LEAN SIX SIGMA APPROACH

SOLVING PROBLEMS, IMPROVING AND OPTIMISING PERFORMANCE USING **DMAIC**

Stage	OUTPUTS	TOOLS & METHODS
DEFINE What needs improvement?	• Perceived problem and objectives statement • List of customers and stakeholders • Identified needs of the customers and business • High level process map	• Team charter • Includes & excludes • Brainstorming (get the right people) • CTQ (Critical-to-Quality) drill down tree • Affinity diagram • Surveys and focus groups • Process flowchart
MEASURE What is the existing condition?	• Selection of critical measurable CTQs • List of potential causes • Data collection plan • Specification limits for the process	• Quality Function Deployment (QFD) • Kano analysis • 4-blocker • Deployment-Opportunity chart • Pareto chart • Cause & effect matrix (prioritised) • Data collection plan • Benchmarking
ANALYSE When, where, and why does this occur?	• Current capability/maturity of the process • Defined objectives for the improvement • Root cause and/or vital parameters (x's) associated with the process issues	• Normality test • Process capability / process efficiency • Benchmarking • Box-plots • Scatter-plots • Histogram / dot-plot • ANOVA (correlation & confidence tests) • Pearson correlation test
IMPROVE How can we improve the process?	• Potential solutions based on statistical or non-stat methods • Selected Solution that best achieves the objectives • Implementation plan and cost benefit analysis of proposed solution	• Regression • Design of experiments (DOE) • Creativity / cycle-time / TRIZ (inventive problem solving techniques) • Force field analysis / Pugh matrix • Cost benefit analysis (CBA) • Failure modes & effects analysis (FMEA) • Mistake proofing
CONTROL How can we sustain the improvement? *(bullet proof the solution)*	• Metrics for the project outcomes and vital parameters • Final project storyboard / case study • Signed implementation & control plan • Transfer to the process owner	• Metrics • Control plan • Control charts • Financial validation • Project story in PowerPoint (to share); *(improvement success breeds success)*

CREATING NEW IMPROVED PROCESSES TO IMPROVE PERFORMANCE USING **DMADV**

Stage	OUTPUTS	TOOLS & METHODS
DEFINE What process is being (Re)Designed?	• Perceived problem and objectives statement • List of customers & stakeholders • Identified needs of the customers and business • Project resource needs • Risk assessment (of process change)	• Team charter • Includes & excludes • Resource plan • Brainstorming (get the right people) • CTQ (critical-to-quality) drill down tree • Affinity diagram • Surveys and focus groups
MEASURE What are the design requirements and targets?	• Design requirements • Performance standards of the requirements • Data collection plan • Valid measurement system	• Quality Function Deployment (QFD) • Kano analysis • 4-blocker • Pareto chart • Cause & effect matrix (prioritised) • Failure modes & effects analysis • Data collection plan • Benchmarking
ANALYSE What design concept best meets the Critical-to-Quality measures?	• Design alternatives based on statistical or non-stat methods • Selected design approach that best achieves the project objectives • Vital parameters (x's) associated with the new process	• Brainstorming • Benchmarking • Regression • Design of experiments (DOE) • Creativity / cycle-time / TRIZ (inventive problem solving techniques) • Force field analysis / Pugh matrix • Process capability / process efficiency
DESIGN What is the detailed design of the process?	• Detailed design plan • Implementation plan and cost benefit analysis of the proposed solution (new process) • Metrics for the project outcomes and vital parameters	• Process flowchart • Failure modes & effects analysis (FMEA) • Mistake proofing • Implementation plan • Cost benefit analysis (CBA) • Metrics
VERIFY Show that the new process achieves the desired results.	• Design simulation / pilot test • Final project storyboard • Validation of the financial benefits • Signed implementation & control plan • Transfer to the process owner	• Simulation / pilot test plan • Control plan • Control charts • Financial validation • Project story in PowerPoint (to share)