

Increase Demand Forecast Accuracy

Aravinthan Sundararajan

ROADMAP



Overview



Define



Measure



Analyse



Improve



Control

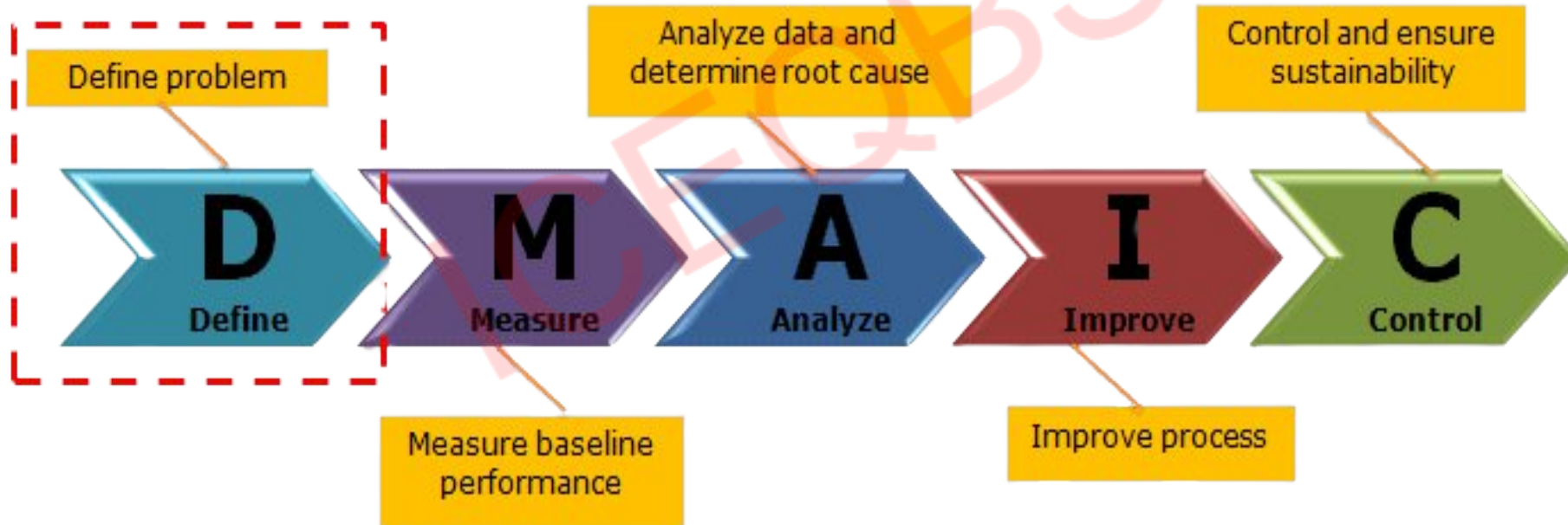
OVERVIEW



Background

The current Demand Forecast Accuracy averages 70%, with fluctuations between 66% and 82%, resulting in frequent inventory imbalances, stockouts, and disruptions in production and logistics planning. These inaccuracies are causing the organization to incur nearly ₹12 million per quarter in excess inventory and lost sales. The variability in forecasting reduces customer service levels, drives up carrying costs, and forces operations to rely on reactive planning rather than a stable, data-driven approach. Improving forecast accuracy to at least 90% will significantly reduce inventory costs by 15–20%, enhance product availability, and strengthen coordination between Sales, Operations, and Supply Chain. Overall, the project is expected to deliver annual savings of ₹30–40 million through improved efficiency and reduced operational waste.

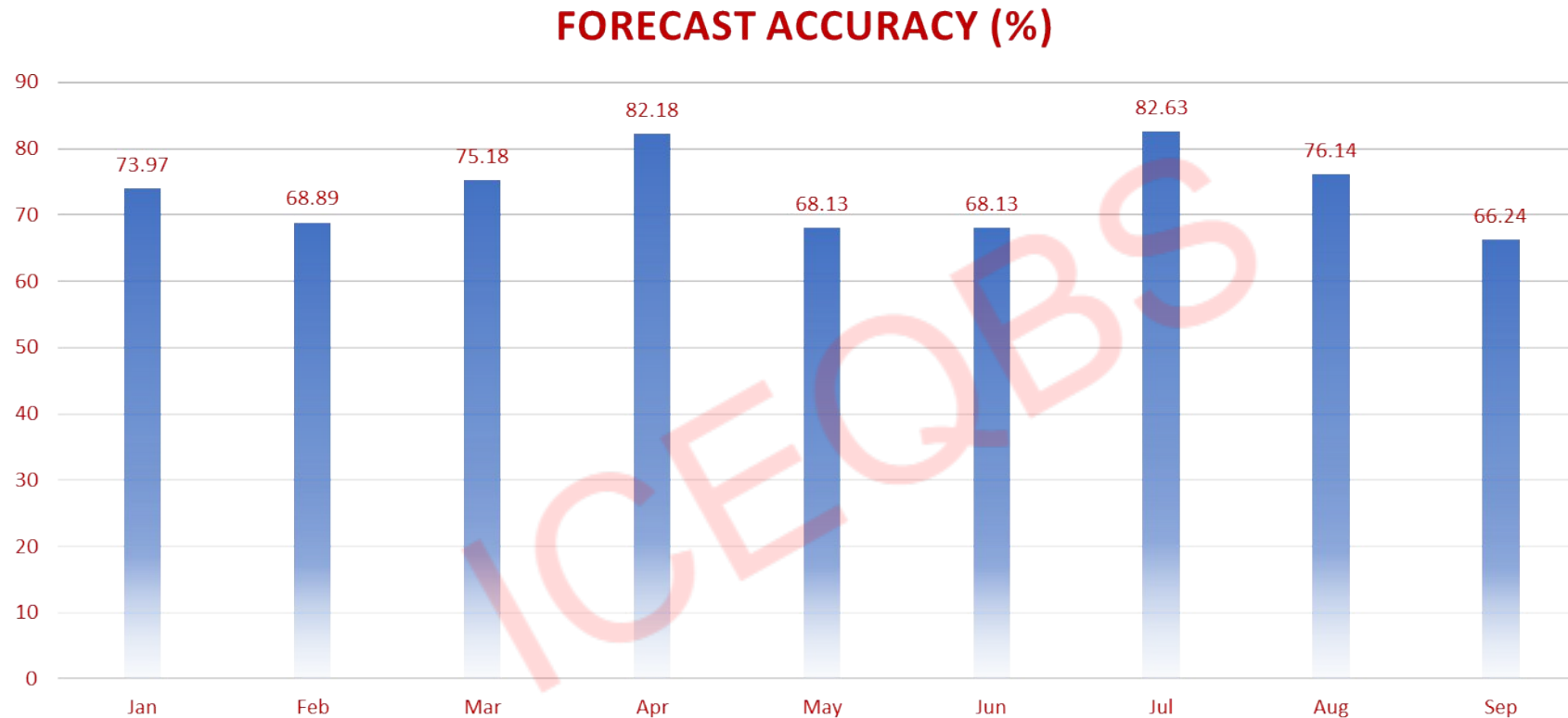
DEFINE PHASE



CTQ Tree :

Voice of customer	Critical to X	Primary Metric for improvement
<i>Our operations depend on reliable demand predictions, so improving forecast accuracy is critical."</i>	CTC – Forecast Accuracy	Primary Metric - Y = Forecast Accuracy (%) Secondary Metric - Inventory Turnover, Stockout Rate, Order Fill Rate

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



Inference :

- Last 9 months 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)
Sales Department	Historical Sales Data	Collect historical sales and customer data	Forecast Report	Production Planning
Marketing Team	Promotion Plans, Campaign Calendars	Clean and validate data inputs	Demand Plan	Procurement Team
Finance Department	Budget and Cost Data	Generate baseline statistical forecast	Forecast Accuracy Report	Inventory Management
Supply Chain Planning	Inventory Levels, Lead Times	Review forecast with cross-functional team (S&OP meeting)	Inventory Optimization Report	Sales Department
Sales Department	Historical Sales Data	Collect historical sales and customer data	Forecast Report	Production Planning

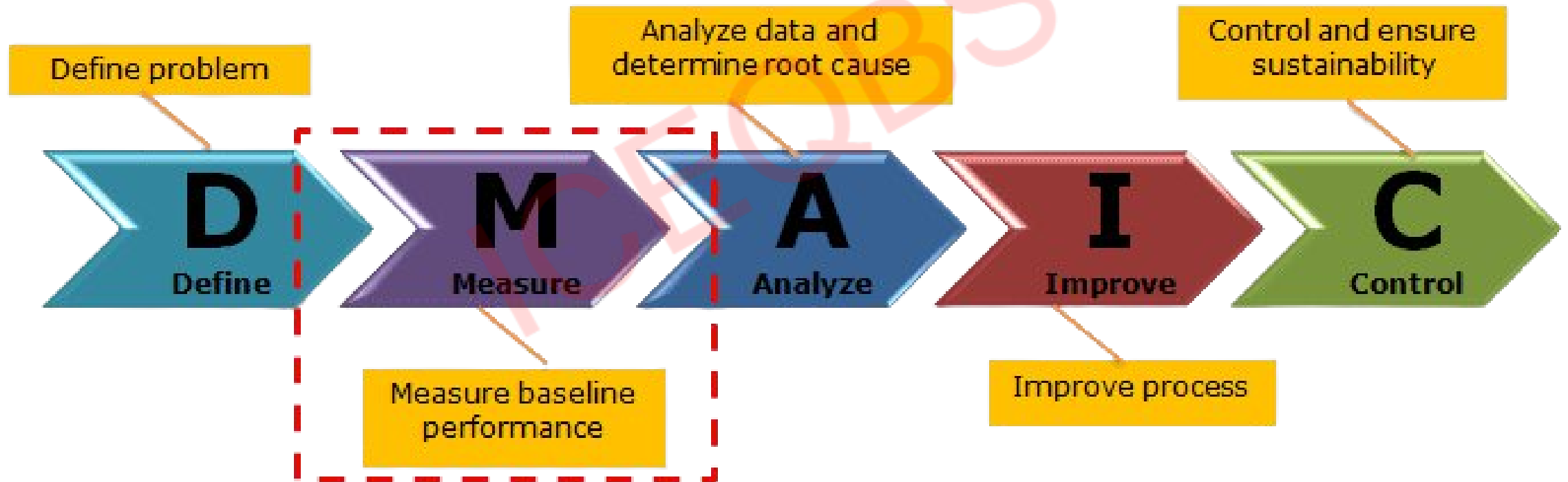
Project Charter

Project Title:	Demand Forecast Accuracy Improvement Project		
Project Leader	Aravinthan Sundararajan	Project Team Members:	Ms. Priya Menon Ms. Shalini Rao Mr. Ajay Kumar Mr. Joseph D'Souza
Champion/Sponsors:	Mr. Ramesh Nair	Key Stake Holders	Procurement / Sourcing Team Production / Manufacturing Inventory Management / Warehouse
Problem Statement:	Over the past 9 months, the Demand Forecast Accuracy for finished goods has averaged 70%, with monthly variation ranging from 66% to 82%. This inconsistency has led to frequent inventory imbalances, stockouts, and increased carrying costs. The lack of forecasting precision impacts production planning, logistics scheduling, and overall customer satisfaction.	Goal Statement:	To increase the average Demand Forecast Accuracy from 70% to at least 90% and reduce variability (standard deviation) by 40% within 6 months (Oct 2025 – Mar 2026), ensuring a more stable and data-driven forecasting process.
Secondary Metric	Inventory Turnover, Stockout Rate, Order Fill Rate Productivity	Assumptions Made:	No major market disruptions or abnormal demand spikes during the project timeline. Stakeholders (Sales, Supply Chain, Operations) will consistently participate

Project Charter

Tangible and Intangible Benefits:		Risk to Success:	
₹30–40 million annual savings through reduced excess inventory and avoided lost sales. 15–20% reduction in inventory carrying costs. Improved production and procurement planning efficiency.		Limited or inconsistent data availability for demand forecasting. Low stakeholder engagement or resistance from Sales/Planning teams.	
In Scope:		Out of Scope:	
Forecasting process for finished goods only. Data analysis of the past 12–18 months of demand and forecast patterns. Collaboration with Sales, Operations, and Supply Chain teams.		Forecasting for newly launched SKUs (<3 months sales data). Distribution-level demand variability not linked to primary sales Changes to ERP system architecture	
Signatories:		Project Timeline:	
Mr. Ramesh Nair		6 Months	

MEASURE PHASE



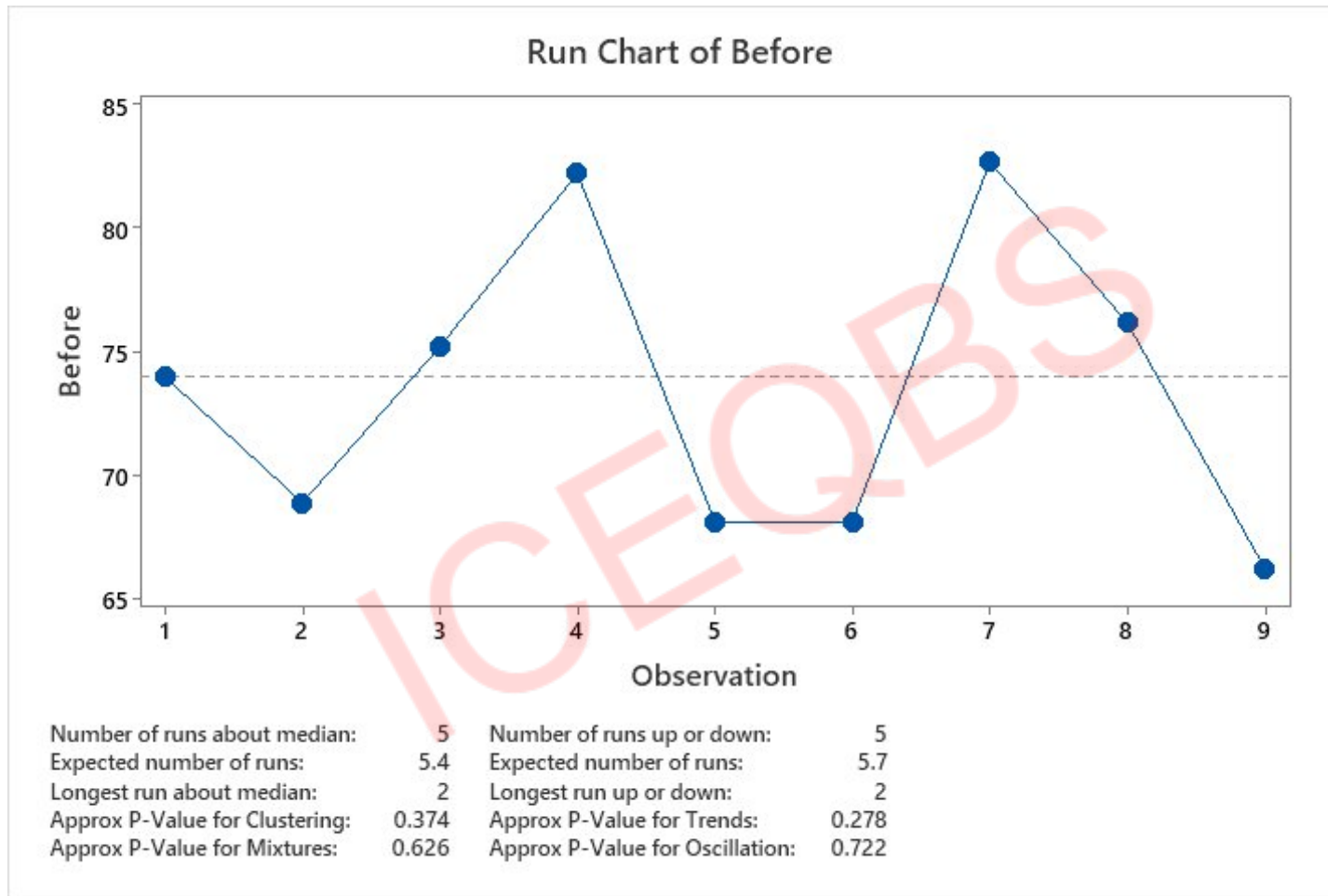
Data collection – Histogram (Before improvement)



Inference :

- Data is normally distributed over the mean

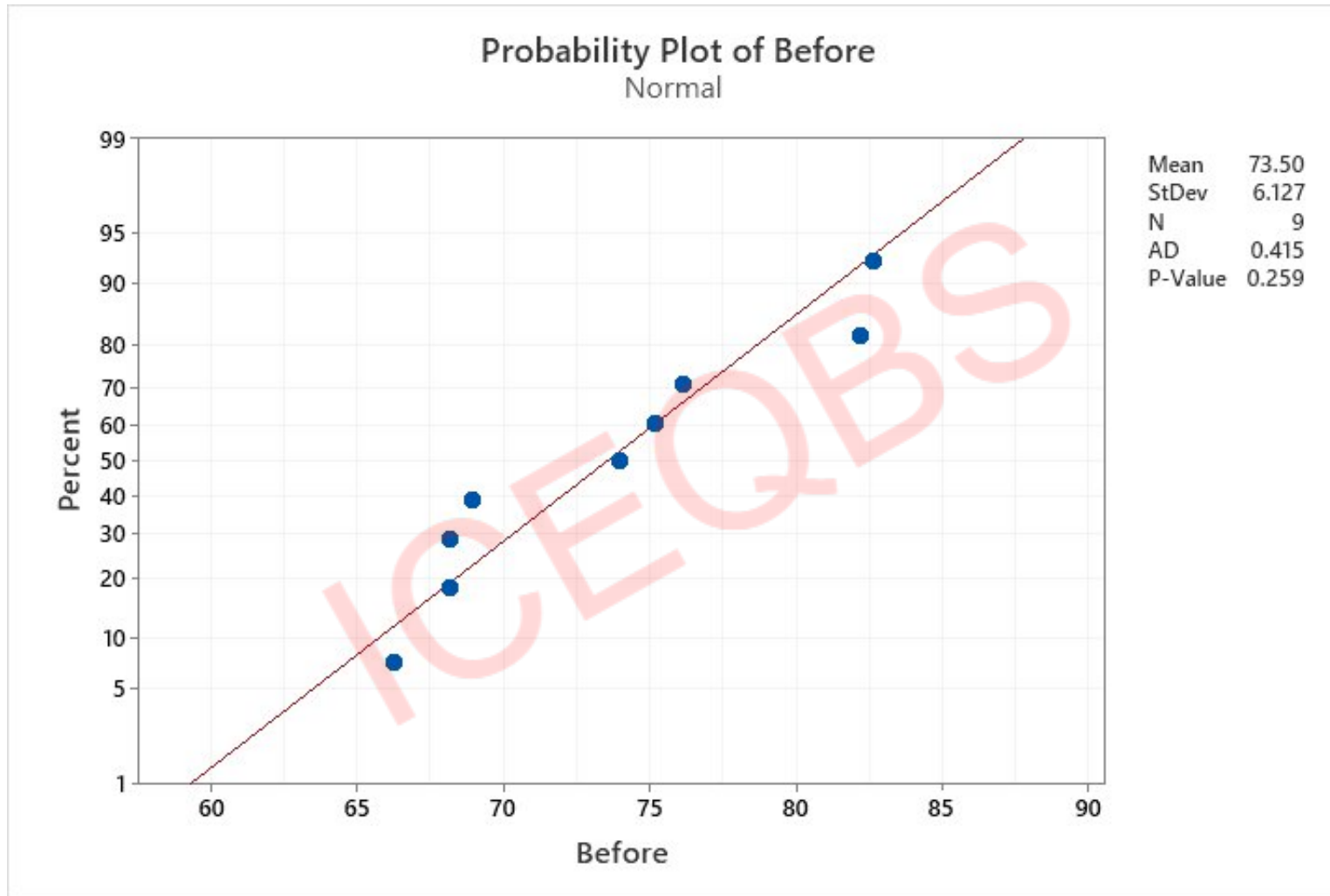
Data collection – Run Chart (Before improvement)



Inference :

$P > 0.05$ – No special causes in the process. Data can be used for further analysis

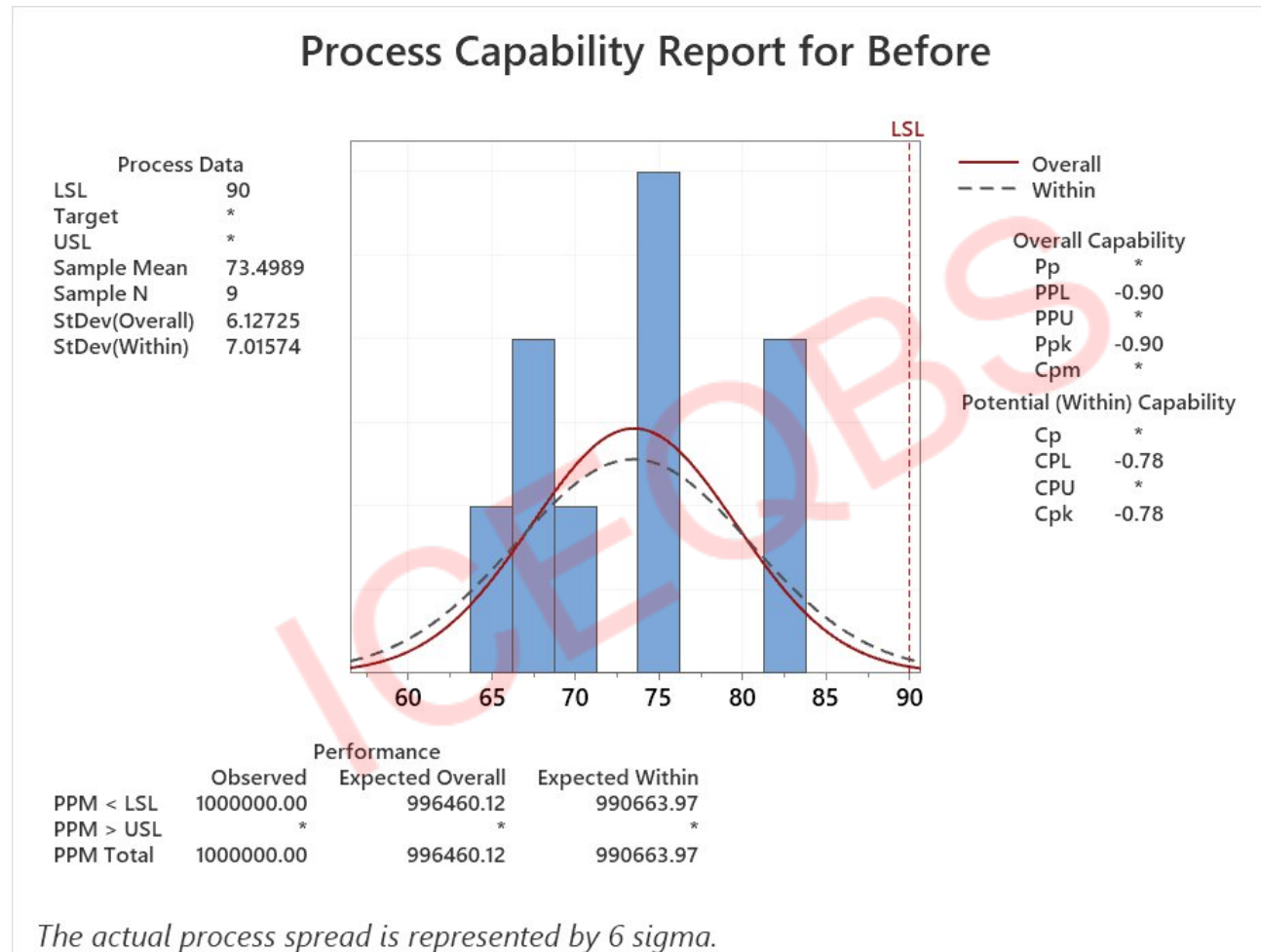
Data collection – Normality plot (Before improvement)



Inference :

- $P > 0.05$ in all scenarios, thus all the data is normally distributed

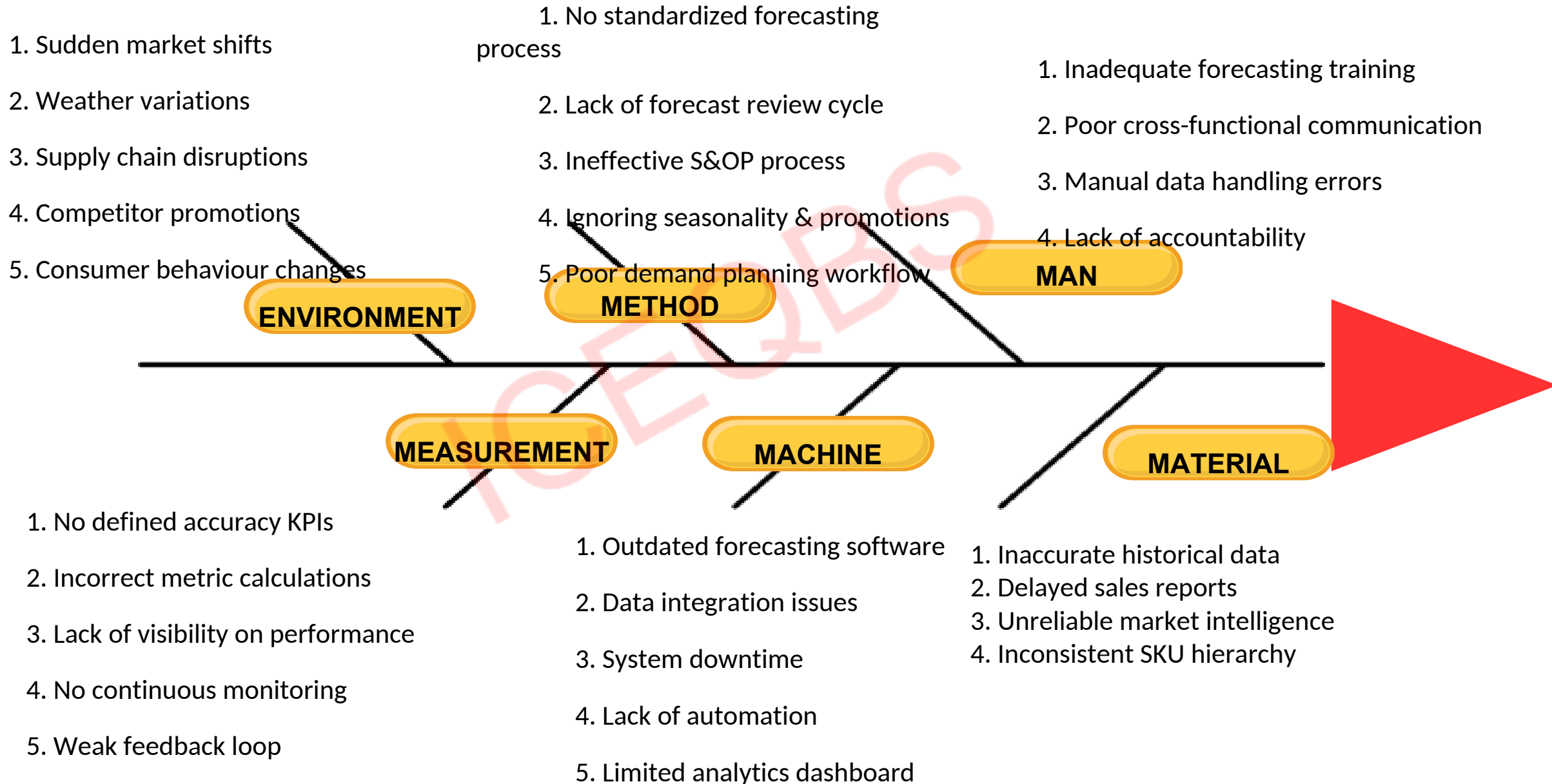
Data collection – Process capability (Before improvement)



Inference :

The process is completely incapable, with all outputs falling below the LSL and negative capability indices indicating severe misalignment and high variation.

Fish Bone Diagram



3M Analysis for Waste

MUDA

Rework: Repeated manual adjustments to forecasts due to inaccurate initial data.

Waiting: Planners waiting for sales or marketing inputs before finalizing forecasts.

Overprocessing: Using multiple spreadsheets and duplicate reports for the same analysis

MURA

Inconsistent Data Updates: Forecasts updated irregularly across different product lines.

Irregular Communication: Uncoordinated timing of inputs from marketing, sales, and operations.

Fluctuating Forecast Accuracy: Some SKUs consistently show high variance, others remain stable

MURI

Excessive Manual Work: Planners handling too many SKUs without automation tools.

Tight Deadlines: Unrealistic timelines for forecast submission each cycle.

System Overload: Forecasting software crashes during high data processing loads.

common and special causes

Common Causes:

- Inaccurate historical data
- Poor demand planning tools
- Lack of cross-functional communication
- Inconsistent data entry
- Supplier lead time variability
- Manual data processing errors
- Seasonal demand fluctuations
- Inadequate training for planners
- Lack of standardized forecasting process
- Inaccurate customer order history

Special Causes:

- Sudden market trend changes
- Promotion or discount spikes
- Unexpected supply chain disruptions
- New product introductions
- Political or economic instability
- Natural disasters
- System downtime or software failure
- Data corruption in forecasting system
- Supplier strike or shutdown
- Sudden change in customer contracts

8 Wastes Analysis

Defects

- Forecast errors due to incorrect formulas or data duplication.
- Mismatch between sales actuals and forecast data because of wrong unit of measure.

Overproduction

- Preparing multiple versions of forecasts that are never used.
- Generating weekly forecasts for low-volume SKUs unnecessarily.

Waiting

- Planners waiting for sales or marketing data updates before finalizing the forecast.
- Delay in receiving system-generated reports from the ERP tool

Non-Utilized Talent

- Planners not trained in advanced forecasting analytics or tools.
- Insights from experienced salespeople not incorporated into forecast adjustments

Transportation

- Transferring large Excel files of forecasts between departments instead of using shared systems.
- Moving data manually from CRM to ERP rather than automated integration

Inventory

- Maintaining excess safety stock due to inaccurate forecasts.
- Keeping outdated or duplicate forecast files “just in case.”

Motion

- Forecasting staff switching between multiple systems and spreadsheets to retrieve data.
- Searching for missing sales or promotion inputs from different teams.

Overprocessing

- Reformatting data repeatedly to fit different templates.
- Creating redundant presentations and summaries for the same forecast review.

Action Plan for Low Hanging Fruits

Summary of Quick Wins (Low Hanging Fruits)		
Lean Tool	Quick Action	Impact
5S + Standard Work	Streamline templates, clean up redundant files	Reduced confusion and wasted effort
Poka-Yoke (Error Proofing)	Data validation in forecasting forms	Fewer entry errors
Visual Management	Dashboards for forecast accuracy tracking	Transparent performance monitoring
Kanban / Workflow Standardization	Regular input and review schedule	Shorter cycle time
Kaizen (Small Continuous Improvements)	Automate repetitive manual steps	Time saving, faster decision-making
Value Stream Mapping (VSM)	Identify and remove process bottlenecks	Process flow optimization

Lean Action Plan – Demand Forecasting Process (Gemba Walk Insights)

Area	Observed Issue (Gemba Finding)	Category	Action / Countermeasure	Lean Tool Used	Responsible	Expected Benefit
Data Entry Errors	Forecast data inconsistencies due to manual Excel input	Defect / Muda	Implement a single shared online forecasting template with validation checks	5S (Standardization), Poka-Yoke (Error Proofing)	Demand Planning	Reduce forecast errors by 20%
Multiple Forecast Versions	Several teams maintaining separate versions of forecasts	Overproduction / Mura	Establish version control through centralized ERP upload	Visual Management, 5S	IT / Planning	Eliminate duplication and confusion
Waiting for Inputs	Sales team delays providing updated figures	Waiting / Muri	Set a fixed weekly data submission schedule and reminders	Standard Work, Kanban (Task Flow)	Sales Lead	Reduce forecast cycle time by 25%
Uncoordinated S&OP Meetings	Poor communication between Sales, Marketing & Supply Chain	Man / Method / Mura	Conduct structured S&OP meetings with shared dashboard	Daily Management Board, PDCA Cycle	SCM Head	Improve collaboration and accuracy
Manual Data Transfer	Forecasts moved manually between tools	Transportation / Overprocessing	Automate data integration between CRM and ERP	Automation (Lean IT), Kaizen	IT Department	Save planner time and reduce transfer errors

Lean Action Plan – Demand Forecasting Process (Gemba Walk Insights)

Area	Observed Issue (Gemba Finding)	Category	Action / Countermeasure	Lean Tool Used	Responsible	Expected Benefit
Overloaded Planners	Too many SKUs handled manually	Muri (Overburden)	Segment SKUs by ABC classification for focus-based planning	Workload Balancing, Value Stream Mapping (VSM)	Planning Manager	Improve productivity, reduce stress
Inaccurate Data Inputs	Delayed or missing actuals	Material / Special Cause	Automate daily sales data update and verification	Jidoka (Automation with quality)	Data Analyst	Improve real-time visibility of demand
System Downtime	ERP/forecast tool crashes during update	Machine / Special Cause	Schedule updates during low-traffic hours; upgrade server performance	TPM (Total Productive Maintenance)	IT Support	Ensure continuous system availability
Irregular Forecast Review	Forecast accuracy not monitored monthly	Measurement / Mura	Establish monthly review KPI dashboard (Forecast Accuracy, MAPE, Bias)	Visual KPI Board, Standard Work	SCM Analyst	Sustain forecast performance tracking
Overprocessing Reports	Repeated manual formatting for presentation	Overprocessing / Waste	Create automated dashboard reports (Power BI/Tableau)	Automation / Visual Management	Analytics Team	Save 5+ hours/month per planner

Action Plan for Low Hanging Fruits

Waste	Lean Tool	Action Plan	Benefit
Overproduction	Kanban Scheduling	Produce only to customer demand	Lower WIP, reduced scrap risk
Transportation	Cellular Layout	Group machines closer by sequence	Faster flow, less handling damage
Motion	5S	Place gauges and tools near point of use	Reduced operator walking time
Inventory	Pull System	Limit WIP using Kanban bins	Lower storage cost, better flow
Overprocessing	Standard Work	Eliminate extra polishing or redundant machining	Saves time & cost
Defects	Poka-Yoke	Error-proof setups and in- process checks	Scrap reduced from 3% → 1%
Waiting	Andon / Visual Boards	Signal delays to supervisors immediately	Quick problem resolution
Unused Talent	Kaizen Events	Involve operators in daily improvements	Engaged workforce, continuous ideas

Top 12 Prioritized Root Causes (Based on Net Score)

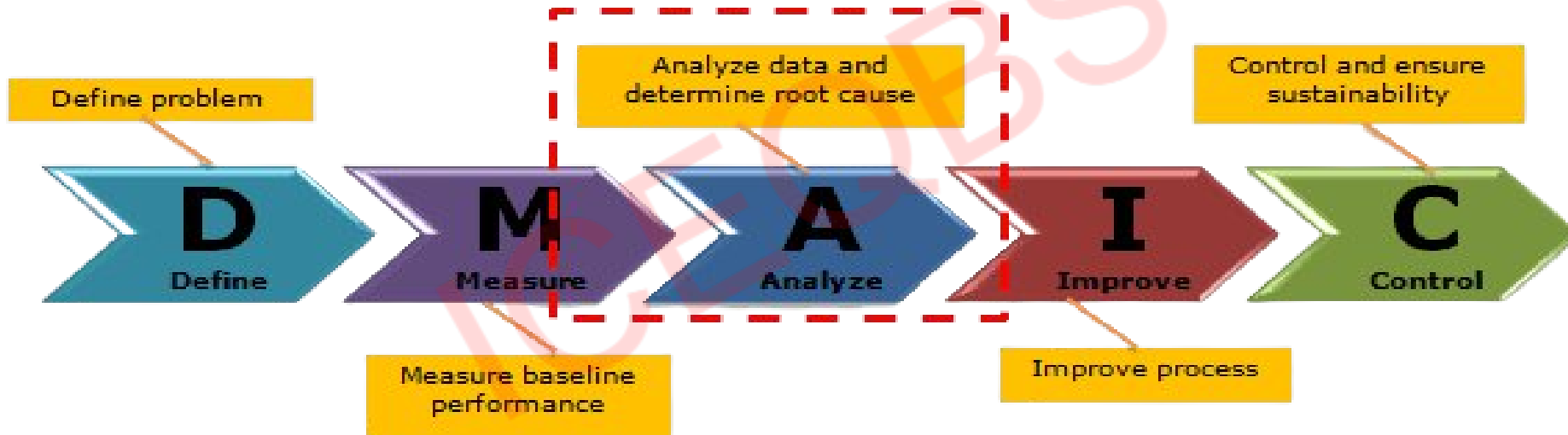
Root Cause	Score
No accountability for forecast errors	250
Outdated forecasting software	246
No continuous monitoring of accuracy	210
Inaccurate historical data	200
System downtime during forecast updates	195
Inconsistent SKU codes	170
Manual data entry errors	168
No standardized forecasting process	162
Lack of forecasting training	156
Weak S&OP process	156
Data integration issues	153
Poor cross-functional communication	121

Data Collection Plan					
Data to Be Collected	Type of Data	Collection Method	Data Source	Frequency	Responsibility
List of planners vs. error % by SKU	Quantitative	System reports / Forecast audit	ERP / Forecast Tracker	Monthly	Demand Planning Lead
System uptime, version age, missing features	Qualitative / Quantitative	IT logs, user feedback	IT System Logs	One-time	IT Manager
Frequency of forecast reviews, accuracy reports generated	Quantitative	Review calendar, KPI logs	Planning Dashboard	Monthly	SCM Analyst
% missing/duplicate sales data	Quantitative	Data validation script	Sales & ERP	Weekly	Data Analyst
Hours of unavailability per month	Quantitative	System monitoring tool	IT Infrastructure Logs	Monthly	IT Support
# of missed S&OP meetings, unshared updates	Quantitative	Attendance logs / survey	Meeting Minutes	Monthly	S&OP Coordinator

Data Collection Plan

Data to Be Collected	Type of Data	Collection Method	Data Source	Frequency	Responsibility
Forecast deviation during promo months	Quantitative	Historical vs. actual demand comparison	Sales & Marketing	Monthly	Marketing Analyst
Days between sales closure and data upload	Quantitative	Timestamp analysis	Sales Reports	Weekly	Sales Admin
% of SKUs discussed vs. total SKUs	Quantitative	Meeting checklist review	S&OP Tracker	Monthly	SCM Lead
# of failed data sync transactions	Quantitative	IT system logs	ERP / CRM Sync Records	Weekly	IT Integration Team
# of corrections per forecast cycle	Quantitative	Audit of forecast files	Forecast Excel / ERP	Monthly	Demand Planner
% of trained vs. untrained staff	Quantitative	HR training records	HR / Training Dept.	Quarterly	HR Business Partner

ANALYSE PHASE



Analyse – Hypothesis testing

Regression Equation

Forecast_Accuracy_% = 92.03 + 1.472 Forecast_Accountability_Score - 2.054 Software_Age_Years
- 1.367 Historical_Data_Error_% - 1.278 Manual_Data_Error_%

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	92.03	2.08	44.30	0.000	
Forecast_Accountability_Score	1.472	0.179	8.24	0.000	1.13
Software_Age_Years	-2.054	0.224	-9.15	0.000	1.03
Historical_Data_Error_%	-1.367	0.110	-12.39	0.000	1.03
Manual_Data_Error_%	-1.278	0.156	-8.21	0.000	1.10

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
2.42454	94.43%	93.54%	92.23%

Inference :

- Since $p < 0.05$, thus not all means are equal

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	4	2492.7	623.183	106.01	0.000
Forecast_Accountability_Score	1	399.0	398.977	67.87	0.000
Software_Age_Years	1	492.0	492.035	83.70	0.000
Historical_Data_Error_%	1	901.8	901.760	153.40	0.000
Manual_Data_Error_%	1	395.8	395.768	67.33	0.000
Error	25	147.0	5.878		
Total	29	2639.7			

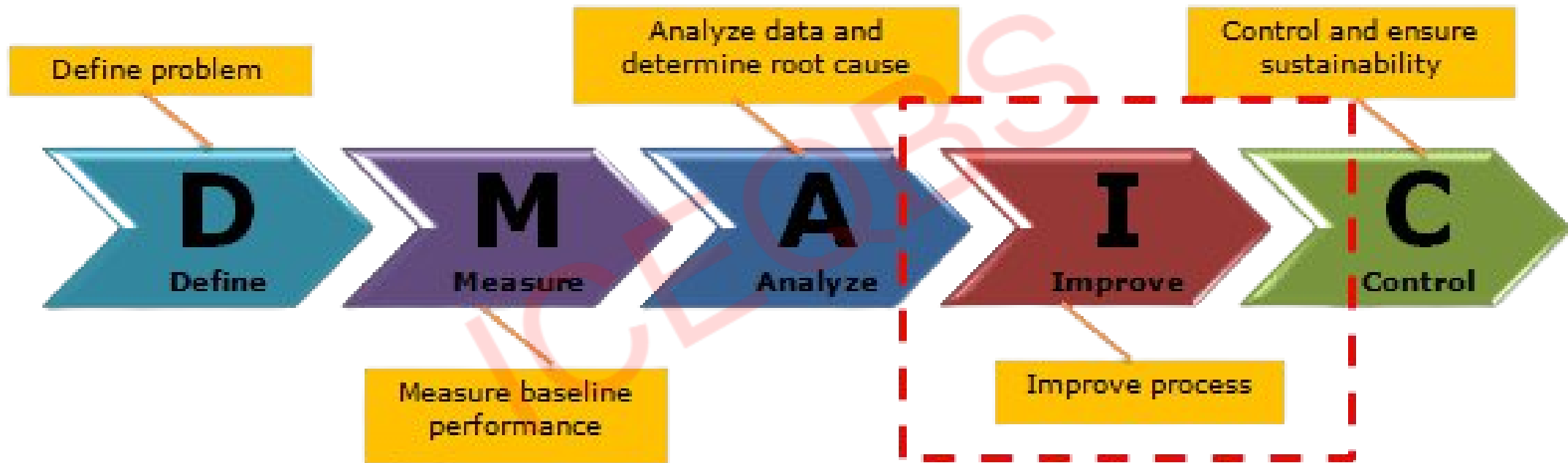
Inference :

- Forecast Accountability score, Software Age, Historical Data Error, and Manual Data Entry are validated as critical root causes

Summary of Statistically validated Root causes

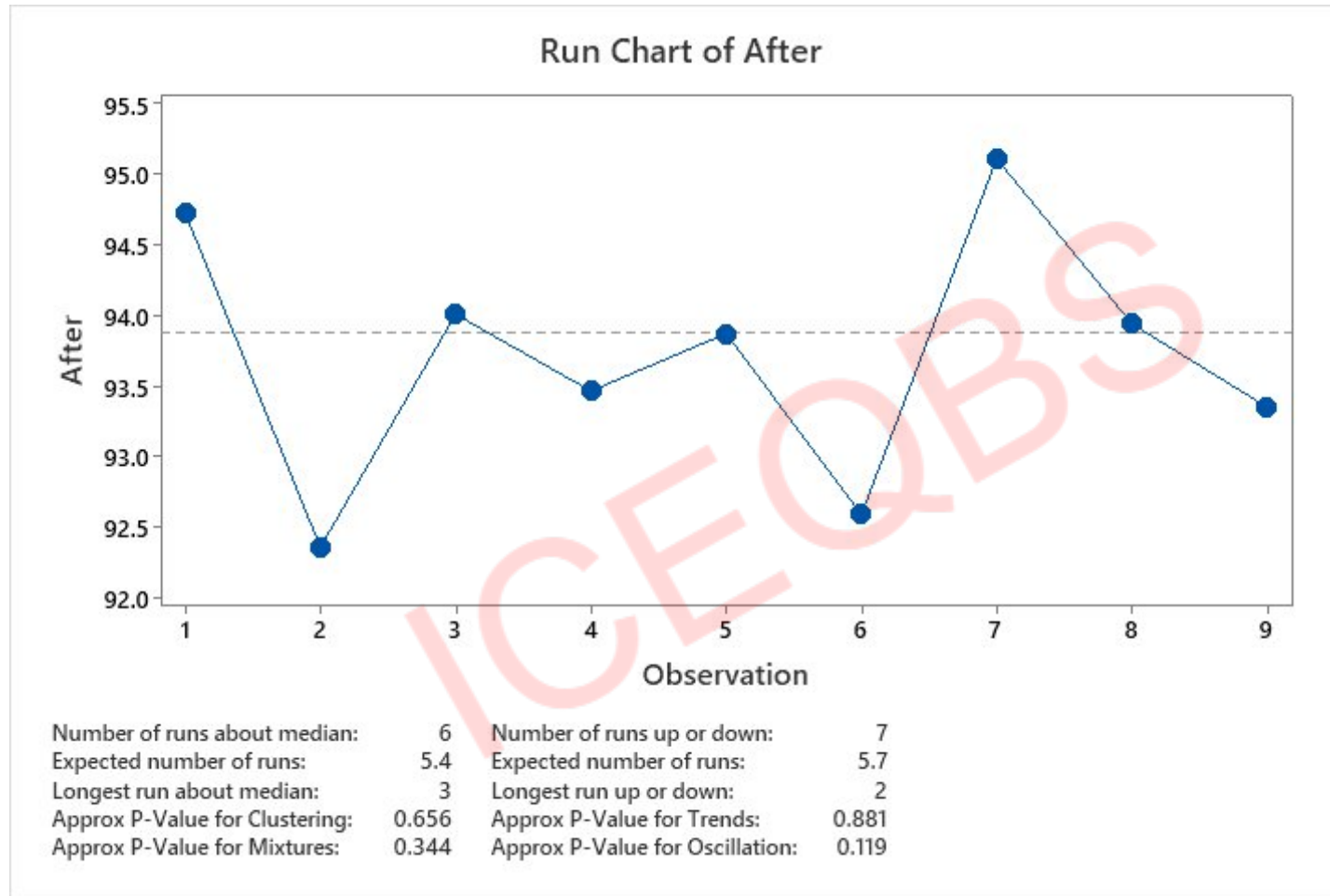
- Forecast Accountability score, Software Age, Historical Data Error, and Manual Data Entry are validated as critical root causes

IMPROVE PHASE



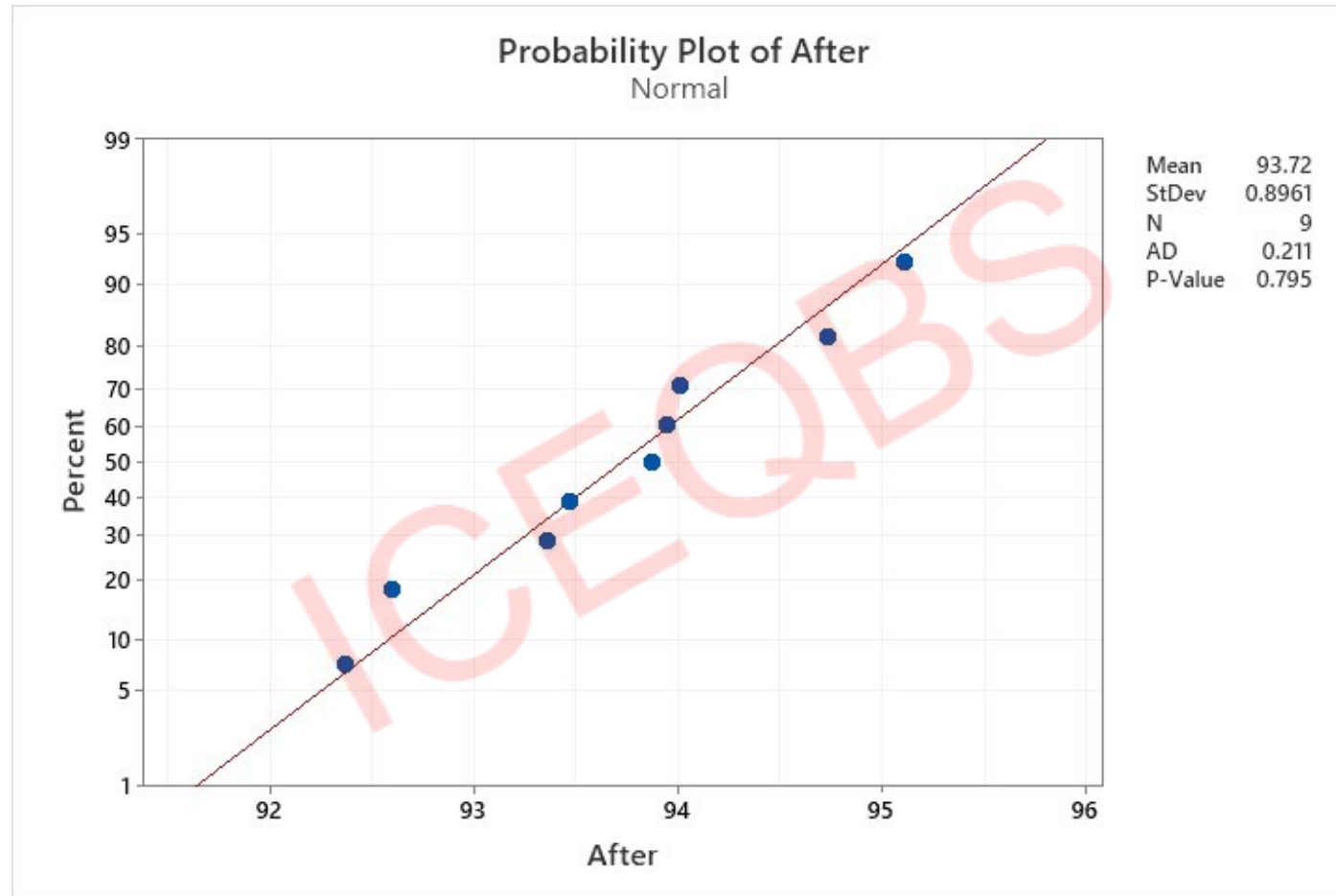
Improve

Critical Root Cause	Proposed Solution / Action	Specific Activities to Implement	Responsibility
1. Low Forecast Accountability Score	Establish individual and team-level ownership for forecast accuracy	• Assign accountability metrics in KPIs for planners and category managers. • Publish a monthly Forecast Accuracy Dashboard by planner / SKU category. • Conduct monthly review meetings with cross-functional teams (Sales, Marketing, SCM).	Demand Planning Head / Supply Chain Manager
2. Outdated Forecasting Software	Upgrade to AI / ML-based forecasting tool integrated with ERP	• Evaluate latest forecasting platforms (SAP IBP, Blue Yonder, Oracle Demantra, o9, etc.). • Pilot AI-based model using historical data for 3 major SKUs. • Integrate with ERP and automate forecast updates.	IT & Digital Transformation Team / SCM Manager
3. High Historical Data Error (%)	Implement a robust data validation and cleansing mechanism	• Standardize master data formats and SKU hierarchy. • Automate data validation rules for missing / inconsistent entries. • Conduct quarterly audit of historical data and reconcile mismatches.	Master Data Management (MDM) Team / IT
4. High Manual Data Entry Error (%)	Eliminate manual entries through automation and validation checks	• Implement barcode / QR-based SKU scanning for data capture. • Introduce double-entry verification for manual updates. • Conduct training on accurate data entry and system usage.	Warehouse Operations Lead / IT Systems



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 – Run chart and Normality Test (After Improvement)

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

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.

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
-9.80	8	0.000

Descriptive Statistics

Sample	N	Mean	StDev	SE Mean
Before	9	73.50	6.13	2.0
After	9	93.717	0.896	0.30

Estimation for Difference

Difference	95% CI for Difference
-20.22	(-24.98, -15.46)

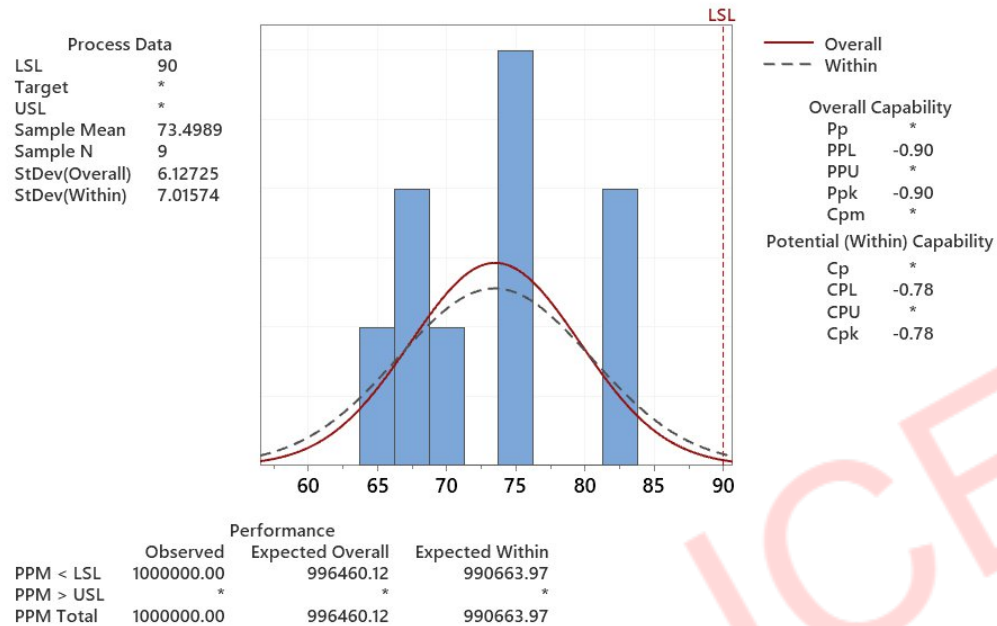
Inference:

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 % scrap

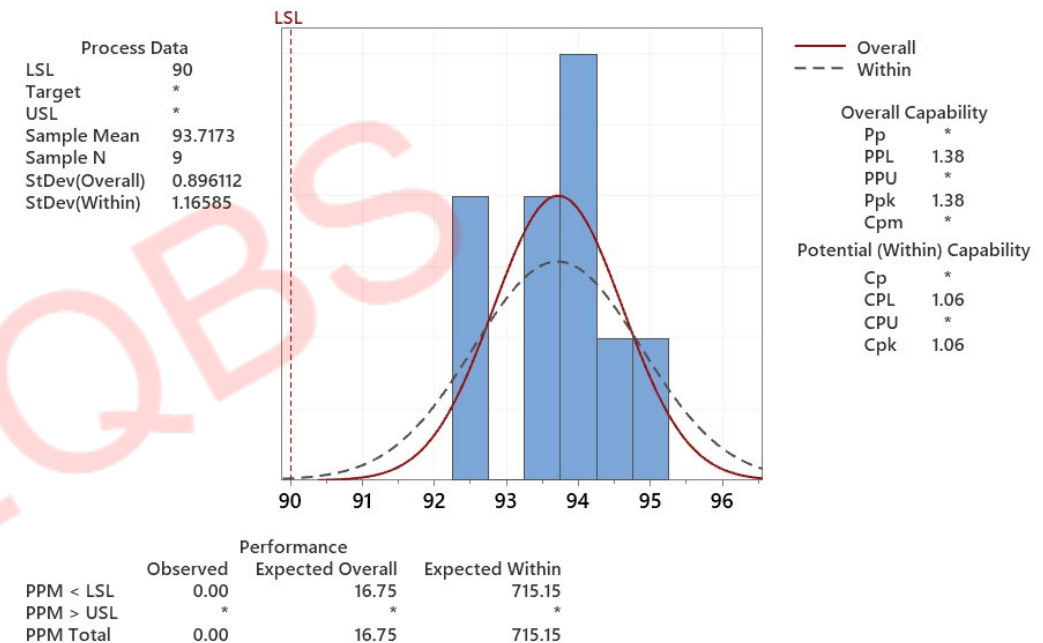
Improve – Process capability – Before & After Improvement

Process Capability Report for Before



The actual process spread is represented by 6 sigma.

Process Capability Report for After

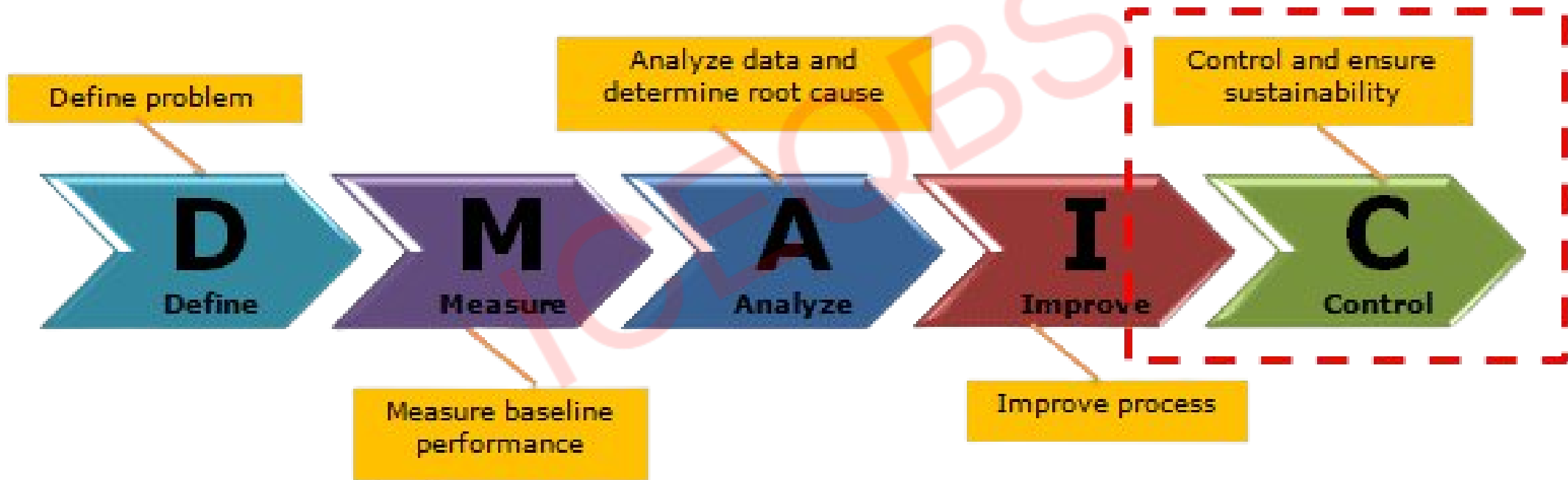


The actual process spread is represented by 6 sigma.

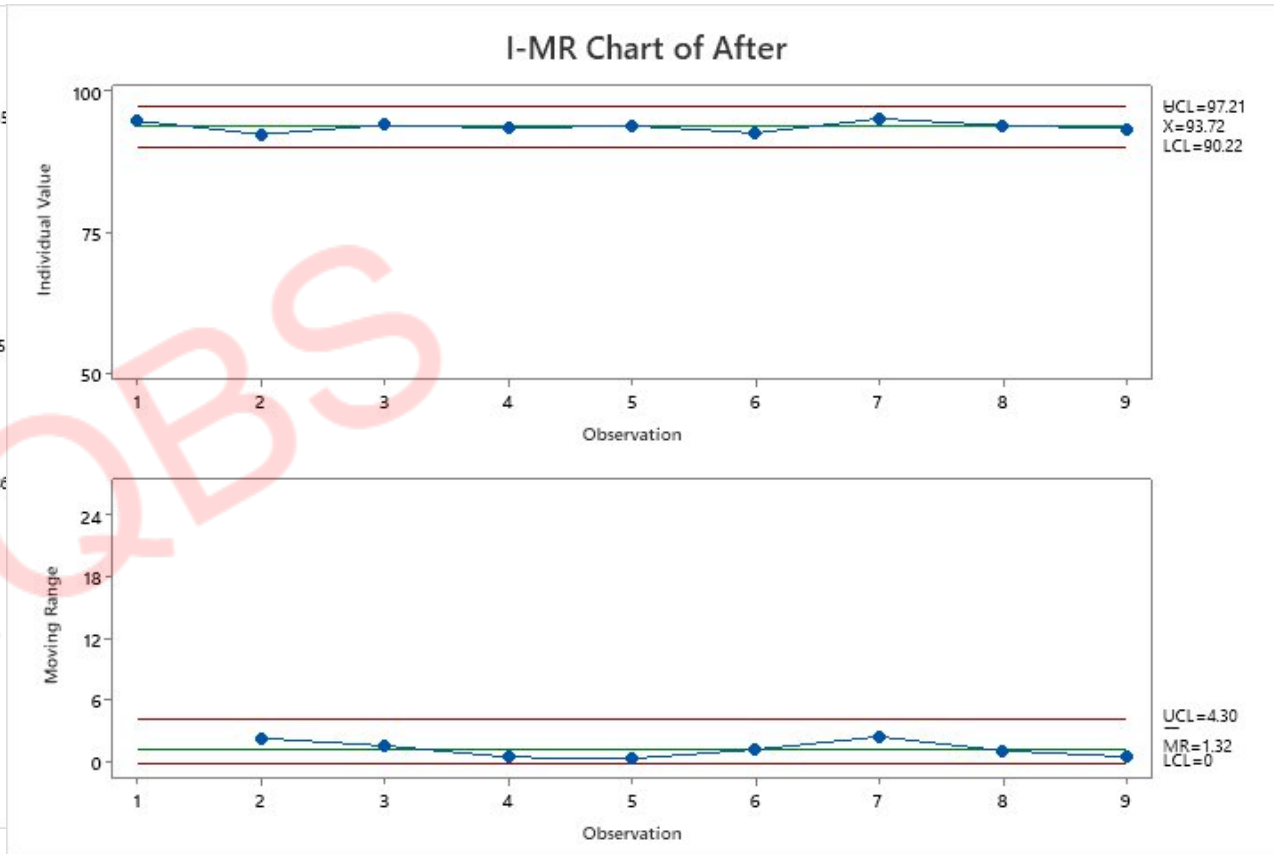
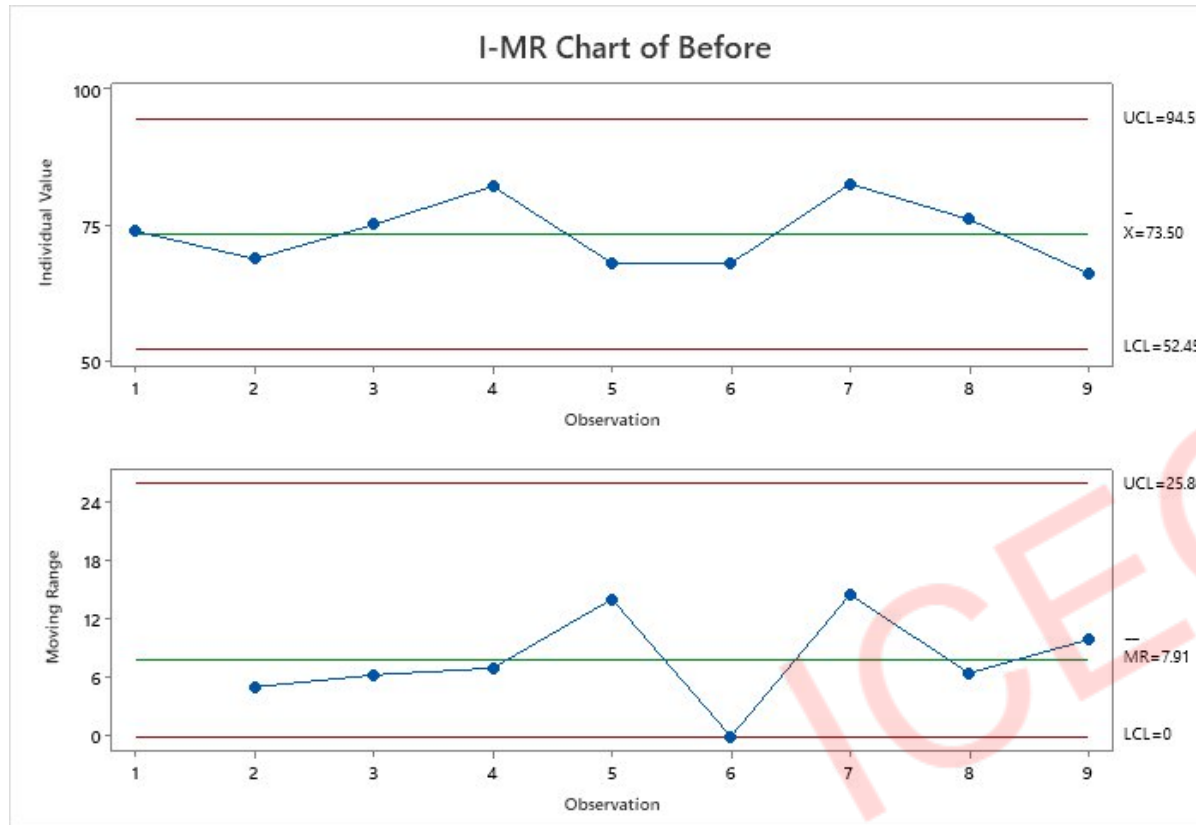
Inference :

- Before $C_{pk} <$ After C_{pk} , 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

CONTROL PHASE



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



Inference:

- As seen in control chart, before improvement mean was high and there was high variability and after improvement, it has achieved the target

Control Plan

5S Step	Implementation in Forecasting & SCM Context	Expected Benefit
1. Seiri – Sort	• Eliminate redundant SKU codes, outdated data files, and obsolete forecast templates. • Archive past versions of forecasts systematically.	Reduces confusion and ensures only valid SKUs and data are used for forecasting.
2. Seiton – Set in Order	• Create a structured digital folder hierarchy: /Forecast/Year/Month/SKU_Category. • Define standard naming convention for SKU codes and data files. • Maintain version control in ERP or shared drive.	Enables quick access to the right data and version, reducing forecast errors.
3. Seiso – Shine	• Schedule weekly data cleansing and error log checks. • Automate scripts to detect missing or duplicate entries. • Visual dashboards highlight “data cleanliness” scores.	Prevents propagation of data inaccuracies that affect forecasts.
4. Seiketsu – Standardize	• Create a Standard Operating Procedure (SOP) for forecast data entry, validation, and upload. • Document approval flow for forecast updates. • Define standard formats for demand review reports.	Brings uniformity across planners and ensures consistency in inputs.
5. Shitsuke – Sustain	• Conduct monthly “Forecast 5S Audit” checklist reviews. • Display performance charts showing adherence to SOPs. • Introduce rewards or recognition for high forecast accuracy and compliance.	Builds ownership and continuous improvement culture among forecasting teams.

Control Plan

Area	Potential Error	Error-Proofing Mechanism (Poka-Yoke)	Expected Outcome
Data Entry	Wrong SKU / quantity entered manually	• Dropdown list or barcode scanning instead of free-text entry. • Auto-validation for SKU code + category match.	Eliminates manual data entry errors.
Forecast Upload	Uploading wrong file version or format	• File naming rule with time stamp & version number. • System alerts if incorrect template used.	Ensures only latest, correct forecast is uploaded.
Historical Data Maintenance	Corrupted or incomplete past data	• Auto-backup system and data integrity validation before upload. • Flag missing fields before forecast run.	Maintains reliable baseline for future forecasts.
System Downtime	Forecast not updated due to outage	• Automated alert for downtime >10 mins. • Redundant server or cloud mirror for continuity.	Prevents loss of data and ensures uninterrupted updates.
Accountability Tracking	Planners not reviewing forecast accuracy	• Auto-email report showing forecast vs actual variance by planner. • Dashboard with red/yellow/green scorecards.	Reinforces accountability and continuous review.
Data Version Control	Overwriting previous forecasts	• Lock previous month's files and create auto-generated version IDs.	Ensures auditability and prevents accidental overwrites.

Control Plan									
Process Step / Improvement Area	Potential Failure Mode	Potential Effect of Failure	Potential Cause	Current Controls / Detection Method	S	O	D	RPN (S×O×D)	Recommended Action
1. Assign Forecast Accountability	Lack of ownership from planners	No one responsible for variance; accuracy doesn't improve	Accountability not linked to KPI / unclear roles	Monthly review of forecast accuracy	8	6	5	240	Integrate accountability into individual KPIs and review dashboards monthly
2. Upgrade Forecasting Software	Delay or rejection of software upgrade	Continued dependence on manual / outdated systems	Budget constraint or user resistance	Management review meetings	9	5	4	180	Present ROI of software upgrade with pilot results; secure top management buy-in
3. Data Cleansing & Validation (Historical Data)	Incomplete or incorrect data cleanup	Forecast error persists despite process change	Manual errors, missing standardization	Random data audits	7	6	5	210	Automate data validation using scripts; conduct cross-departmental data audit before go-live
4. Automating Manual Data Entry	Barcode / automation system not adopted fully	Manual errors continue; data inconsistency	Poor training, lack of devices	Pilot verification by IT	8	5	4	160	Provide end-user training; ensure system usability; verify scanning coverage before rollout
5. Monitoring Process Implementation	Forecast accuracy not tracked post-implementation	Drift in performance after initial improvement	Lack of governance & visual controls	Weekly report check	7	7	6	294	Form Forecast Review Board; monthly review and variance reporting
6. SOP Standardization & Training	New process not followed consistently	Process deviations cause data errors	Lack of refresher training / unclear documentation	Internal audits	6	6	5	180	Establish SOP version control and quarterly training refresh
7. System Downtime During Forecast Update	Forecast process interruption	Missed updates, outdated data in ERP	IT infrastructure issues	System uptime logs	8	4	5	160	Set up redundancy and downtime alert system; create manual backup protocol

Control Plan

Process Step / Improvement Area	Control Characteristic / KPI	Specification / Target	Measurement Method / Tool	Frequency	Responsible Person	Reaction Plan if Out of Control
1. Forecast Accountability	Forecast Accuracy % by Planner / SKU	≥ 90% overall accuracy; no planner < 85%	Forecast Accuracy Dashboard (Actual vs Forecast %)	Weekly	Demand Planner / SCM Manager	Investigate variance root cause, review forecast assumptions, corrective coaching for planner
2. Forecast Software Upgrade & Use	% Usage of AI-based Forecast Tool	100% adoption within 3 months	System usage logs and dashboard analytics	Weekly	IT & SCM Head	Conduct refresher training; escalate low adoption cases to management
3. Historical Data Accuracy	% Error-free records in Master Data	≥ 98% data accuracy	Data validation script / audit report	Monthly	Master Data Management (MDM) Team	Identify error source; re-run data cleanup; initiate RCA for recurring issues
4. Manual Data Entry Reduction	% Automated vs Manual Entries	≥ 95% transactions automated	System data logs / Automation ratio report	Weekly	Warehouse Lead / IT Analyst	Review pending manual processes; fix integration or barcode scanning issues
5. Forecast Monitoring & Governance	% Forecast Reviewed Monthly	100% of SKUs reviewed monthly	Monthly Forecast Review Meeting Minutes	Monthly	Forecast Review Board	Delay follow-ups or missed reviews trigger escalation to SCM Head
6. SOP Adherence & Training	% Employees Trained on SOP	100% of demand planning & warehouse staff	Training attendance records & audit checklist	Quarterly	HR & SCM Lead	Schedule make-up sessions; re-train non-compliant staff
7. System Uptime (Forecasting Tool)	Downtime (Hours / Month)	≤ 2 hours/month	System uptime monitoring tool	Monthly	IT Support	Switch to backup system; raise alert to vendor; initiate root cause analysis



Results after improvement

- By addressing key drivers such as data errors, system limitations, and accountability gaps, the project significantly improved forecast accuracy and stabilized the process, achieving the targeted performance levels.