LEAN SIX SIGMA METRICS: HOW TO MEASURE IMPROVEMENTS WITHIN A PROCESS

How do you identify areas for improvement in a process? After you've implemented an improvement, how do you know that your efforts are making a difference?

The following is a list of metrics frequently used in Lean Six Sigma projects to measure the outcomes of a process, identify opportunities for improvement and monitor changes over time. These metrics will help you to pinpoint sources of waste, variability or customer dissatisfaction, and by focusing on them you will have a greater potential to find the root causes of problems and thus high-leverage areas for improvement. At least two of these metrics should be incorporated into your project charter as a guide for how you gather baseline data. The metrics you select will depend on the goals of your project, and may require multiple iterations as you discover more about the process you are trying to improve. Often it is helpful to focus on a metric that is meaningful to the customer and another that will resonate with agency leaders and the organization's strategic goals.

Lean Six Sigma Metrics by category

Time metrics *How long does it take to produce a product or service? How long does it take to deliver that service to the customer? How much of that time is spent adding value to the product?* ***Note:** Lead time > processing time > VA time. The goal of Lean is to make lead time and processing time closer to VA time.*	**Lead time**: the total time from start to finish to develop a service/product and deliver it to the customer, including waiting time *(expressed in days; a lower number is better)* **Processing time**: "touch time", or the number of working hours spent on process steps, not including waiting time *(a lower number is better)* **Response (wait) time:** the number of working hours it takes to react to a customer request for a service or product *(a lower number is better)* **Activity ratio**: processing time divided by lead time *(expressed as percentage; a higher number is better)* **Best and worst completion time**: the range of variation in lead time or processing time, may also include standard deviation if data are available *(a smaller range is better)* **Percent on-time delivery**: how often your lead time meets your target *(a higher number is better)* **Value-added (VA) time**: amount of processing time spent adding value to the service/product, where value is defined as "something the customer is willing to pay for" such as drafting a contract for a vendor *(a higher proportion of VA time is better)* **Non-value-added (NVA) time**: amount of time not spent adding value to the service/product, activities that the customer is not "willing to pay for" such as waiting for a signature or review *(a lower proportion of NVA time is better)* **Essential non-value-added (ENVA) time**: non-value-added steps that cannot be eliminated *(goal varies by service or product)*
Cost metrics *How much does it cost to complete the process and produce a service or product? What are operational costs relative to production levels?*	**Total process cost**: total costs, including labor, material and overhead, to produce the service/product *(a lower number is better, given the same level of production)* **Cost per transaction**: total process cost divided by number of services/products produced *(a lower number is better)* **Cost savings:** dollar or percentage reduction in total process cost or cost per transaction *(a higher number is better)* **Cost avoidance:** dollar or percentage reduction in planned spending that would otherwise have occurred (*a higher number is better)* **Labor savings**: reduction in labor hours needed to perform process, usually "soft cost savings" as staff hours are redirected to value-added activities *(expressed in hours, FTEs, or percentage reduction; a higher number is better)*

Quality metrics *Did you succeed in creating value for the customer? Do services meet customer satisfaction criteria? How often does the process generate mistakes that require rework?*	**Customer satisfaction**: qualitative or quantitative data derived from surveys, number of complaints, thank-you notes or other feedback mechanisms *(goal varies by measurement technique)* **Defect rate**: percent of services/products that are "defective", where a defect is defined as "something the customer does not like" *(a lower number is better)* **Rework steps / time**: amount of a process spent correcting mistakes or going back for missing information *(a lower number is better)* **Percent complete and accurate**: percent of occurrences where a process step is completed without needing corrections or requesting missing information *(a higher number is better)* **Rolling first-pass yield**: percent of occurrences where the entire process is completed without rework, or the product of all steps' percent complete and accurate rating *(a higher number is better)*
Output metrics *How many services or products are completed or produced every month or year? How many are in the pipeline? Did you produce more than the customer needed?*	**Production**: total number of services or products completed or produced in a given amount of time *(goal varies by service or product; the optimal level should align with customer demand to minimize backlogs and excess inventory)* **Work in process**: number of services or products currently being processed *(goal varies by service or product)* **Backlog**: number of services or products that are waiting to start the process *(a lower number is better)* **Inventory**: a supply of raw materials, finished products or unfinished products in excess of customer demand *(a lower number is better)*
Process complexity *Is the process overly complex? How many steps make up the process? How often does it change hands or require someone's signature?*	**Process steps**: total number of steps to complete the process *(aim for reduction)* **Value-added process steps**: number of process steps which add value to service/product *(aim to increase proportion of value-added steps, or eliminate non-value-added steps)* **Decisions**: Number of decision points where process changes for different situations and staff must decide the appropriate path to follow *(goal varies by service or product, typically aim for reduction)* **Signatures required**: number of approvals needed, usually involve delays and handoffs *(aim for reduction)* **Handoffs**: number of times the service/product changes hands, can be a source of errors, miscommunication, or delays *(aim for reduction)* **Loop backs**: when steps of a process must be repeated, usually to correct errors or find missing information *(aim for reduction)*
Organizational metrics *Are Lean deployments creating a cultural shift in your organization? Are you improving employee work environments and morale?*	**Lean events**: number of Lean events, such as Kaizen or value stream mapping events **Lean participation**: number of employees participating in Lean events or projects **Lean training**: number of employees receiving Lean training **Employee satisfaction**: qualitative or quantitative data derived from surveys, number of complaints or other feedback mechanisms *(goal varies by measurement technique)*