Sigma concerned with the final product or service, but the entire enterprise, related to this function as well. From this perspective, it is noticeably different from ISO 9000 which focuses upon the end result (product).

In our business of supplying the most accurate imagery and products possible, especially those regarding human life, there can be little room for variability or defects. The goal may very well not be 6 sigma; .9999966, or 3.14 defects out of 1,000,000 attempts. This outcome, due to variations in weather conditions, mechanical and engineering functions, as well as human interpretations may render this goal extremely difficult and, perhaps, even unattainable. But the necessity to apply measures required for development of metrics to gauge the results is crucial to this process.

Metrics are vital to our business, whether they are used for documenting the level of performance parameters that are often the centerpiece of Acquisition Program Baselines (APB(s)), establishing contract performance assessments, or assisting in management decision-making and execution of those decisions. The measures (those baseline devices from which the metrics are generated) are of paramount importance since they become the foundation for reporting the to the audience what are perceived to be the important issues to be monitored and controlled. These metrics will be focusing on those target objectives and the course corrections to arrive at the objectives.

The inclusion and objective of Lean into Six Sigma is to deliver exactly what our customers need, when and where they need it. The Lean approach achieves this by focusing on an organization's operating system, management system, mindsets and behaviors of its resources.



@MoreSteam

The illustration above depicts the five critical steps of Lean Six Sigma (LSS). These steps produce real results in difficult economic times by uncovering process waste, reducing non-value adding activity, and increasing productivity. For this Article, it also provides a visual illustration of the necessity for instituting a strong program of measures and metrics. Measures are identified in the Measure step and metrics are essential for the Control step by providing empirical data to evaluate, monitor, and retain as a benchmark for either continued accomplishments or as a low threshold to pass in route to higher marks. The benefits are noticed, particularly in IT programs where measures and metrics are usually more prevalent and easier to develop.

It is equally important that we discuss briefly the “Voice of the Customer” and what it represents. Voice of the Customer is a disciplined approach to obtaining understanding and prioritizing customer wants and needs. One of the major dimensions of attaining customer satisfactions is the determination of requirements.

Typical steps in the VOC process are:

- Well defined customer and stakeholder interviews where substantive communication is developed and maintained throughout the program or project.
- A profound appreciation and thorough understanding of key themes taken from the interviews
- Development of a matrix that will demonstrate the steps required to reach customer satisfaction in theme areas.
- Reaching concurrence of stakeholders' highest priorities for improvement and sustaining these themes throughout program maturation.
- Regularly and purposefully revisiting the process to assess progress and measure and apply changes in the customer needs.

Critical to Quality Characteristics (CTQC) is a measurable characteristic of a process or product which should express a key customer requirement; whether they be an internal or external stakeholder or customer. This CTQC should be unambiguous, quantifiable and documented by a thorough understanding of the VOC process. The number of opportunities must be determined based upon these "Critical to Quality Characteristics", and should be based upon a well-reasoned process that is demonstrated by stakeholder communication.

Before improving a process, it is necessary to define "improvement." Understanding this will enable us to identify an appropriate measurement, and the resulting metric. In other words, if you are going to play a game, you will want to know how to keep score and what constitutes a score. A given process may be measurable in many different ways depending on the type of data that are collected, and how the data are characterized. Variable Data may offer a noticeably higher content than Attribute Data. For example, the actual measured weight of an object (variable data) includes more information than merely making an attribute distinction into two categories of light or heavy.

The old axiom of "What gets measured gets done" is generally correct; if we do not measure it then how, or even why, should it be perceived as having value? Measurements communicate values and priorities to an organization, and invariably, these measurements are required and used for critical reasons. The resources that may be assigned to collection and measurement demonstrate the management commitment that the object of the measurement is important. Therefore, selection and generation of appropriate metrics is an essential starting point (and often form the results of process improvement). Output metrics are typically end-of-process evaluations--defects per unit, yield, warranty claims, customer complaints, on-time shipments, satisfaction ratings, etc., whereas Indicator or Predictor measurements are made upstream in the process on factors that influence the output or results. Results metrics are known as dependent or response variables, where inputs are referred to as independent or explanatory variables.

All defects are not equal in severity, even if they are important to customers. For example, customers may care about a particular tire chosen for an automobile selection, but they will care much more about a defect that will cause the automobile not to stick to the road around curves. Therefore, it may be beneficial and even advantageous to establish different categories of defects by processes and assess the Six Sigma level for each process for our product. Why is the distinction between discrete and continuous important? The implications are best illustrated by *MoreSteam in discussing the pros and cons of Discrete Measurements:

Pros:

- Discrete measurements are simple, fast, and relatively cheap to obtain.
- The discrete measurements are often used to express subjective factors that are hard to measure directly on a numerical scale.
- Some factors can only be expressed in discrete units, particularly representations of events or opinions.
- In one sense, the Sigma level is defined by a discrete measure - defects - although not all defects are truly discrete events.

Cons:

- Attribute/Discrete data may be subject to greater error if subjective traits are categorized on a scale. Categories of defect type are clear cut, but categories of defect severity may be more subjective, so that two persons might categorize the same item differently.

- Process variability is distorted by category distinctions (especially since those categories are often artificial constructs). When variability is hidden, reaction time to process shifts is delayed and made more challenging.
- Many statistical techniques can only be applied to data from variable measurement systems; so using discrete measures can limit analysis. @MoreStream

Efficiency metrics accurately measure the amount of effort necessary to achieve a prescribed result or target accomplishment. An example involving labor productivity is an often used which measures the amount of labor hours or labor dollars per unit as an output. Other metrics of this type include resources expended per unit produced, return on investment, return on asset, and average unit cost; as it is often viewed that a single index (return on investment) is insufficient to provide the information required for intelligence decisions. These measurements may also be used to gauge how efforts might translate into resource savings and financial impact, but they would not be reflective of customer satisfaction or whether or not the Voice of the Customer is being heard or even reflected. Effectiveness metrics are characteristic of the degree to which customer expectations are being met i.e. defects received by customers are being rectified, on-time shipments are being made, extent of customer satisfaction. Even customer loyalty and repeat business are all measures of effectiveness.

For those explorers, program and project managers, and leaders who relish challenge and have courage yet may be criticism averse, a journey into the world of Lean Six Sigma will bring change, interest, and results.

Author

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