

Lean Six Sigma Project Flow: DMAIC Levels 1 to 3

Question Levels 1 to 3		Tool/Resource
Define		
Do you fully understand the severity and scope of the problem?		
	Can you clearly define the problem and its potential impact to the organization?	
	Can you align the problem to a corporate CTQ?	CTQ Drilldown
	Can you clearly & succinctly define the pain point being felt in the organization?	Problem Statement
	Do you have a clear and reasonable scope for focusing the project?	Project Scope
	Do you know what are the potential project benefits for the project?	Project Financial Savings
	Are the minimum (worst case) and/or maximum (best case) potential benefits worth continuing with the project?	Pre-Assessment (e.g. a Min/Max Analysis)
	Do you have a team that agrees with the project focus?	
	Do you know who is on the team and what role they all play?	Stakeholder Analysis (ARMI)
	Does each person on the team agree with the problem definition and scope?	Buy-in/Sponsorship (CAP model)
	Do you understand the high-level process related to the problem?	
	Do you know what the primary steps are within the process and the inputs that feed into it?	High-level Process Map
	Do you know who the suppliers & customers are for the process?	SIPOC
	Do you have a method for communicating the project information?	
	Do you have a project charter?	Project Charter
	Do you have a project storyboard?	Project Storyboard
OUTPUTS:	Project Storyboard, Project Charter, CTQ Drilldown, ARMI, SIPOC, High-Level Process Map, and Project Benefits Pre-Assessment	

Measure		
Do you know the potential root causes (inputs or Xs) and have enough reliable data to test them?		
	Do you know what metric reflects the output described by the problem statement?	Project Y (output)
	Do you know how to define defects in the process and/or outputs?	
	Do you know what are the customer's performance standards (LSL & USL)?	Voice of the Customer (VOC)
	Do you have the key operational definitions like defect, defective, unit, opportunity, etc.?	Operational Definitions
	Do you have enough data measuring the Y and potential inputs (Xs)?	
	Do you know what the potential Xs are for the problem? (i.e., Theoretical Significance)	C&E Diagram & 5 Whys
	Do you know which Xs may have the most potential influence? (i.e., Empirical Significance)	C&E Matrix
	Do you know what data is necessary to measure the Y and most influential Xs?	Data Collection Plan (DCP)
	Do you know how much data you need?	Sample Size Calculator
	Do you know what timeframe your data should span?	Short/Long Term Data
	If collecting the data manually (via time studies, observations, etc.), do you have a plan and the support needed to collect it?	Buy-in/Sponsorship (CAP model)
	Do you know if your collected data is accurate, repeatable and reproducible?	Measurement System Analysis (MSA)
OUTPUTS:	Updated Project Storyboard, Definition of the VOC, Y & Xs, and a reliable and relatively complete dataset	

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Can you statistically validate what are the root causes (inputs or Xs)?		
Analyze	Do you know what the process capability is (a.k.a. Voice of Process or VOP)?	
	Have you assessed the statistical characteristics of your data (i.e., mean, standard deviation, median, mode, etc.)?	Descriptive Statistics
	Do you know if your process is stable?	I-MR chart
	Do you know if your process distribution is normal or non-normal?	Normality Plot (AD test)
	Do you know what your key process capability measurements are (i.e., DPMO, DPU, Z score, sigma level, p(d), Cpk, etc.)?	Process Capability (with six pack)
	Do you know what the target sigma level or performance objectives are for the project?	Performance Objectives
	Have you done hypothesis testing to identify which potential Xs are statistically significant?	
	Have you identified the yes/no question for the practical problem of each potential X?	Hypothesis Testing
	Have you converted the practical problem into a statistical problem for each potential X?	Hypothesis Testing
	Have you identified for every potential X the right statistical test based on data type (e.g. continuous vs. discrete), test type (e.g., proportions, central tendency, spread, or relationships), and comparison level (e.g., 1:Standard, 1:1, or 2+ factors)?	Hypothesis Testing
	Have you interpreted the statistical results for the test on each potential X?	Hypothesis Testing
	Have you translated the statistical results into a practical solution that answers the original practical problem for each potential X?	Hypothesis Testing
	OUTPUTS:	Updated Project Storyboard, key process capability metrics, and hypothesis testing results

Do you know what improvements will fix the root causes (inputs or Xs) and by how much?		
Improve	Do you know which potential Xs are independent and statistically significant?	
	Have you compiled all your hypothesis testing results for the statistically significant Xs?	Compiling Statistical Test Results
	Do you know what the inter-relationship (multicollinearity) is between the significant Xs?	Compiling Statistical Test Results
	Have you built a transfer function? (if possible)	Transfer Function
	Does the team agree with the analysis results?	Buy-in/Sponsorship (CAP model)
	Do you know what improvements can be made to fix the root causes (inputs or Xs)?	
	Did you brainstorm potential improvements with the team?	Brainstorming Solutions
	Did you assess the impact/benefit vs. difficulty/complexity for each potential improvement?	Impact Matrix (PICK chart)
	Did you assess the potential risks for the key improvements?	Risk assessment (FMEA)
	Did you pilot the improvements and get successful results?	
	Did you build a pilot plan for the key improvements?	Pilot/Implementation Plan
	Did you define a time & location scope for the pilot?	Pilot Duration
	Did you build a scorecard for the pilot?	Scorecard
	Do you know if your scorecard data is accurate, and the method of collecting it (if manual) was repeatable and reproducible?	Measurement System Analysis (MSA)
	Did you get agreement from your team where the improvements will be piloted?	Buy-in/Sponsorship (CAP model)
OUTPUTS:	Updated Project Storyboard, list of improvements, data/charts (e.g., scorecard) validating the success of the pilot	

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Did the improvements successfully and permanently resolve the original problem?		
Control	Did you implement the improvements?	
	Did you assess the potential risks for full implementation of the key improvements?	Risk assessment (FMEA)
	Did you build an implementation plan for the key improvements?	Pilot/Implementation Plan
	Did you build a scorecard for the key improvements?	Scorecard
	Do you know if your scorecard data is accurate, and the method of collecting it (if manual) was repeatable and reproducible?	Measurement System Analysis (MSA)
	Did you get agreement from your team where the key improvements will be implemented?	Buy-in/Sponsorship (CAP model)
	Are the improvements successfully meeting expected results (sustained and in control)?	Control Charts
	Did you fully transfer control and responsibility of the improvements back to the process owner?	
	Did you define standard operating procedures (SOP) for the improvements (as needed)?	Standard Operating Procedures (SOP)
	Did you build a control plan to help sustain the improvements?	Control Plan
	Did the process owner accept responsibility for controlling the new improvements?	Control Plan
	Does the team (including the Sponsor & Champion) agree the project is complete?	
	Did you update the project storyboard to reflect the project's lifecycle and results?	Project Closure
	Did you get agreement from your team (and the leadership that owns the area where the improvements were implemented) that the project was successful and complete?	Buy-in/Sponsorship (CAP model)
	OUTPUTS:	Updated final project storyboard, control plan, SOP, agreement from entire team that the project is complete.