

TAT Project

Phase A-

A huge client of Silverline Services, Mr. John, complained that there is a high percentage of non-compliance of TAT to the relationship manager and process owner of Silverline Services, Mr. Venkat. This means that the customer care service of Silverline Services spends more time satisfying the customers' needs than sanctioned in the agreement. Due to this high non-compliance, Mr. John is losing a lot of his customers and he says that they will discontinue this agreement if immediate action is not taken. Mr. John is a very reliable client for Mr. Venkat and he can't afford to lose him. Due to this fact, a precise Lean Six Sigma project was necessary to be conducted.

Phase B-

1. We understood the business case
2. We identified the external and internal customers from the business case. Critical to Quality factor was identified from the Voice of Customer.
3. We collected the Define phase data and analyzed it.
4. From the analysis, we prepared a project charter.
5. Using the tool SIPOC we constructed a snapshot of the process.
6. A high level process map was created.
7. We prepared a RACI matrix.
8. We set the Performance Standards.
9. We listed the potential causes for the problem.
10. We prepared a Ishikawa diagram using the list of potential causes
11. We prepared a CI matrix and sorted the potential causes into specific categories.
12. We prepared a data collection plan using the suitable sampling plan.
13. We collected and analysed the Measure data.
14. We prepared a Capability Analysis Chart.
15. We did the Graphical Analysis and Inferential Test.
16. We prepared a Solution Brainstorming Table.
17. Using the brainstormed potential solutions, we prioritized them in the Solution Refining Table.
18. We did Pilot Phase Planning.
19. We collected Improve phase data.

20. We performed Stability Analysis using the Run Chart on the collected data.
21. We performed Normality Analysis on the collected data.
22. We performed a Validation Test using the 2 Proportion Test and 1 Proportion Test on the collected data.
23. We prepared a Capability Test Table.
24. We compared the Phase-Wise sigma value of Measure Phase and Improve Phase.
25. We performed various Validation Tests for X's Improvement.
26. We summarized all the Validation Tests for Improvement.
27. We updated the Process Map.
28. We prepared a FMEA Chart.
29. We collected Control phase data.
30. We prepared many Control Charts on the data, suitable to the nature of the data.
31. We performed Stability Analysis using the Run Chart on the collected data.
32. We performed Normality Analysis on the collected data.
33. We performed a Validation Test using the 2 Proportion Test and 1 Proportion Test on the collected data.
34. We prepared a Capability Analysis Table.
35. We compared the Phase-Wise sigma value of Measure Phase, Improve Phase and Control Phase.
36. We prepared a Combined Individual Chart for Performance of Y.
37. We prepared a Monitoring Plan accordingly to the results.
38. We prepared a Response Plan accordingly to the results.
39. We received Project Sign Off approval from Process Owner, MBB and Finance Manager for project completion.
40. We ended the project.

Phase C-

1. We understand the business scenario to get the context of the background of the agreement between the company and the client. From this, we can understand the main problem more precisely and can conduct the project with much ease. We understand the need for the conduction of the Lean Six Sigma project.
2. This step is necessary to identify the Internal customer, External customer and the Critical to Quality factor. In this case, Mr. John and his Customers are the External customers and they are complaining that the Internal Customer, Mr. Venkat and Silverline Services are taking more time to solve the customer queries than what they agreed in their deal($TAT \leq 180$ min). There is a high percentage of non-compliance of TAT(Turn Around Time) by the internal customer compared to SLA agreement.
3. We collected the Data of the average TAT to resolve the end customer query of each day and calculated how many days satisfy the target TAT.
4. We prepared a Project Charter to summarize the business case briefly. We made a Problem Statement in which we understand the average TAT per day for 47 days out of 92 days is higher

than allowed TAT. We made a Goal Statement in which we declared the target TAT and the time it will be achieved. We made a Project Scope in which we understand the In-Scope(Fields to be worked on) and Out-Scope (Fields to be ignored). We clarified the members and their roles and prepared a Project Timeline.

5. SIPOC (Suppliers Inputs Process Outputs Customers). SIPOC is a scoping tool that views the process as a system of process steps, inputs and outputs. SIPOC allows the team to clearly define the process boundaries, link the stakeholders to process, and begin laying out the 'map' of the process itself, at a very high level.
6. A Process Map is a tool for graphically describing a process and used to identify project focus areas.
A high level process mapping provides shared understanding between the team, a visual layout of the entire process for better communication, illustration of interrelationships of process to get an idea of the data versus the emotions of the customers and identification of bottlenecks and wastes to focus more on the project.
7. RACI matrix is a responsibility assignment chart that maps out every task, milestone or key decision involved in completing a project and assigns which roles are Responsible for each action, which personnel are Accountable and where appropriately, who needs to be consulted or informed. We identify the roles of every member in this project and hold them responsible for the task they are assigned. We make clear when the review meetings will be held.
8. The goal of a performance standard is to translate the customer needs into a measurable characteristic. It specifies the customer wants and a good process to give them what they want. The Defect and Defective here are any ticket with TAT>180 min and any day with avg. TAT of >180 min.
9. We brainstormed the potential causes for high TAT and listed them.
10. We sort the list of potential causes into various groups and categories. This is called the Ishikawa diagram.

The main categories are as follows:

- Man/Personal related causes
 - Machine related causes
 - Method or policy related causes
 - Material related, measurement related causes
 - Environment related or external factors
11. The CI matrix gives us an idea of if the potential causes we listed are Controllable or Uncontrollable, High or Low Impactable and Measurable or Immeasurable. This gives us an idea of what causes we really need to focus on.
 12. Data Collection Plan is a tool to collect data of causes. It describes exact steps as well as the sequence that needs to be followed. In gathering the data for the given Six Sigma project. Sampling method is decided according to the nature of the data.
 13. We collected Measure phase data and listed the various X's and if they meet the SLA compliance or not.
 14. We prepared a Capability Analysis Chart where we stated that the Defective Definition is a day which has avg. TAT per day>180. We found out that out of the 20 units, 14 are defective and the long term sigma value is -0.524.

15. We performed a Graphical Analysis using various graphs and charts. of the data and Inferential Test to find the statistically significant causes of the problem.
16. In Solution Brainstorming, we discuss the various possible solutions for the significant causes we have found out. In this step, all the team members sit down and discuss many possible solutions to each of the significant causes.
17. In solution refining, we check for possible cost of implementation, impact of solution, feasibility of solutions, client/senior management's consent for the solutions we have discussed and listed out in the solution brainstorming session. We calculate the Solution Priority Index to short list the more effective and feasible solutions.
18. Piloting is preparation for the 'unintended consequences' of implementing change. It is a test of a potential solution on a smaller scale, in order to better understand the effects of X's solutions , and to learn how to make the implementation more effective. Data is collected to ensure Y's performance is under specification limit every day. To track the challenges in deployment and fix them. Cause log and Solution log are maintained simultaneously for fixing challenges. Weekly meetings with operations/production leaders are conducted for the smooth deployment.
19. We collected Improve phase data and listed the significant causes and their TAT.
20. We performed Stability Analysis using the Run Chart to find if the data is stable or not. There are 4 P-values in this test:
 - Approx P-Value for Clustering
 - Approx P-Value for Mixtures
 - Approx P-Value for Trends
 - Approx P-Value for OscillationAs all the P-Values are greater than 0.05, we can conclude that the data is stable.
21. We performed Normality Analysis to find if the data is normal or not. As the P-Value is less than 0.05, we can conclude that the data is non-normal.
22. Validation tests are performed to ensure that target is achieved and applicable to the total population in improve phase. In the 2-Proportion Test, the P-value is less than 0.05 and therefore, % TAT compliance is accomplished for the total population. In the 1-Proportion Test, the P-value is more than 0.05 and therefore, % TAT compliance has achieved the set target.
23. In the Capability Test Table, we defined Defective as % TAT Compliance < 43% and found out that 2 out of 25 units are defective. Hence, we use Long-term sigma value as the data is non-normal and get the value as 1.41.
24. We compared the Measure and Improve phase sigma value in a graphical manner and plotted their average.
25. First, we did a Validation Test for X's Improvement for % of Rework Incidences in a given day by Correlation method and got the correlation coefficient as -0.435. It indicates that as % rework incidences per day increases, TAT increases moderately.
Then we did Validation Test for X's Improvement for Shifts by Test of Equal variances and as the p-value is greater than 0.368, we can conclude that there is no impact of shift of day on TAT.
26. We summarized all the significant causes, their P-values and interpretation in a table so that we can see all the useful data in a glimpse.
27. After implementing the solutions, we updated the process map as per our new requirements.
28. The first thing we do in the Control phase is prepare a FMEA chart. FMEA (Failure Mode and Effect Analysis) is a tool to identify potential X's by considering and quantifying the risks of

failure. We calculate the RPN (Risk Priority Number). We rate the severity of the cause of failure and the frequency of occurrence. On the basis of the RPN, the resources are focused on the causes with highest RPN i.e. causes having highest severity.

29. We collected Control phase data
30. Statistical Process Control commonly referred to as SPC are the charts used to prevent overreaction to normal process variation. Control charts are made to test the consistency and the stability of the process. SPC graphically illustrates the difference between special cause and common cause variation. Provides quick detection of unintended process changes as we can see the data point lie outside of the control limit. Control charts are an effective medium to detect any changes in the unintended x's as it works for both discrete and continuous types of data. As the Sample Characteristics are Low Volume and Data plotted is in individual data points, we use I-MR Chart .
31. We performed Stability Analysis using the Run Chart to find if the data is stable or not. As all the P-Values are greater than 0.05, we can conclude that the data is stable.
32. We performed Normality Analysis to find if the data is normal or not. As the P-Value is less than 0.05, we can conclude that the data is non-normal.
33. We perform a Validation Test- 2 Proportion Test to check whether the improvement is sustained in Control phase. As the P-value is less than 0.05, we can conclude that improvement in % TAT Compliance is sustained.
We perform a Validation Test- 1 Proportion Test to check whether the defined goal is met, sustained and whether the result is applicable for the total population in the Control phase. As the P-value is greater than 0.05, we can conclude that we have sustained with the target of 46% in the control phase.
34. We prepared a Capability Analysis Chart where we stated that the Defective Definition is an unit where % TAT Compliance<43%. We found out that out of the 40 units, 8 are defective and the long term sigma value(as the data is non-normal) is 0.84.
35. We compared the Measure, Improve and Control phase sigma value in a graphical manner and plotted their average.
36. Combined individual control chart is made to compare the improvement in various phases i.e. the sole purpose of the combined chart is to track the improvement performance over time for Y over the various phases we have been through.
37. Monitoring plan helps to ensure that solutions that we have found are properly implemented.
38. Response plan is made to provide a response plan for each monitored Y i.e. % Quality score and X the causes.
39. We received Project Sign Off approval from Process Owner, MBB and Finance Manager for project completion.
40. We investigated the project again and checked if no mistakes are made. Then we ended the project and submitted it to the management.