

Reduction in Ticket Resolution Time

Smaline Diana

ROADMAP



Overview



Define



Measure



Analyse



Improve



Control

OVERVIEW



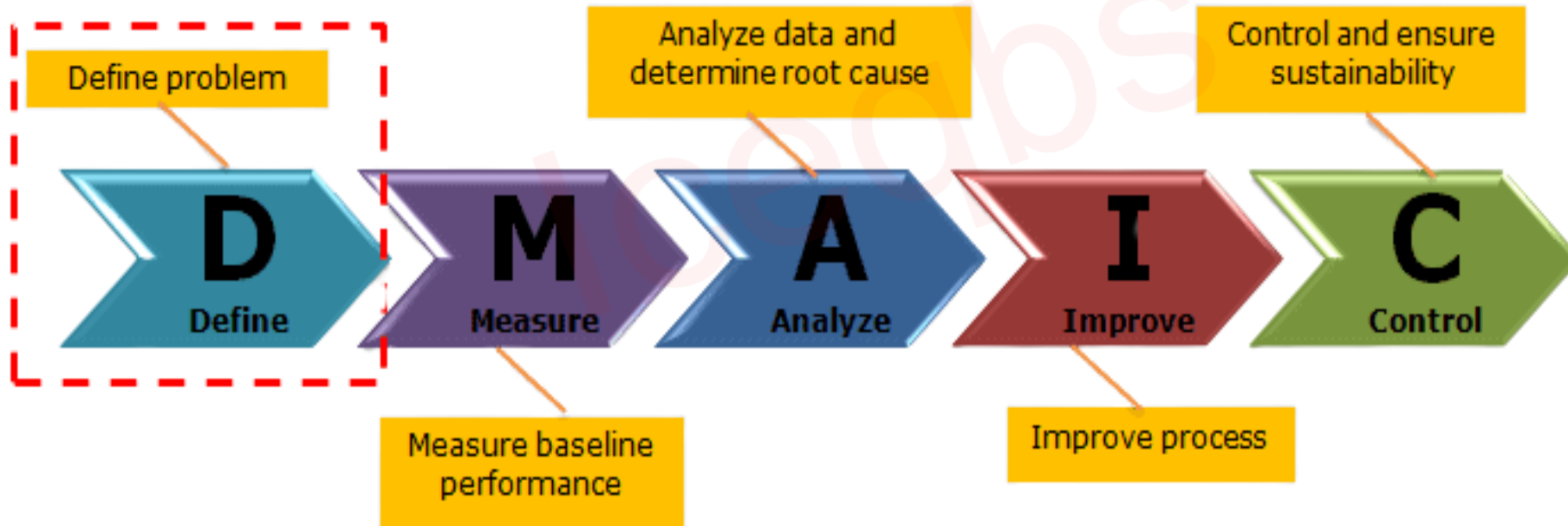
Background

A software development company was experiencing delays in customer service, with average ticket resolution times reaching 4.5 days. Customers frequently expressed dissatisfaction due to slow responses and repeated follow-ups.

Internal analysis showed that many tickets were being misclassified at the initial stage, leading to unnecessary reassignments across teams and extended resolution cycles.

The issue was aggravated by ambiguous ticket categories in the system, language and cultural barriers in a global support setup, and high attrition causing new hires to struggle with classification standards. These challenges created inconsistent service quality and increased the risk of breaching service level agreements (SLAs).

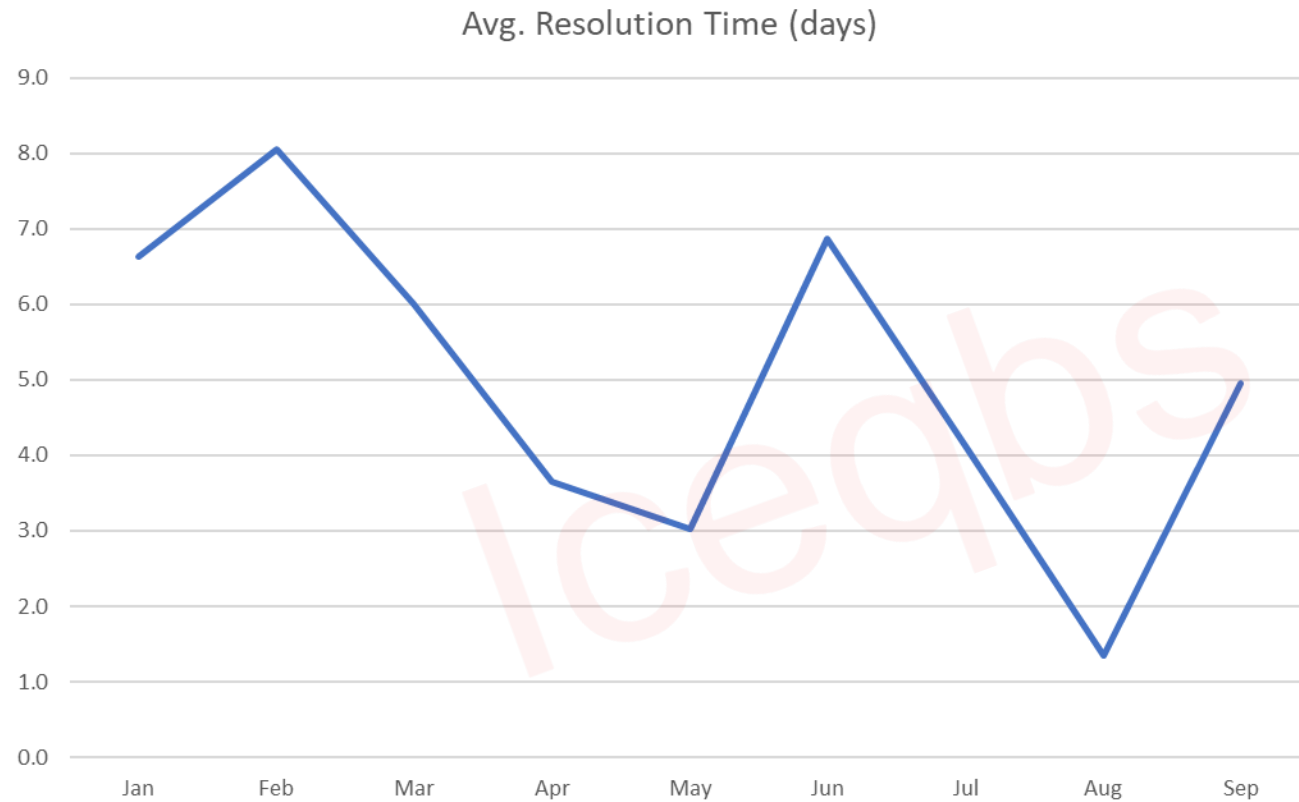
DEFINE PHASE



CTQ Tree :

Voice of customer	Critical to X	Primary Metric for improvement
<i>" We need fast, accurate responses to billing software issues to avoid business disruption."</i>	Critical to X CTD: Resolution time	Primary Metric - Y = Average ticket resolution time. Secondary Metric – First Time Resolution rate

Baseline Performance of Primary Metric (9 months data as Line chart)



Inference :

- Last 9 months Average Resolution Time data shows a significant variation and hence ideal problem to be taken up as a Six Sigma Project.

SIPOC

Suppliers (S)	Inputs (I)	Process (P)	Outputs (O)	Customers (C)
Client, Agent	Issue report/ticket	Intake, categorize,	Resolved ticket,	Client, Support
Knowledge base	Ticket details/data	Assign, investigate,	Documentation update,	Management, QA
Product Team	Updated KB, FAQ	resolve, communicate	Feedback report	Agent Lead
Client, Agent	Issue report/ticket	Intake, categorize,	Resolved ticket,	Client, Support
Knowledge base	Ticket details/data	Assign, investigate,	Documentation update,	Management, QA

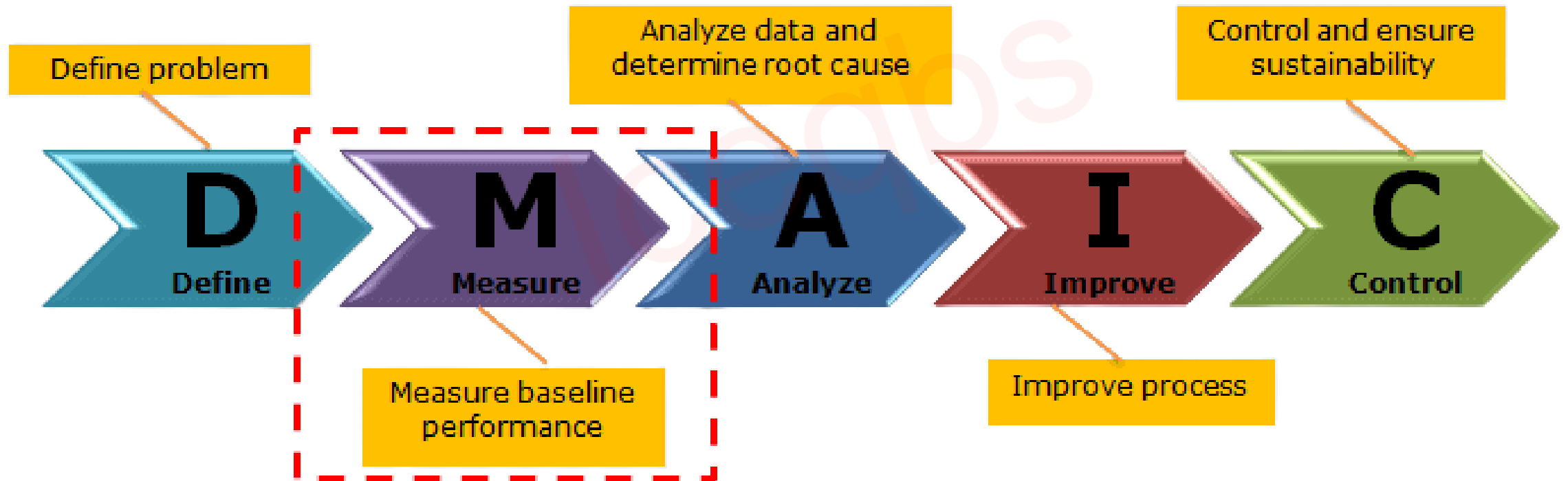
Project Charter

Project Title:		Reduction of Average ticket resolution time to < 3 days within 6 months		
Project Leader			Project Team Members:	
Smaline Dayana				
Champion/Sponsors:			Key Stake Holders	
Problem Statement:			Goal Statement:	
Avg. ticket resolution is 4.5 days, causing delayed customer satisfaction based on last 9 months data			Reduce avg. ticket resolution time to ≤3 days within 6 months.	
Secondary Metric			Assumptions Made:	
Productivity				

Project Charter

Tangible and Intangible Benefits:		Risk to Success:	
Faster resolution improves retention, reduces cost, and enhances product reputation. Annual Financial savings of 50,000 USD because of penalties for late responses			
In Scope:		Out of Scope:	
All customer support tickets for billing software		except internal IT.	
Signatories:		Project Timeline:	
Project Head :		6 Months	
Sponsor :			
Master Black Belt :			
Finance Representative :			
		Stages	Start
		End	
		Define	1 st January 2022
		Measure	31 st January 2022
		Analyze	1 st February 2022
		Improve	28 th February 2022
		Control	15 th April 2022
			31 st May 2022
			30 th June 2022

MEASURE PHASE



Data collection – Histogram (Before improvement)

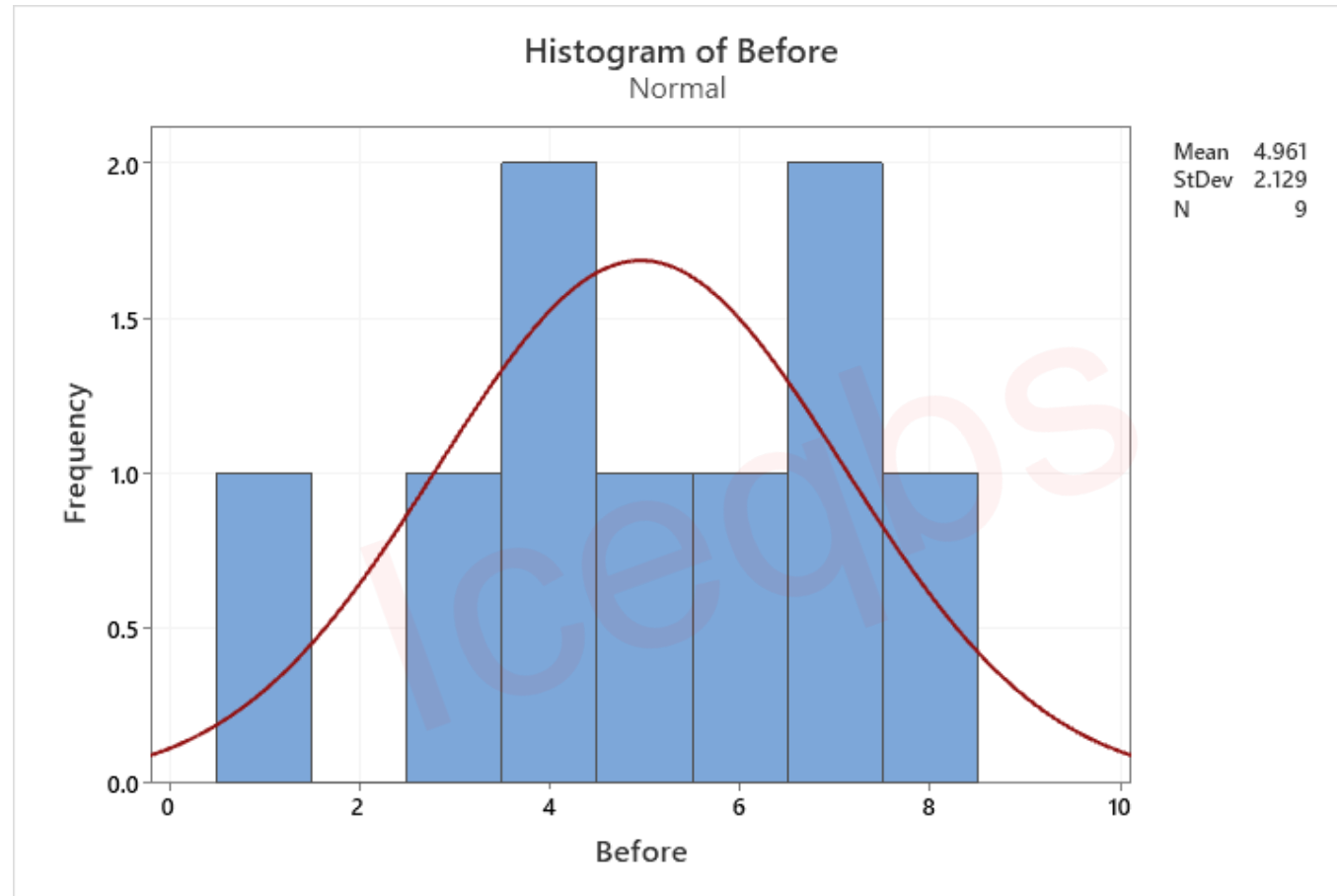
Statistics

Variable	N	N*	Mean	StDev	Variance	Median	Range	Mode	N for Mode
Before	9	0	4.961	2.129	4.534	4.955	6.705	*	0

Inference :

- Average Resolution time is 4.96 days with a Standard Deviation of 2.13

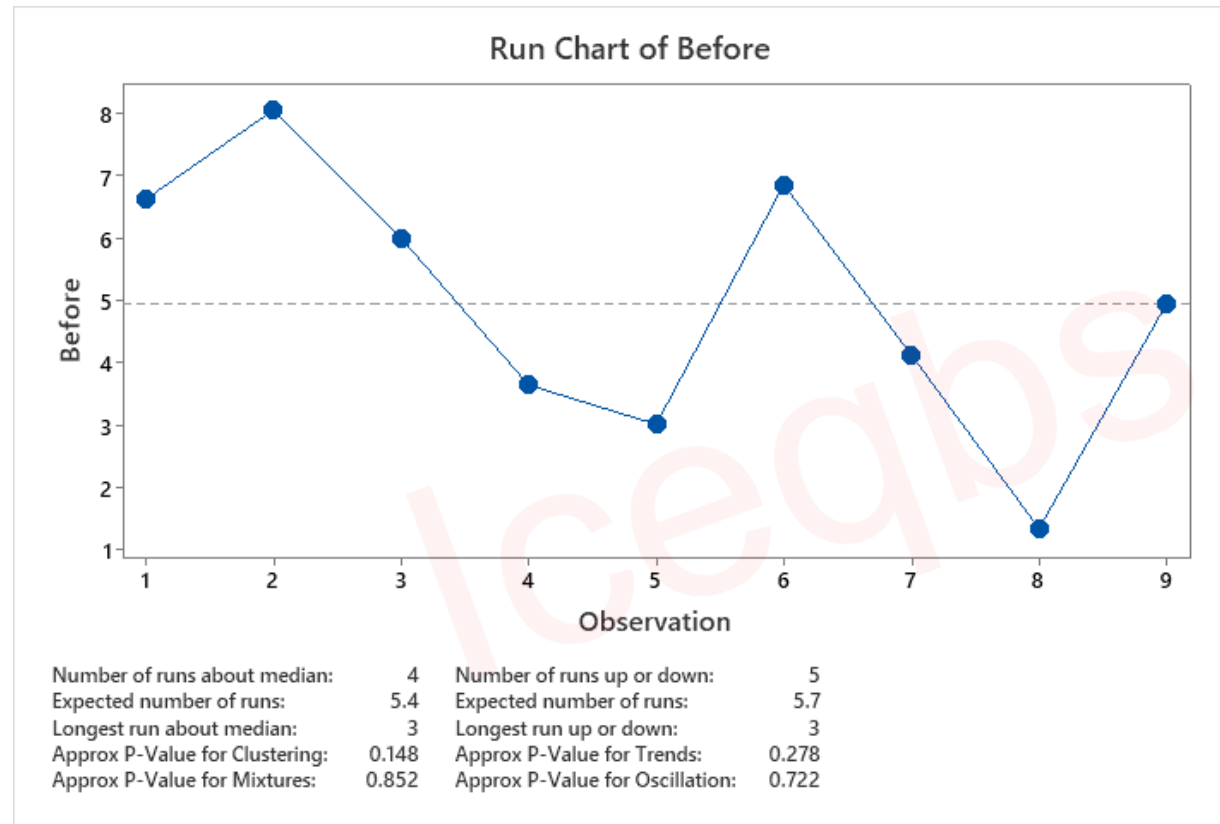
Data collection – Run Chart (Before improvement)



Inference :

- Data is normally distributed over the mean

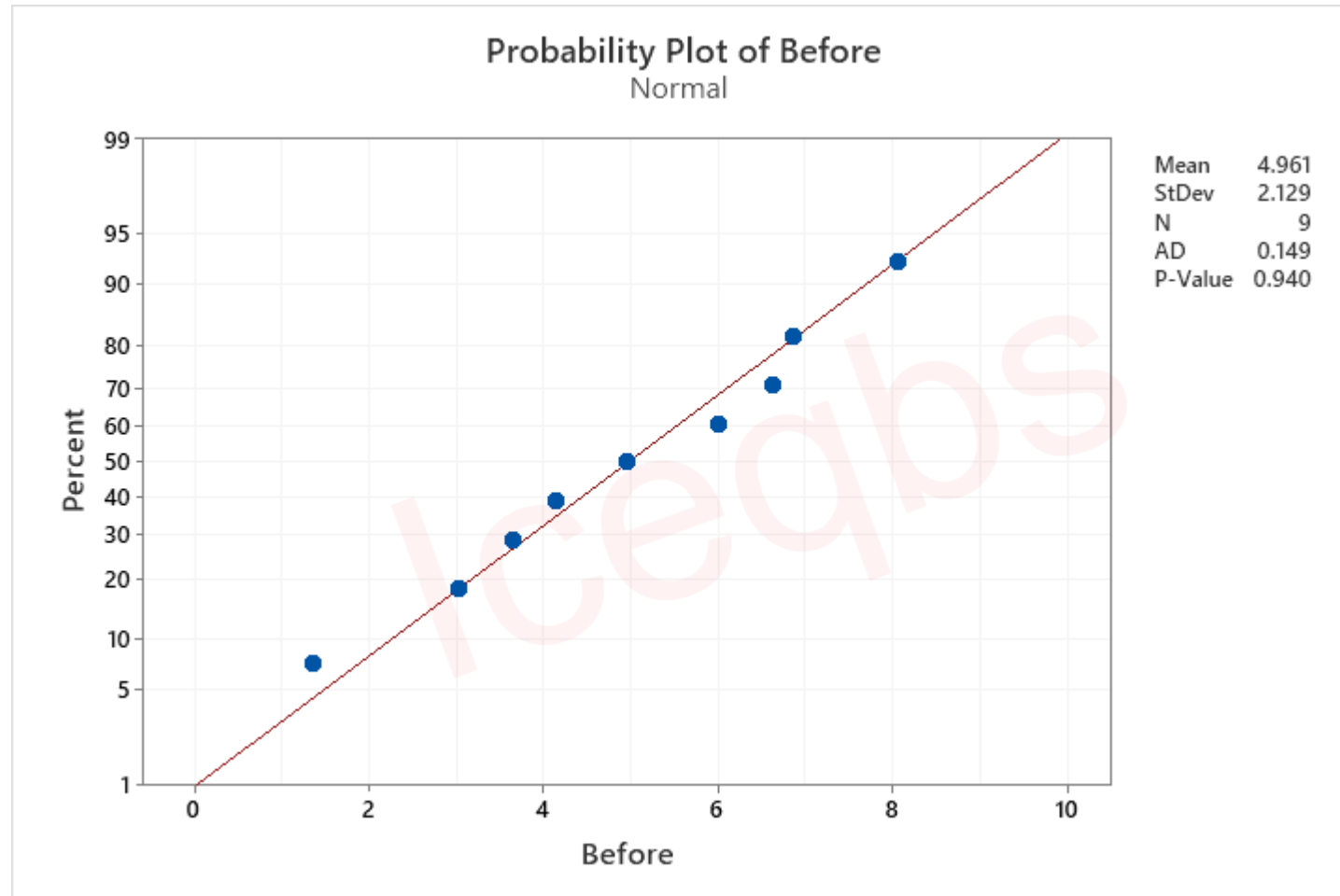
Data collection – Normality plot (Before improvement)



Inference :

- $P > 0.05$ – No special causes in the process

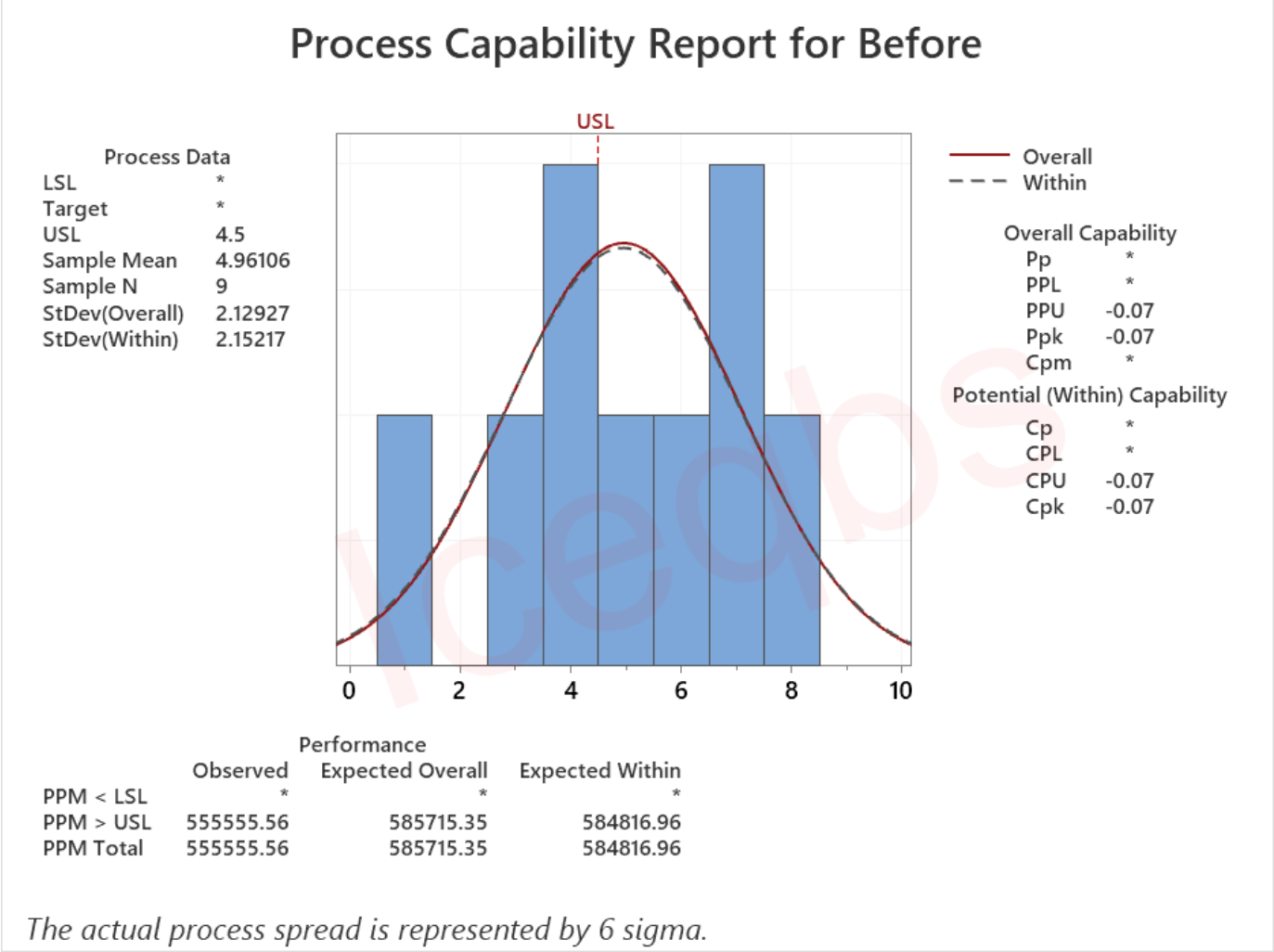
Data collection – Normality plot (Before improvement)



Inference :

- $P > 0.05$ the data is normally distributed

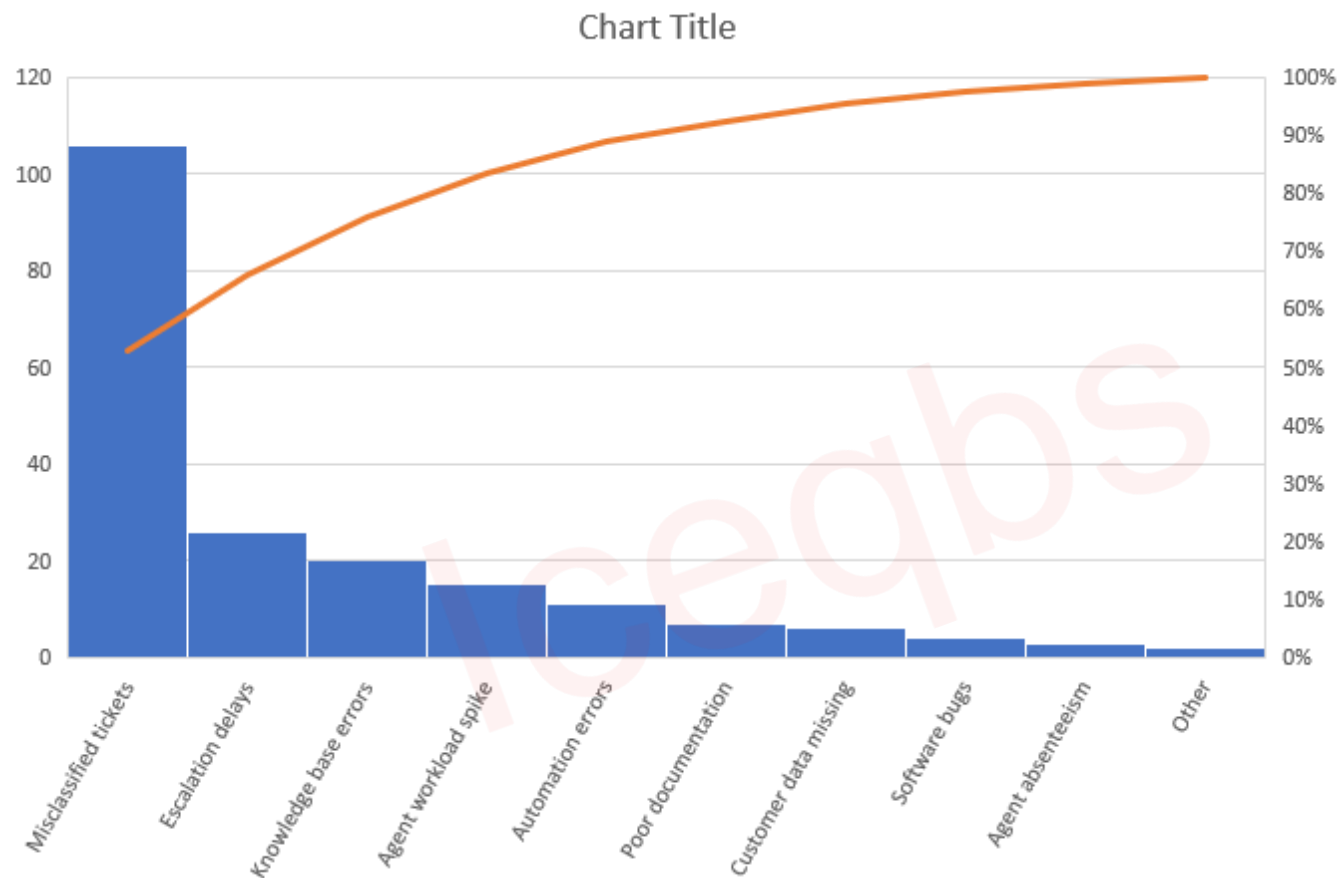
Data collection – Normality plot (Before improvement)



Inference :

- CpK is -0.07, meaning process is highly incapable. Since Mean is > USL, CpK is negative

Data collection – Normality plot (Before improvement)



Inference :

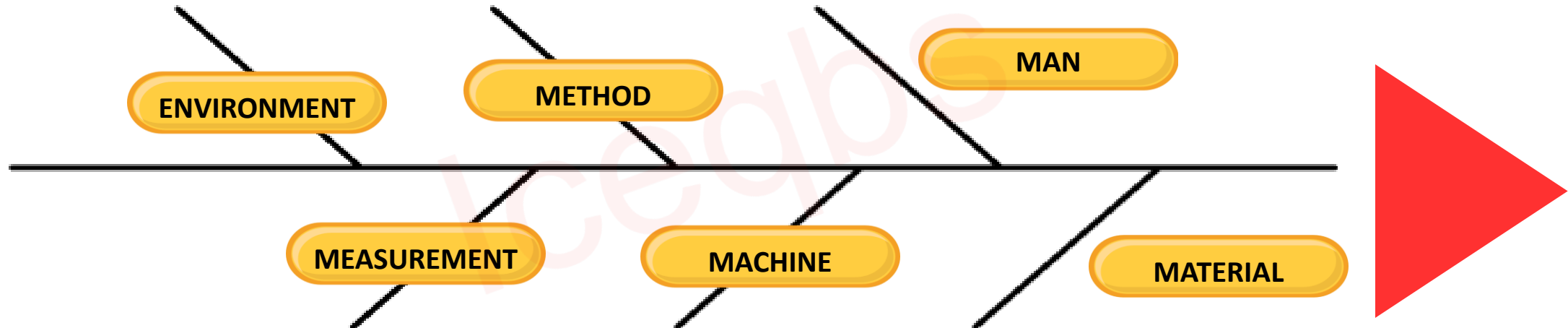
- Misclassification of tickets contributes to >50% of the issue and hence it is focused for further analysis

Fish Bone Diagram

1. Pressure to meet ticket handling speed targets over accuracy.
2. Cultural/language barriers between global teams and customers.
3. Remote work setups leading to poor collaboration/knowledge sharing.

1. Lack of periodic audits/feedback loops to correct misclassification trends.
2. Ambiguous ticket categories (overlap/confusion between options).
3. No standardized classification procedure or checklist for agents.

1. Insufficient training for support agents on ticket classification.
2. High attrition/new hires unfamiliar with classification standards.
3. Cognitive overload—agents rushing due to high ticket volume.

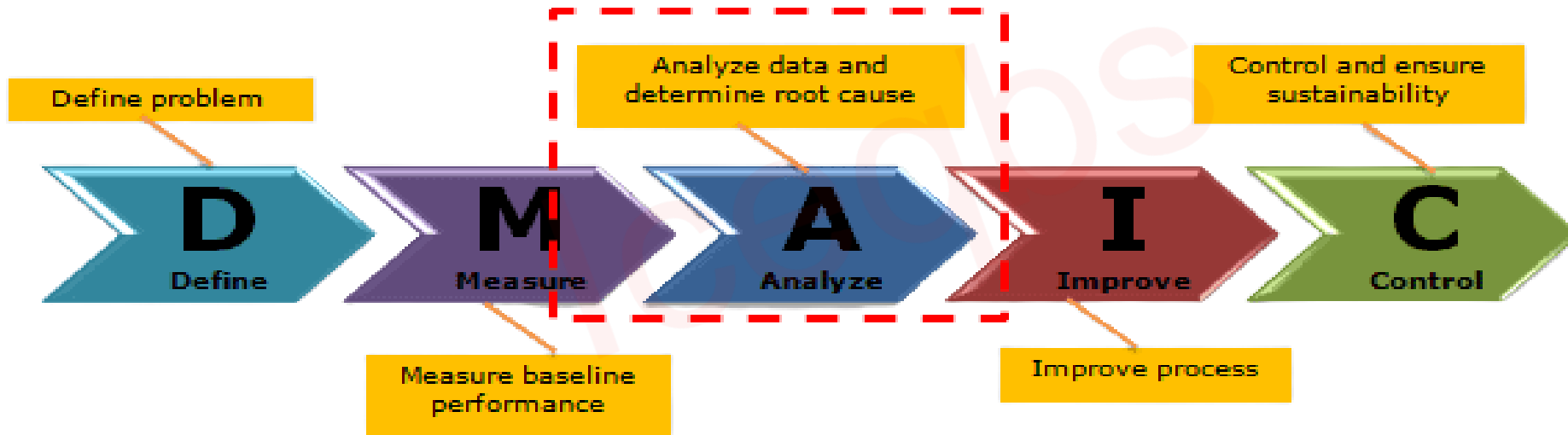


1. No KPI specifically tracking classification accuracy.
2. Delayed feedback on misclassified tickets (only found post-resolution).
3. Lack of root cause analysis on historical misclassification data

1. Integration gaps between CRM and support tools causing incorrect category mapping.
2. Poor user interface leading to frequent mis-clicks during category selection.
3. Ticketing system lacks intelligent auto-classification features.

1. Customers provide incomplete or vague issue descriptions.
2. Use of jargon or inconsistent terminology in customer submissions.
3. Missing mandatory fields in ticket submission forms.

ANALYSE PHASE



Analyse – Hypothesis testing

Rows: has_auto_class Columns: misclassified

	0	1	All
0	796 930.0	561 427.0	1357
1	1260 1126.0	383 517.0	1643
All	2056	944	3000

Cell Contents
Count
Expected count

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	112.032	1	0.000
Likelihood Ratio	112.082	1	0.000

Chi-Square Test for Association: language_match, misclassified

Rows: language_match Columns: misclassified

	0	1	All
0	462 586.6	394 269.4	856
1	1594 1469.4	550 674.6	2144
All	2056	944	3000

Cell Contents
Count
Expected count

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	117.767	1	0.000
Likelihood Ratio	113.873	1	0.000

Chi-Square Test for Association: tenure_experienced, misclassified

Rows: tenure_experienced Columns: misclassified

	0	1	All
0	577 668.9	399 307.1	976
1	1479 1387.1	545 636.9	2024
All	2056	944	3000

Cell Contents
Count
Expected count

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	59.457	1	0.000
Likelihood Ratio	58.243	1	0.000

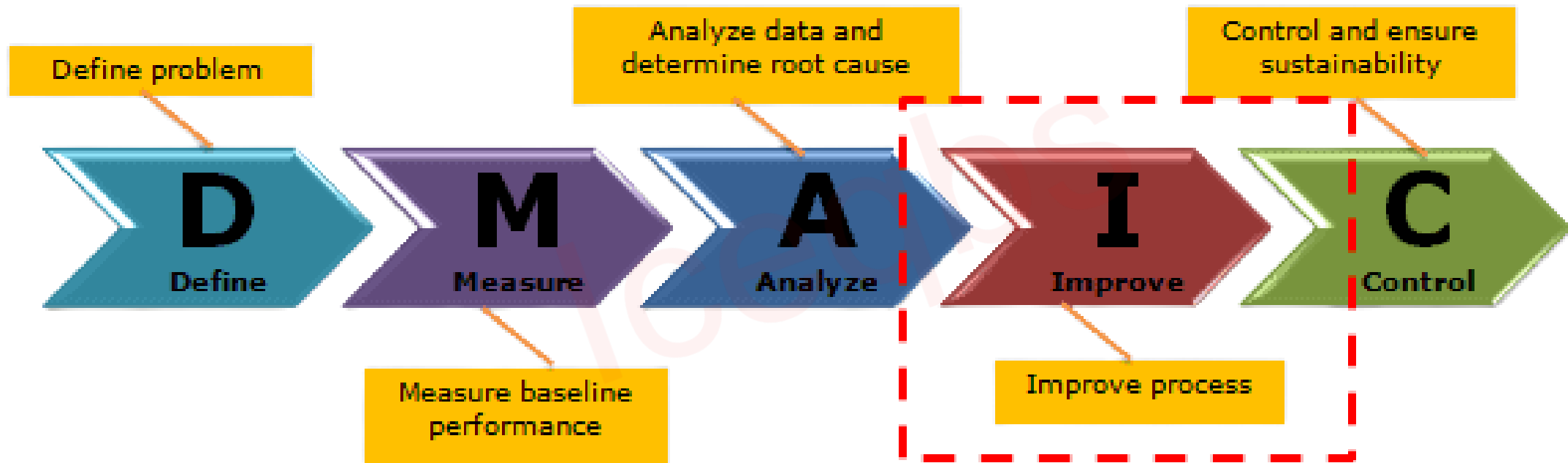
Inference :

- Since $p < 0.05$, No auto classification, Language barrier and Tenure are validated as critical root causes

Summary of Statistically validated Root causes

- No auto classification, Language barrier and Tenure are validated as critical root causes

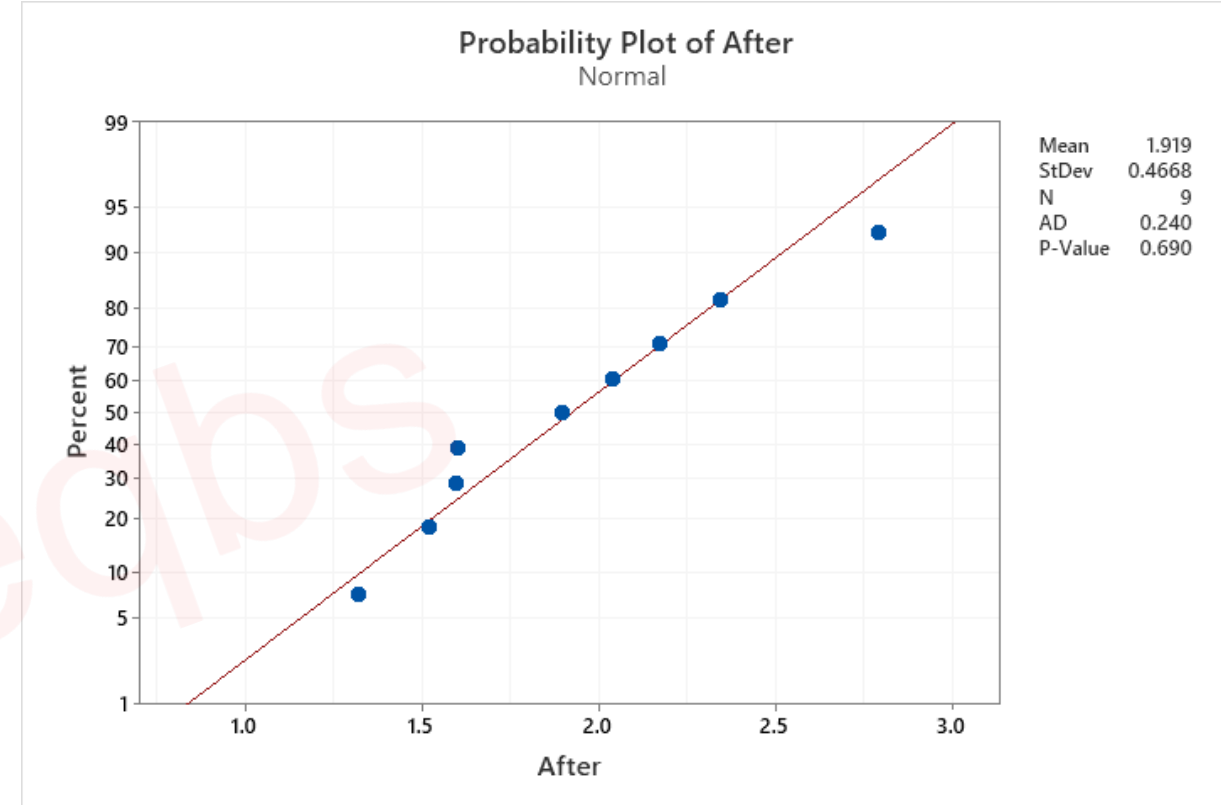
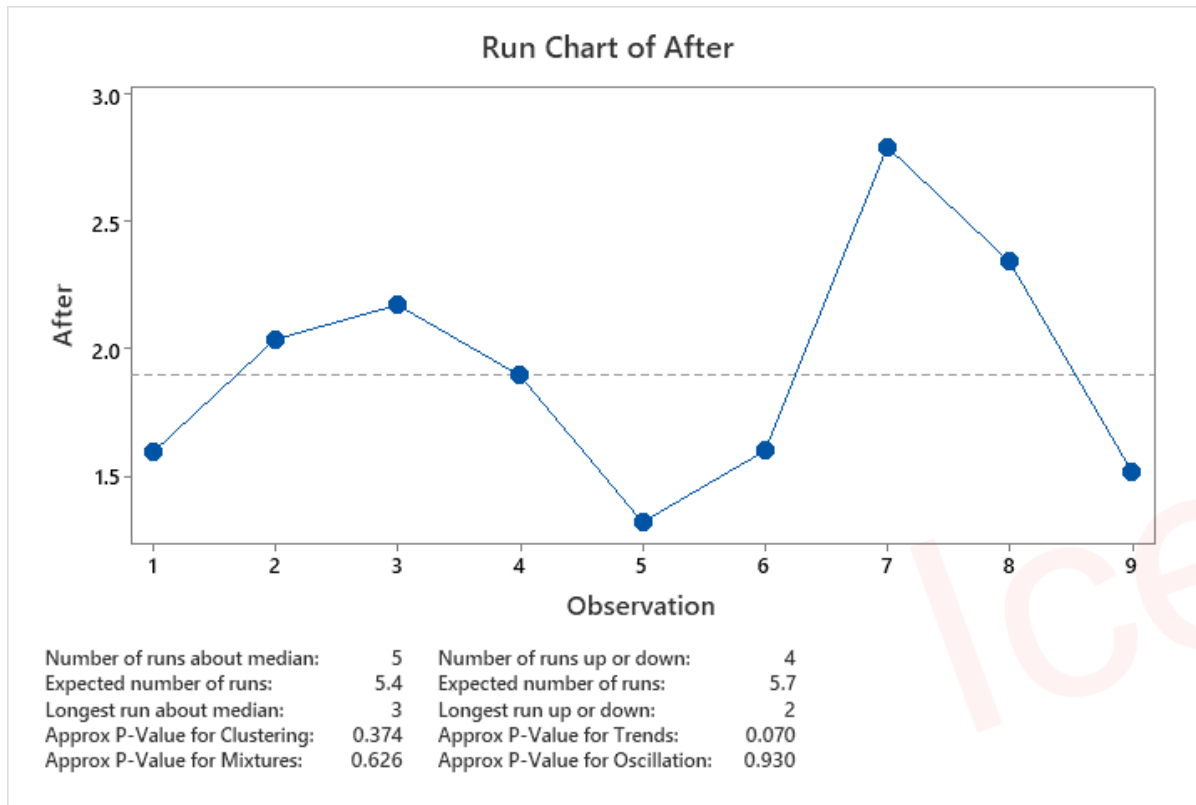
IMPROVE PHASE



Improve - Action Plan

Root Cause	Action	Owner	Timeline	KPI
Ticketing system lacks intelligent auto-classification	Redesign ticket categories, mandatory fields, weekly audits	Customer Service Manager	0–3 months	Misclassification rate < 10%
Ticketing system lacks intelligent auto-classification	Deploy AI-based auto-tagging, CRM integration	IT/Automation Lead	3–6 months	First-time classification accuracy > 90%
Ticketing system lacks intelligent auto-classification	Continuous ML model training, auto-routing specialized tickets	Data Science Team	6–12 months	Resolution time ≤ 2.5 days
Cultural/Language barriers between global teams and customers	Standardized ticket intake form, glossary, language support tools	Support Operations Lead	0–3 months	Reduction in tickets flagged for unclear descriptions
Cultural/Language barriers between global teams and customers	Hire/assign bilingual liaisons, cultural sensitivity training	HR + Regional Ops Manager	3–6 months	Misclassification rate due to language mismatch < 8%
Cultural/Language barriers between global teams and customers	Establish regional hubs, integrate AI translation/speech tools	Global Support Director	6–12 months	CSAT score improvement ≥ 10%
High attrition/new hires unfamiliar with standards	Quick Reference Guide, mentorship program, refresher quizzes	Training Lead	0–3 months	New hire accuracy ≥ 80%
High attrition/new hires unfamiliar with standards	Interactive decision tree in tool, onboarding simulations	Process Excellence Lead	3–6 months	New hire misclassification reduced by 30%
High attrition/new hires unfamiliar with standards	Automated feedback loop, KPI-linked performance, knowledge portal	Quality Lead + HR	6–12 months	First-time classification accuracy > 95%

Improve - Run chart and Normality Test (After Improvement)



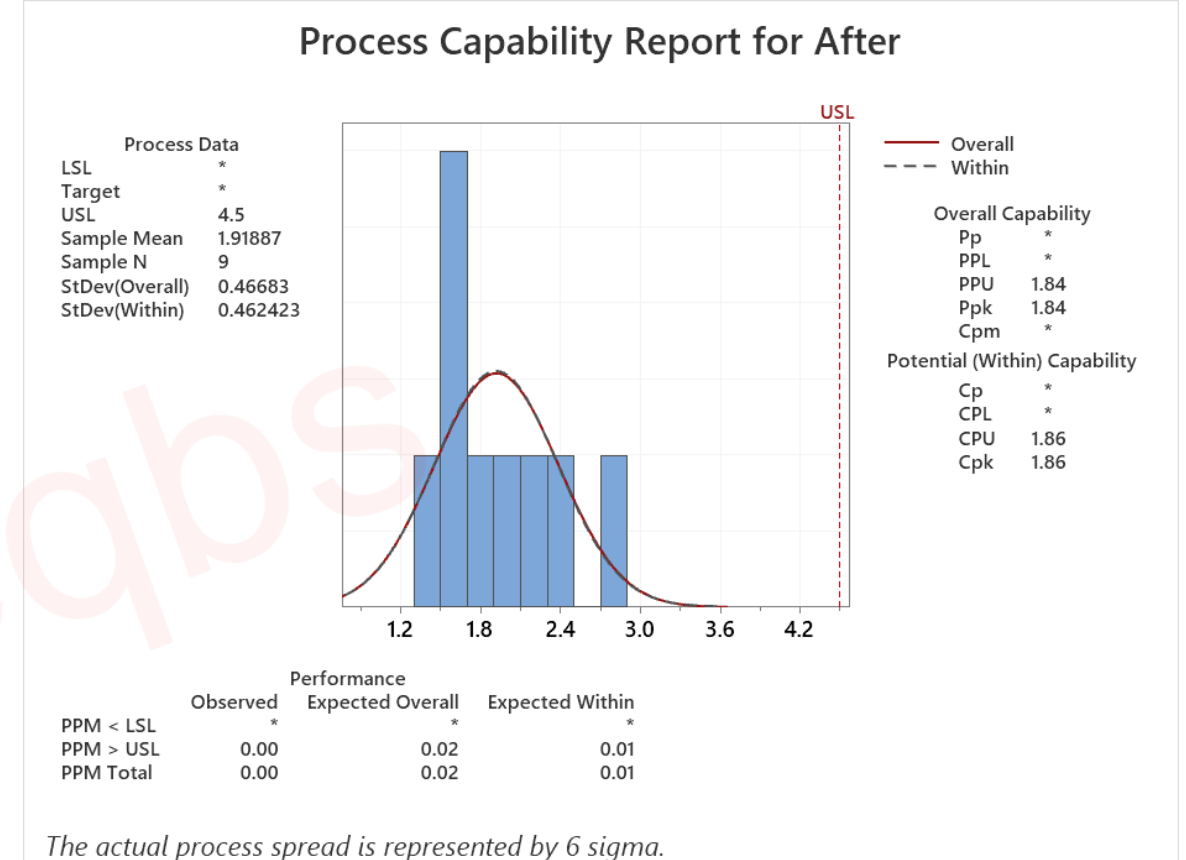
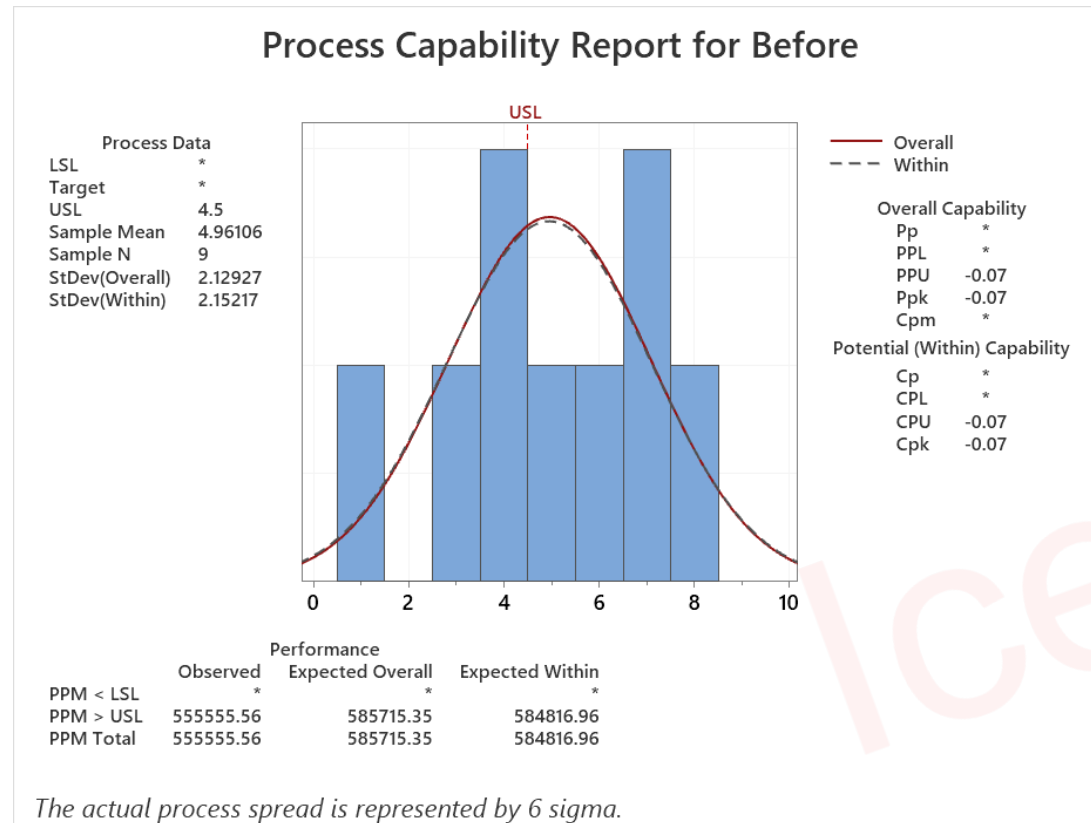
Inference:

- Run chart – process is stable there is no special causes in the process (p value > 0.05)

Inference:

- Normality test – Data are normally distributed

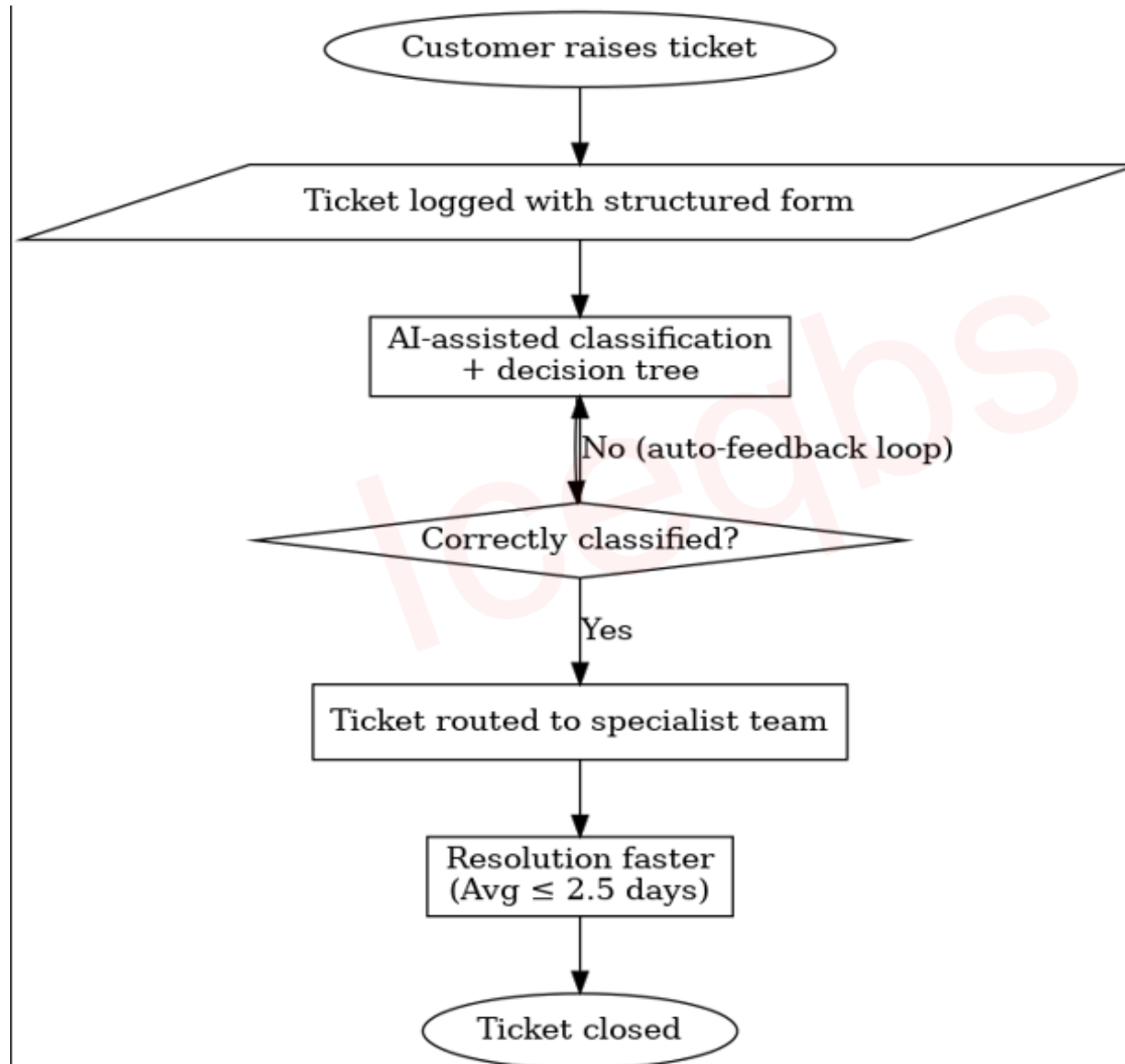
Improve - Process capability – Before & After Improvement



Inference :

- Before $Cpk < \text{After } Cpk$, which shows process is much more capable after improvement
- There is less variability in system since stdev reduced after improvement
- After improvement the data are normally distributed near the target within specified limit

Process Flow Chart – Ticket Resolution Process



After Improvement (Statistical validation for Improvement – Hypothesis Testing)

Two-Sample T-Test and CI: Before, After

Method

μ_1 : population mean of Before

μ_2 : population mean of After

Difference: $\mu_1 - \mu_2$

Equal variances are not assumed for this analysis.

Descriptive Statistics

Sample	N	Mean	StDev	SE Mean
Before	9	4.96	2.13	0.71
After	9	1.919	0.467	0.16

Estimation for Difference

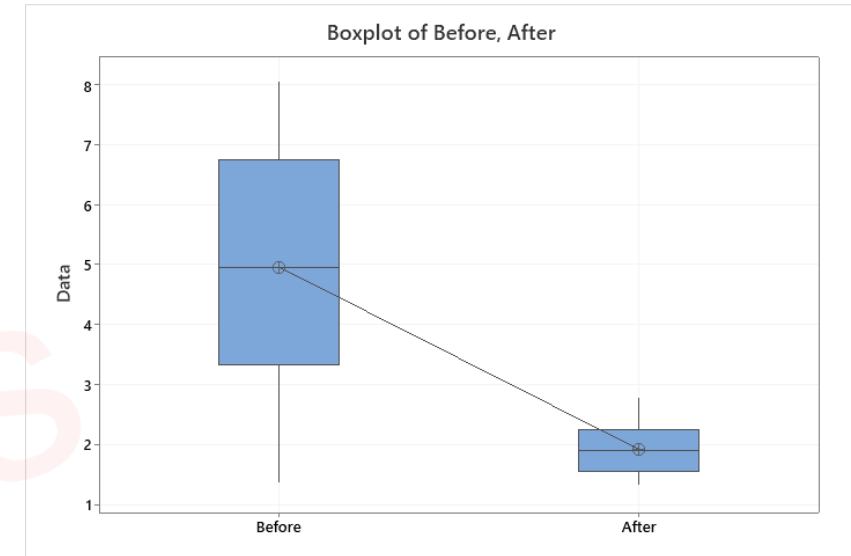
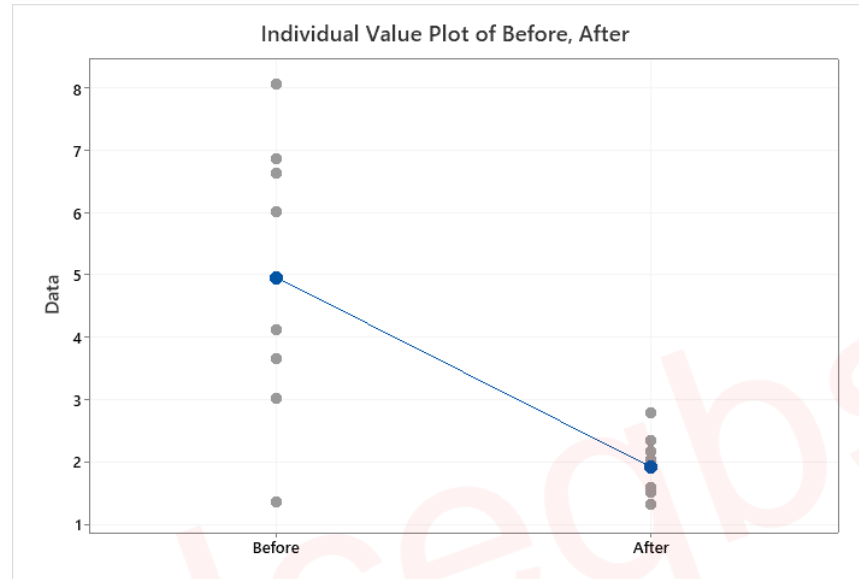
Difference	95% CI for Difference
3.042	(1.367, 4.718)

Test

Null hypothesis $H_0: \mu_1 - \mu_2 = 0$

Alternative hypothesis $H_1: \mu_1 - \mu_2 \neq 0$

T-Value	DF	P-Value
4.19	8	0.003



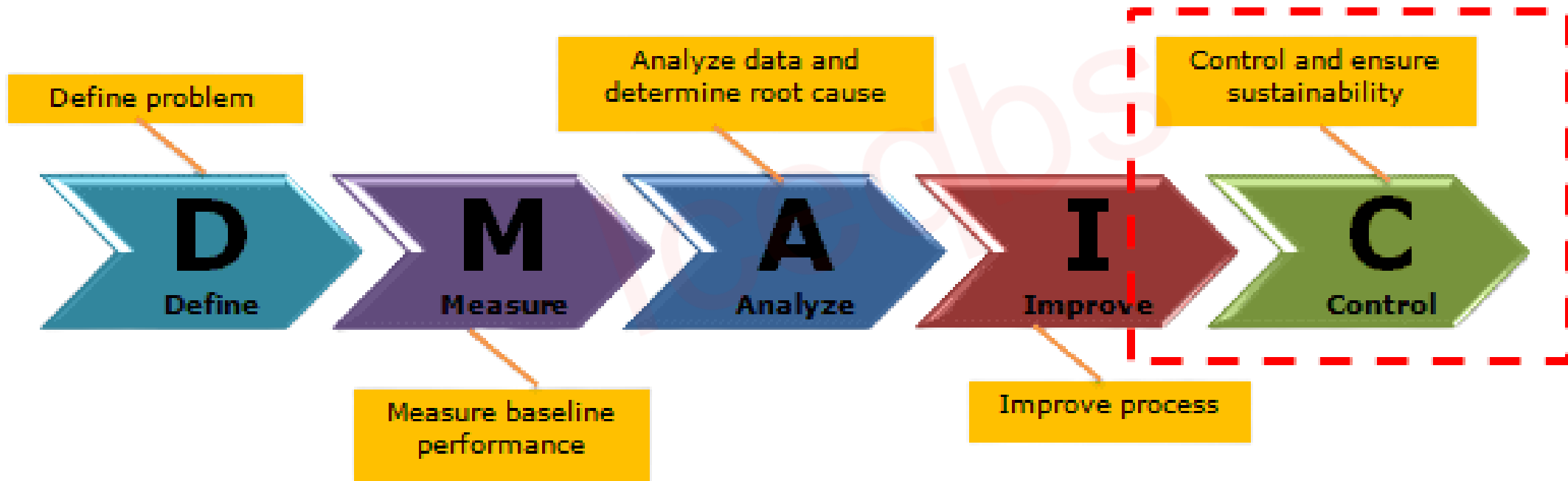
Inference:

- Since P value is less than 0.05, there is enough evidence to reject the null hypothesis and we can conclude that the difference between the population means is statistically significant.
- It is also visible from the individual value plot & box plot, there is clear difference in mean after improvement which is closer to required thickness

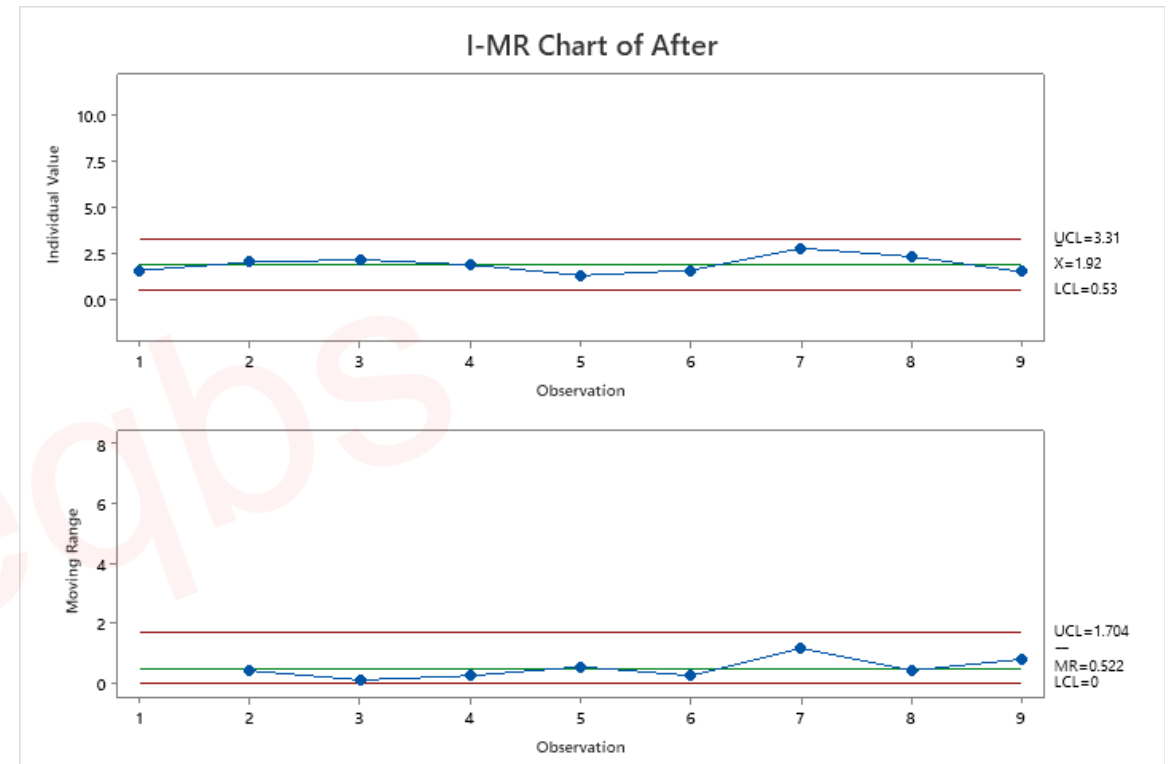
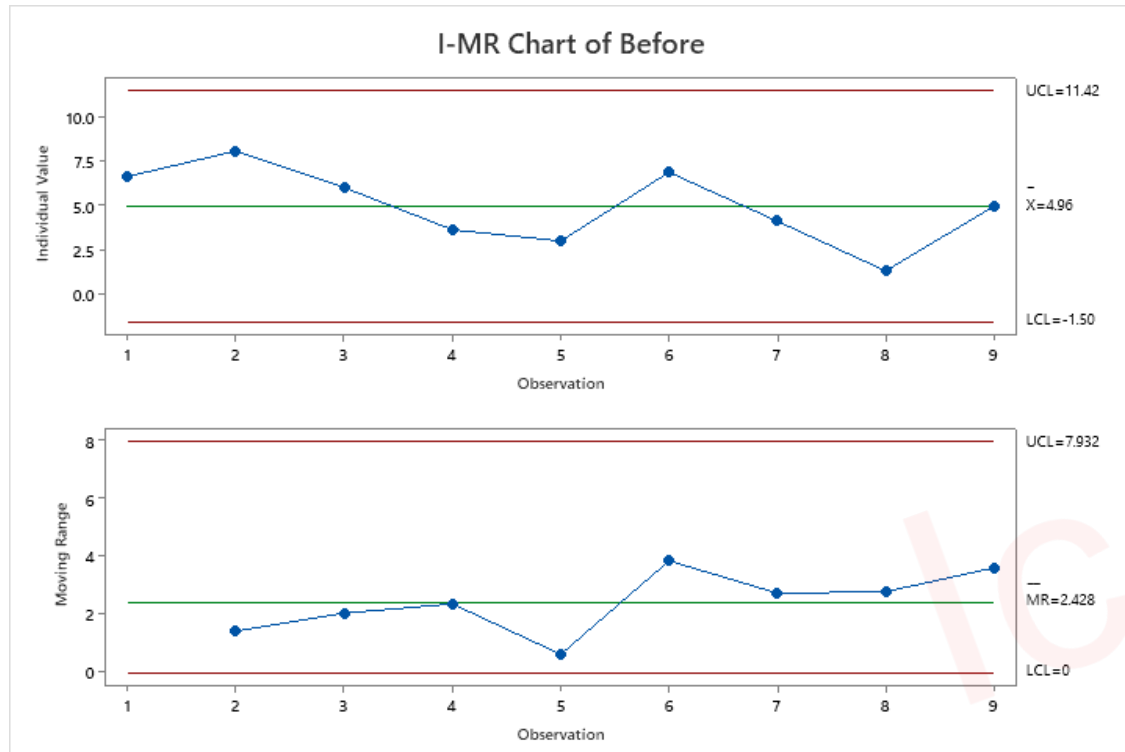
FMEA

Process Step / Action	Potential Failure Mode	Potential Effect of Failure	Potential Cause	S	O	D	RPN (S×O×D)	Recommended Action
Deploy AI-based auto-classification	AI model misclassifies due to poor training data	Misrouted tickets, delayed resolution	Historical data not cleaned; unbalanced categories	8	6	6	288	Clean data before training; retrain model quarterly; monitor misclassification dashboard
Make ticket categories non-overlapping & mandatory fields	Agents bypass or misuse categories	Misclassification persists despite redesign	Categories not intuitive; unclear definitions	7	5	5	175	Pilot new categories with small team; refine definitions; add tooltips/examples
Standardized intake form with glossary	Customers still submit vague descriptions	Ticket routing remains inconsistent	Customers skip optional fields; lack of awareness	6	6	7	252	Make key fields mandatory; add smart hints in form; educate customers through onboarding
Bilingual liaisons & translation tools	Wrong translation/misinterpretation	Issue routed to wrong team, resolution delays	Machine translation errors; liaison workload high	8	4	6	192	Use dual validation (AI + human); feedback loop on translation accuracy
Quick Reference Guide & mentorship program for new hires	New hires ignore guide / mentors overloaded	High error rate continues	Lack of reinforcement; attrition in senior staff	7	5	6	210	Gamify classification accuracy; rotate mentors; weekly calibration meetings
Interactive decision tree / guided workflow	Decision tree becomes outdated	Wrong category suggestions	Business process changes not reflected	7	4	7	196	Quarterly review/update decision tree; assign ownership to Process Excellence team
Automated feedback loop on misclassified tickets	Alerts ignored or delayed	Repeat mistakes by same agent	Alert fatigue; too many notifications	6	6	6	216	Limit alerts to high-severity misclassifications; consolidate feedback into weekly report

CONTROL PHASE



Improve (Statistical validation for Improvement – I-MR Chart)



Inference:

- There is significant improvement on Average Resolution Time after improvement

Actions for sustaining improvements

Ticketing system lacks intelligent auto-classification

- **5S:** Sort & Set in Order (remove duplicate/unclear categories, simplify dropdowns, standardize SOPs).
- **Poka-Yoke:** Auto-suggest categories, mandatory fields, conflict detection, guided workflows.

2. Cultural/Language barriers between global teams and customers

- **5S:** Standardize ticket intake forms, glossary of terms, consistent templates across teams.
- **Poka-Yoke:** Translation prompts, AI-based clarity checks, mandatory structured fields (severity/module).

3. High attrition / new hires unfamiliar with classification standards

- **5S:** Sustain through refresher training, leaderboards, mentorship, and SOP documentation.
- **Poka-Yoke:** Feedback loops for misclassified tickets, escalation triggers for unclassified tickets, decision

Control Plan

Control Plan for Sustaining Ticket Classification Improvements

Process Step	Characteristic to Control	Measurement Method	Frequency	Responsible	Reaction Plan if Out of Control
Ticket classification (AI + manual)	Misclassification rate (%)	QA audit of random 30 tickets per team	Weekly	QA Lead	If >5% misclassified, trigger root cause review, retrain AI model, and conduct refresher training
Ticket intake form	Completeness of mandatory fields	System validation (field completion reports)	Daily automated check	IT System Admin	If missing fields >1%, tighten form validation rules, review customer communication
Category definitions	Clarity & overlap of categories	Feedback survey from agents + misclassification Pareto	Quarterly	Process Excellence Team	If complaints/confusion >10%, redefine categories and update SOP
Translation/Language support	Accuracy of translated tickets	Audit 10 random translated tickets	Monthly	Regional Support Lead	If translation error rate >5%, escalate to vendor/liaison, retrain glossary
New hire performance	Classification accuracy of new hires	Compare to benchmark (experienced agents)	First 90 days of tenure	Training Lead	If <85% accuracy, assign mentor, repeat simulation exercises
Decision tree workflow	Alignment with current process	Process audit	Quarterly	Process Excellence Team	If misaligned, update workflow and re-validate
Feedback loop alerts	Agent acknowledgment of misclassification alerts	System log review	Weekly	Quality Lead	If <80% acknowledgment, consolidate alerts into a weekly summary and escalate to managers
Escalation triggers	% of tickets escalated unclassified	Dashboard monitoring	Weekly	Support Supervisor	If >10% escalated, review trigger settings, provide refresher on classification



Results after improvement

- **Project has achieved its intended results.**