Reducing Financial Data Entry Errors

ICEQBS

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ROADMAP

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OVERVIEW

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Background

The current financial data entry process shows a persistent error rate averaging 3.2%, causing delays in reconciliations, inaccurate financial reporting, and consumption of nearly 15% of the finance team's monthly hours on rework. These inefficiencies weaken compliance readiness, increase operational workload, and extend the month-end closing cycle.

By reducing the error rate to ≤1% through standardized templates, ERP validation rules, and AI-driven anomaly detection, the organization will significantly strengthen the accuracy and reliability of financial reporting. The project is expected to improve reporting precision by over 65%, decrease manual corrections by at least 70%, and reduce the month-end close time by 20%. Additionally, enhanced process stability and improved turnaround times will elevate internal stakeholder satisfaction from 75% to 90%, demonstrating the strategic value of this improvement initiative.

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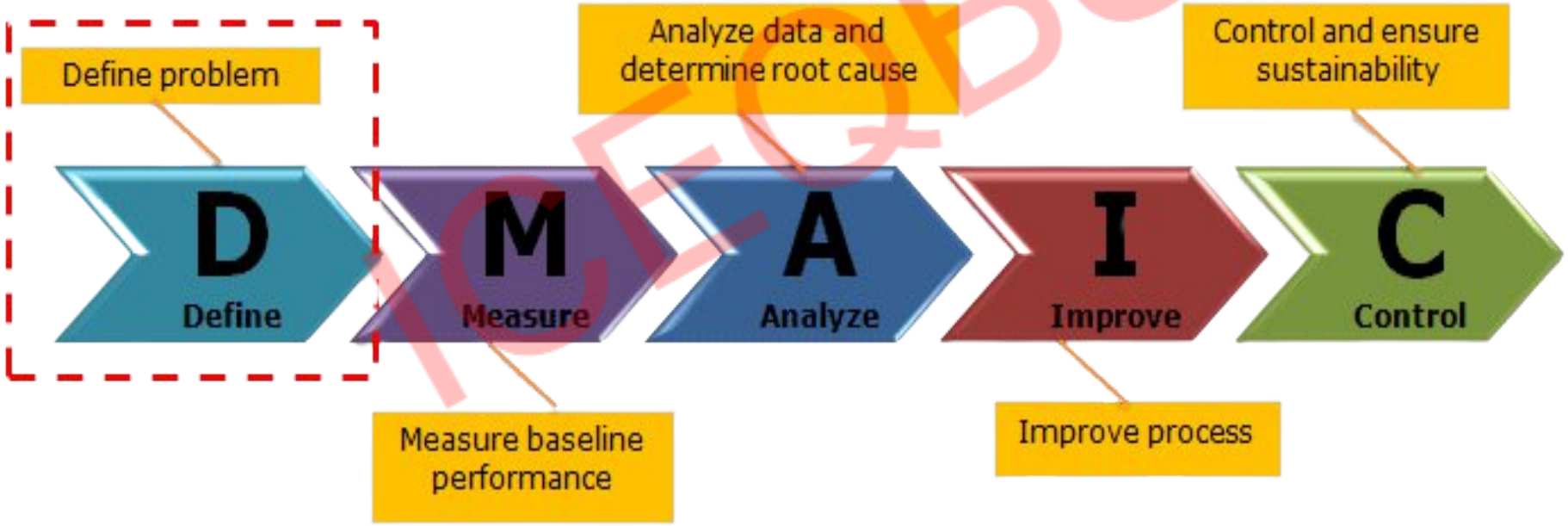
DEFINE PHASE



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VOC & CTQ

CTQ Tree :

Voice of customer	Critical to X	Primary Metric for improvement
"We need accurate financial data with minimal errors to ensure timely reporting."	CTC – Error rate	**Primary Metric -** Y = Data Entry Error Rate (%) **Secondary Metric -** Average Time to Correct Errors (hours), Month-End Closing Time (days)

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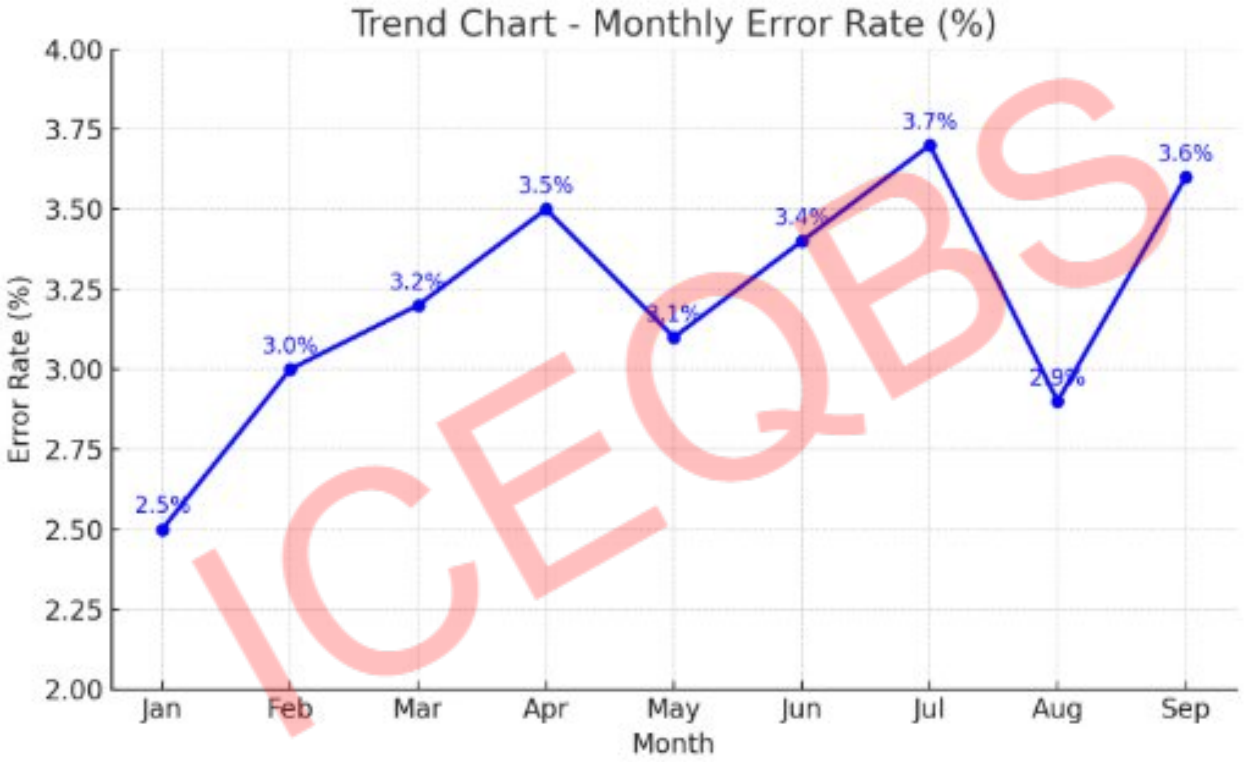
Baseline Performance of Primary Metric (9 months data as Line chart)



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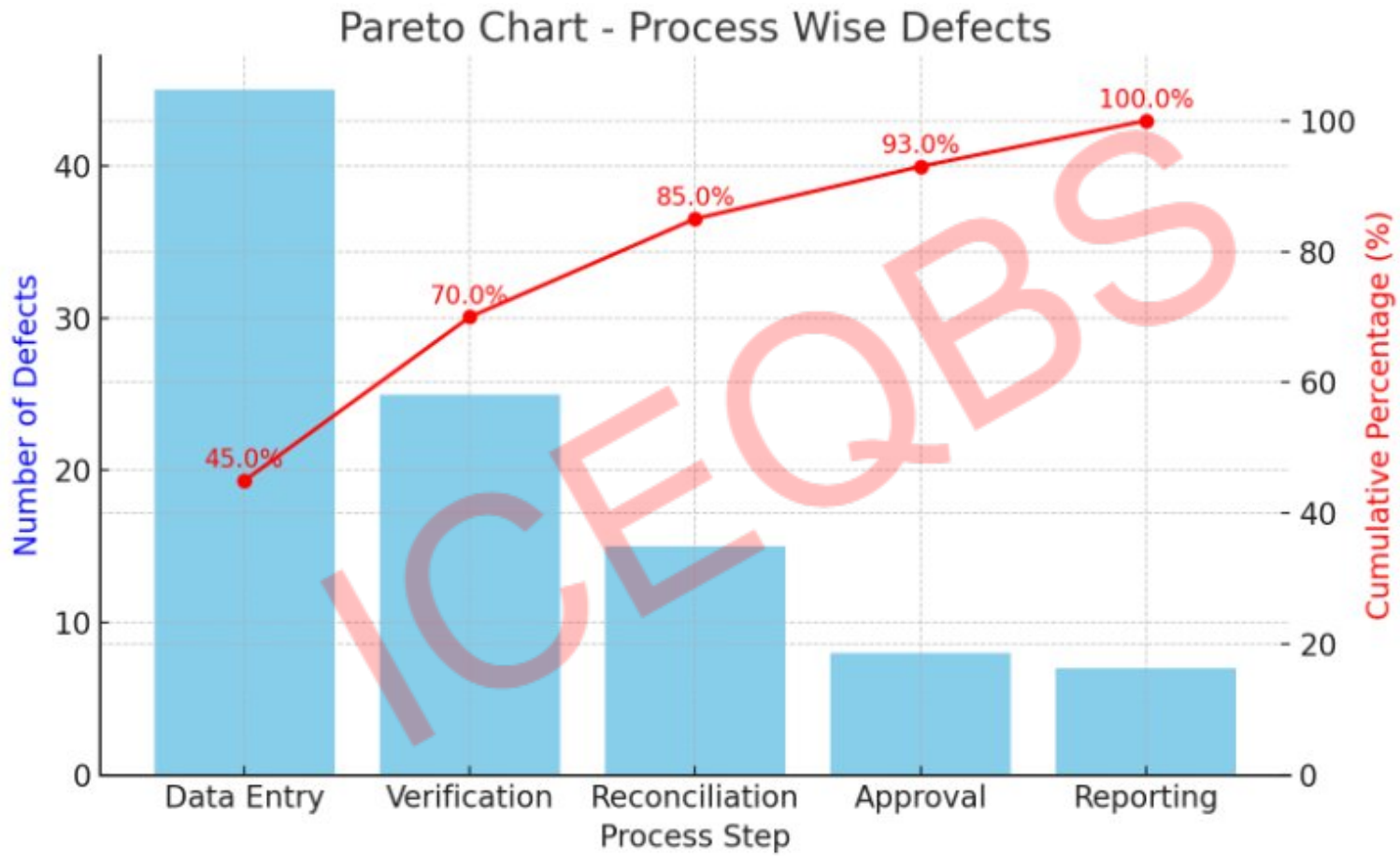
The trend chart shows the monthly error rate (%). Observation fluctuations between 2.5% and 3.7%, this indicates variability in the financial data entry process.

Pareto chart



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Inference :

- Data Entry Process contributes substantially d included in the scope of the project

SIPOC

Suppliers (S)	Inputs (I)	Process (P)	Outputs (O)	Customers (C)
Finance Team Members	Financial data (invoices, receipts, journal entries)	**1. Data Collection** – Receive financial documents from business units	Validated financial data entries	Finance Department
Vendors / Business Units	Vendor and customer master data	**2. Data Entry** – Enter financial transactions into ERP system	Accurate financial transactions in ERP	Internal Auditors
IT / ERP Support Team	ERP System and access credentials	**3. Verification** – Cross-check entries with supporting documents	Verified transaction records	External Auditors
Finance Manager	Standard operating procedures, policies	**4. Reconciliation** – Match entries between sub-ledgers and general ledger	Reconciled accounts	Management / Executives
Quality Assurance Team	Data validation rules, templates	**5. Approval** – Review and approve entries before posting	Approved journal entries	Stakeholders / Regulators

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Project Charter

Project Title:	High Error Rate in Financial Data Entry

Project Leader	Project Team Members:
Sarah Johnson/Michael Adams	David Lin Aisha Bello James Patel Emily Chen
Champion/Sponsors:	**Key Stake Holders**
Plant Head – Production	Finance staff, Accounts Payable/Receivable teams, ERP Support team, Auditors, Vendors, Management, Regulatory bodies
Problem Statement:	**Goal Statement:**
Over the past nine months, the Finance Department has recorded an average financial data entry error rate of 3.2%, with monthly variations ranging from 2.5% to 3.7%. These errors cause reconciliation delays, inaccurate financial reporting, and increased rework effort of about 15% of total finance team hours per month. The current process lacks proper validation checks, standardized templates, and real-time performance monitoring.	To reduce the financial data entry error rate from 3.2% to ≤1% within 16 weeks (4 months) by introducing standardized data templates, ERP validation rules, and AI-driven anomaly detection. Success will be measured by achieving an error rate ≤1% for three consecutive months after implementation and maintaining a 20% reduction in month-end close time.

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Project Charter

Tangible and Intangible Benefits:	Risk to Success:
Estimated saving = • $ 200,000 **Other benefits –** • Customer Satisfaction • Accuracy on delivery time	ow user adoption of new templates, resistance to process changes, ERP/AI integration issues, insufficient training, and unreliable historical data for validation.
In Scope:	**Out of Scope:**
Data entry and validation within ERP finance modules (Accounts Payable, Receivable, General Ledger) Standardization of data templates and formats Implementation of AI/automation checks for validation Staff training on standardized process	Post month-end manual journal adjustments Non-finance ERP modules (e.g., HR, Procurement) Historical data cleanup before 2024
Signatories:	**Project Timeline:**
Sarah Johnson Michael Adams Paul Smith	6 Months

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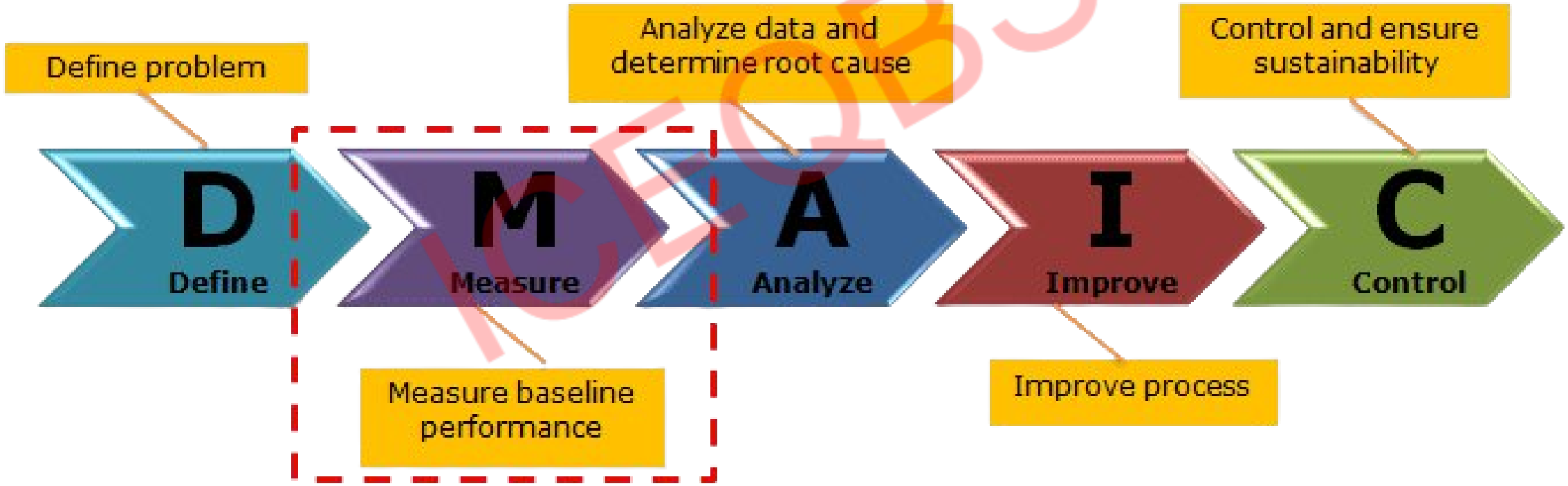
MEASURE PHASE



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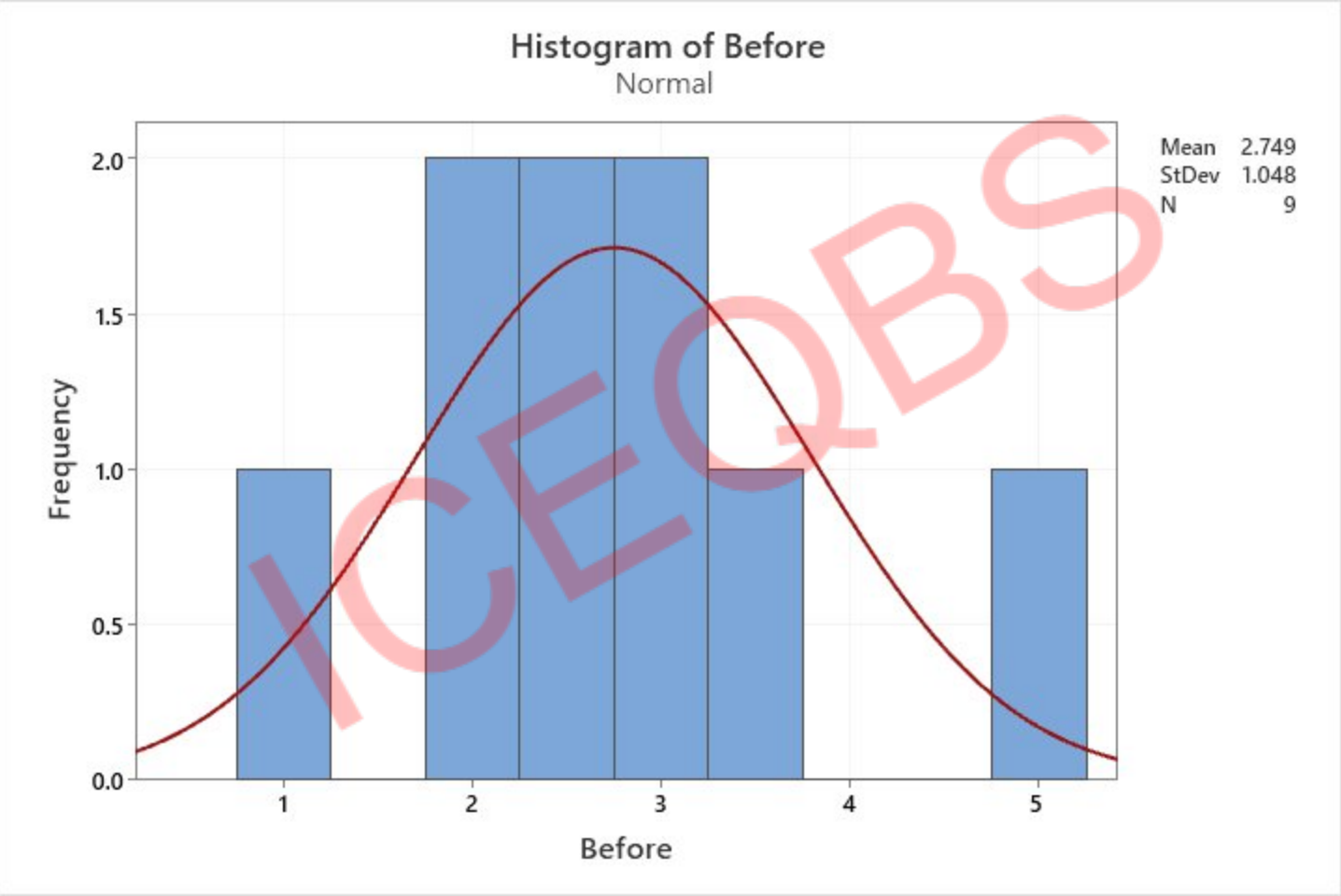
Data collection – Histogram (Before improvement)



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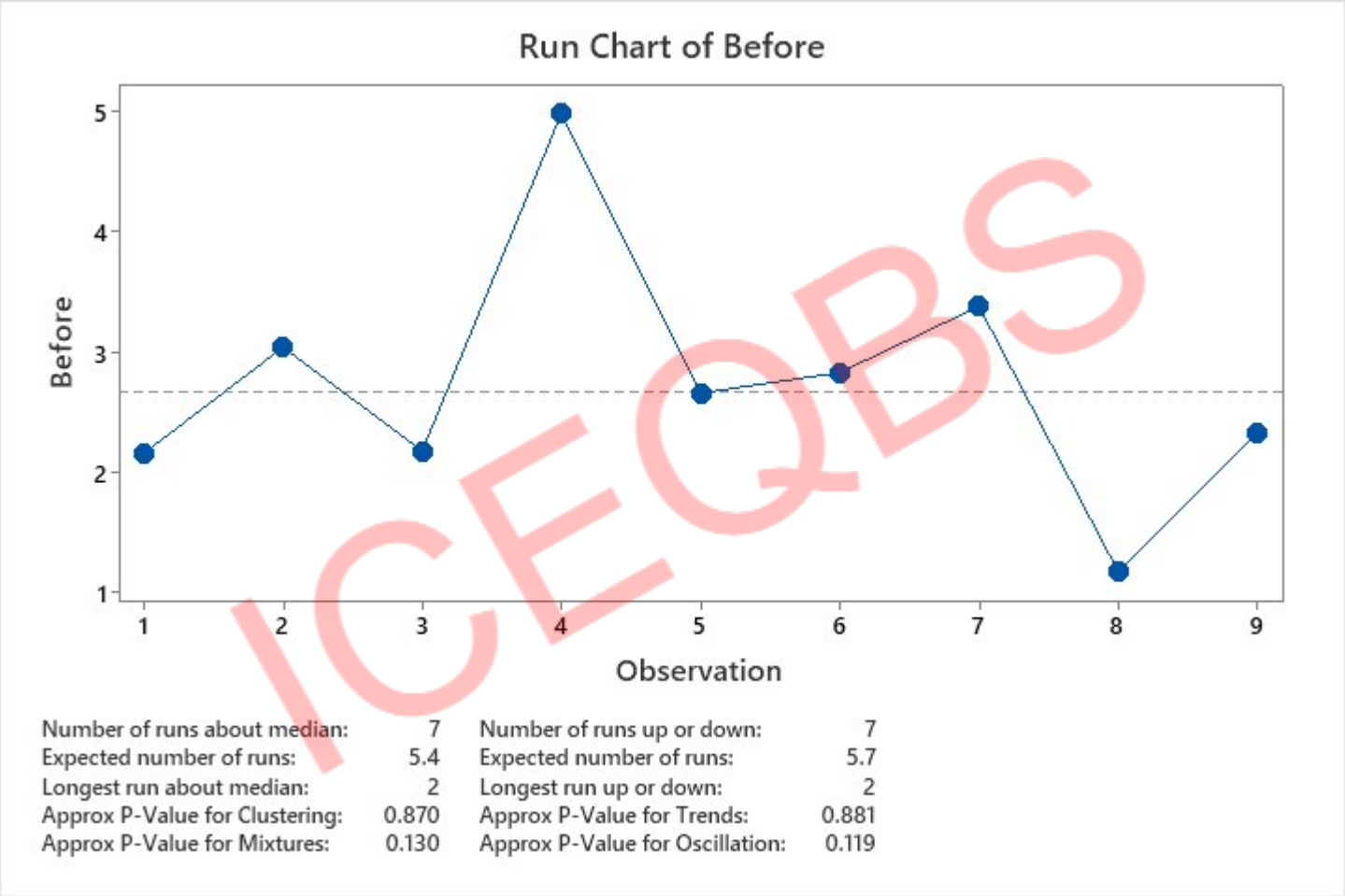
Inference :

- Data is normally distributed over the mean

Data collection – Run Chart (Before improvement)



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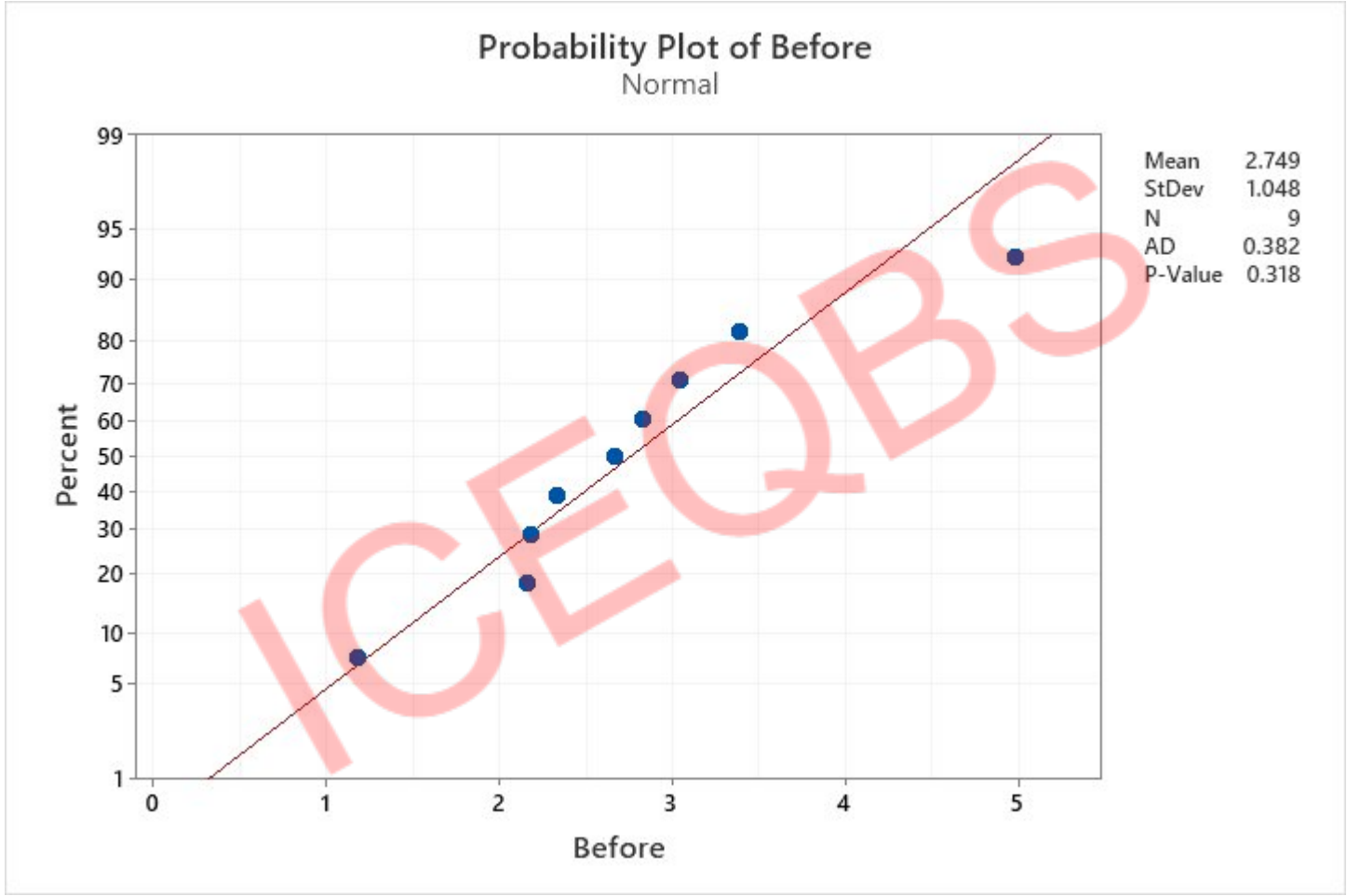
Inference :

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

Data collection – Normality plot (Before improvement)



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Inference :

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

Fish Bone Diagram

Insufficient staffing during peak periods

Remote work challenges (poor connectivity, communication delays)

Lack of ergonomic setup causing fatigue and mistakes

Lack of clear approval workflow

Multiple manual handoffs between users

Inefficient reconciliation and verification process

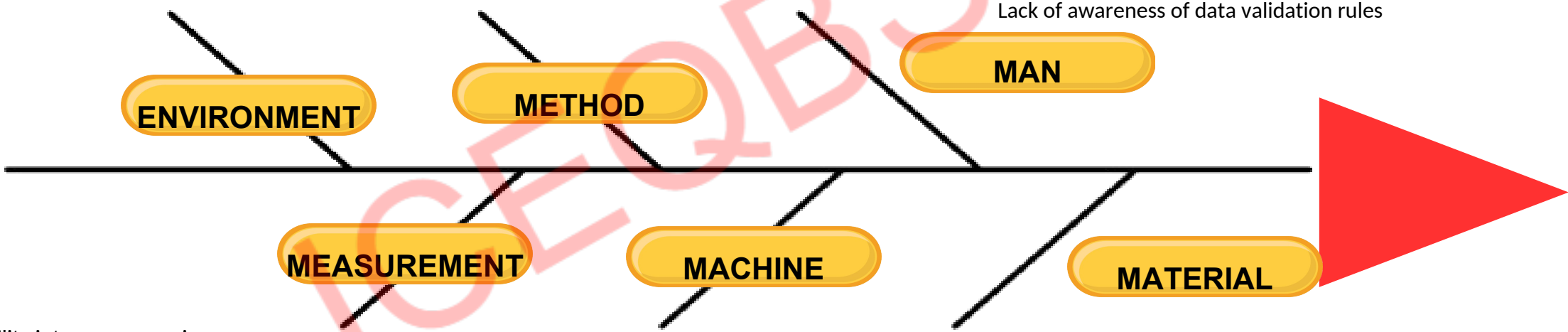
Inadequate training on ERP finance module

High workload and fatigue during month-end close

Lack of accountability for data accuracy

Errors due to manual copy-paste of financial figures

Lack of awareness of data validation rules



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Limited visibility into process variance

Infrequent error analysis or root cause reviews

Manual audit trail without automated error logging

High-pressure month-end environment

ERP system lacks automated validation checks

Slow ERP performance causing timeouts

Poor user interface leading to wrong field entries

Frequent system downtime or crashes

Limited integration between sub-ledgers and general ledger

Inconsistent data entry procedures across teams

Incomplete or inaccurate source documents

Duplicate invoices or entries

Missing supporting documents from departments

Data discrepancies between systems

Common and special causes

Common Causes

- Inadequate training on ERP finance module
- High workload and fatigue during month-end close
- Lack of accountability for data accuracy
- Inconsistent data entry procedures across teams
- No standardized templates for financial uploads
- Incomplete or inaccurate source documents
- Duplicate invoices or entries
- Data discrepancies between systems
- No real-time monitoring of data entry errors
- Lack of performance KPIs for accuracy
- High-pressure month-end environment
- Distractions and interruptions in open office layout

Special Causes

- ERP system lacks automated validation checks
- Slow ERP performance causing timeouts
- Frequent system downtime or crashes
- Outdated or incorrect vendor/customer master data
- Missing supporting documents from departments
- Manual audit trail without automated error logging
- Limited integration between sub-ledgers and general ledger
- Inefficient reconciliation and verification process
- Remote work challenges (poor connectivity, communication delays)
- Insufficient staffing during peak periods

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3M Analysis for Waste

MUDA

- Rework: - Re-entering or correcting financial data due to manual errors.
- Waiting Time: - Delays while waiting for approvals or missing documents from other departments

MURA

- Inconsistent Data Entry: -Different staff using varied formats or naming conventions in the ERP system.
- Uneven Workload: -High volume of entries during month-end closing versus low volume mid-month.
- Variable Approval Time: -Some managers approve expense claims instantly while others delay for days.

MURI

- Overloaded Staff: -Finance team members working overtime during closing periods.
- System Overload: - ERP system performance drops due to heavy data upload during peak hours
- Unrealistic Deadlines: -Tight month-end schedules that don’t account for error resolution or validation

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8 Wastes Analysis

Defects	• Incorrect account coding or data entry leading to reconciliation issues. • Missing or duplicate vendor payment entries requiring correction.
Overproduction	• Preparing multiple versions of financial reports for the same audience. • Entering non-essential or duplicate data in the ERP system.
Waiting	• Delays in receiving approval or supporting documents from department heads. • Waiting for the ERP system to process bulk uploads or validations.
Non-Utilized Talent	• Highly skilled staff spending time on routine manual data entry. • Lack of involvement of data analysts in automating validation processes.
Transportation	• Sending physical or scanned invoices between departments for approval instead of digital submission. • Transferring data manually between different ERP modules (e.g., AP to GL).
Inventory	• Large backlog of unprocessed invoices waiting for data entry. • Unreviewed transactions accumulating before monthly reconciliation.
Motion	• Staff switching between multiple screens and systems to enter one transaction. • Manually searching through files or emails for supporting documents
Overprocessing	• Manually verifying transactions already validated by the ERP system. • Reconciliation steps repeated by multiple team members unnecessarily.

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Action Plan for Low Hanging Fruits

Special Causes (sudden failures / abnormalities)

Issue Observed	Lean Tool	Action Plan	Benefit
Sudden CNC spindle failure	TPM (Total Productive Maintenance)	Implement preventive maintenance schedule and operator-led daily checks	Reduced downtime, stable machining accuracy
Coolant system breakdown	Visual Controls + TPM	Add coolant level indicators and checklists	Avoid surface defects, improve tool life
Out-of-spec raw material batch	Incoming Quality Control (Poka Yoke)	Strengthen supplier certification and incoming lot checks	Fewer rejections, reduced scrap
CMM program crash	Standardized Work	Create validated backup CMM programs	Faster recovery, less delay
Abrupt power fluctuation	**Andon System + Backup**	**Install voltage stabilizers and surge protectors**	Avoid unexpected stoppages

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Action Plan for Low Hanging Fruits

Muda (Waste)

Waste Type	Lean Tool	Action Plan	Benefit
Frequent re-entry of incorrect data	Poka-Yoke (Error Proofing)	Implement AI-based validation and data field auto-checks	Reduce rework by 70%
Multiple layers of approval for routine entries	Value Stream Mapping (VSM)	Streamline approval hierarchy for low-risk transactions	Reduce approval time by 40%

Mura (Unevenness)

Issue	Lean Tool	Action Plan	Benefit
Different naming and coding styles used by staff	Standard Work + SOPs	Create and enforce standardized ERP data templates	Ensure uniformity and fewer reconciliation issues
No real-time monitoring of errors	Role Reassignment + Training	Automate routine tasks; retrain analysts for data quality and insight roles	Better resource utilization

Muri (Overburden)

Issue	Lean Tool	Action Plan	Benefit
Frequent ERP lags and crashes during high load	Kaizen & IT Maintenance Scheduling	Schedule ERP maintenance during off-peak hours; optimize batch	Reduced downtime and faster data entry
Staff working overtime to meet close deadlines	Workload Leveling (Heijunka)	Distribute transaction processing evenly across the month	Reduce overtime hours and errors

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Action Plan for Low Hanging Fruits

Improvement Area	Lean Tool Used	Expected Benefit
Data validation automation	Poka-Yoke / AI	70% error reduction
ERP performance optimization	Kaizen	25% faster processing
Standardization of templates	Standard Work	50% fewer inconsistencies
Workflow simplification	Value Stream Mapping	40% faster approvals
Document digitization	Visual Management	50% less waiting time
Workload balancing	Heijunka	30% less overtime
Skill optimization	Training & Automation	25% higher productivity
Digital 5S	5S Lean Method	30% faster file retrieval
Dashboard visibility	Visual Management	Continuous improvement tracking

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Top 12 Prioritized Root Causes (Based on Net Score)

Root Cause	Score
No automated validation checks	297
High workload / fatigue	297
Manual reconciliation process	297
Lack of accountability for errors	282
Unclear data ownership	282
Inadequate ERP training	261
Lack of standard data entry templates	261
Incomplete or inaccurate source documents	261
Missing supporting documents	261
Duplicate vendor master data	261
Inconsistent approval workflow	273
Poor ERP system performance	216

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Data Collection Plan

Data Element	Definition / Purpose	Source	Method of Collection	Frequency	Owner
Error %	% of inaccurate financial entries	Operational Data Systems	Automated report extraction	Weekly	Finance Ops
Manual Reconciliation %	% entries requiring manual correction	Operational Data Systems	Reconciliation logs	Weekly	Finance Ops
Validation Missing %	% entries with missing/invalid fields	Validation Logs	System validation checks	Weekly	Quality Team
Missing Documents %	% of cases with incomplete documentation	Document Management System	Document completeness scan	Weekly	Compliance
Entries per Day	Avg. number of entries processed per user/day	Performance Dashboards	Dashboard export	Daily/Weekly	Team Leads
Training Hours	Hours of completed training per staff	LMS	Attendance & completion records	Weekly	L&D Team
Data Accuracy Score	Accuracy after training & validation rules	Combined sources	Calculated metric	Weekly	Data Analyst
Productivity Impact	Correlation of training vs.	Combined sources	Statistical analysis	Bi-Weekly	Analyst

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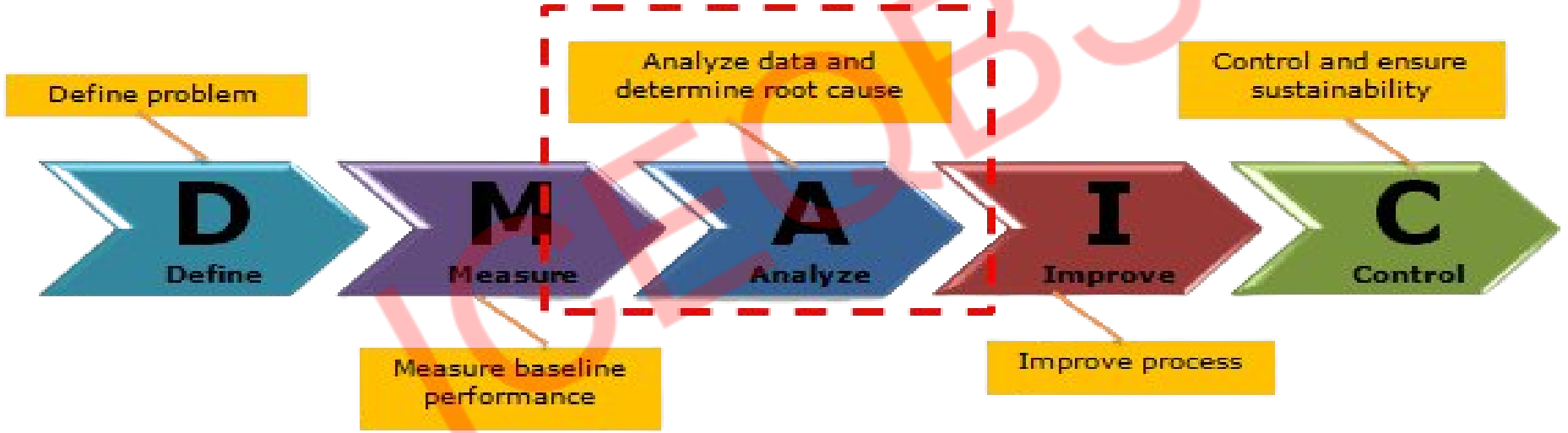
ANALYSE PHASE



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Analyse – Hypothesis testing

Regression Equation

Error_% = -2.234 + 0.07634 Validation_Missing_% + 0.05555 Manual_Reconciliation_% - 0.0594 Training_Hours

Coefficients

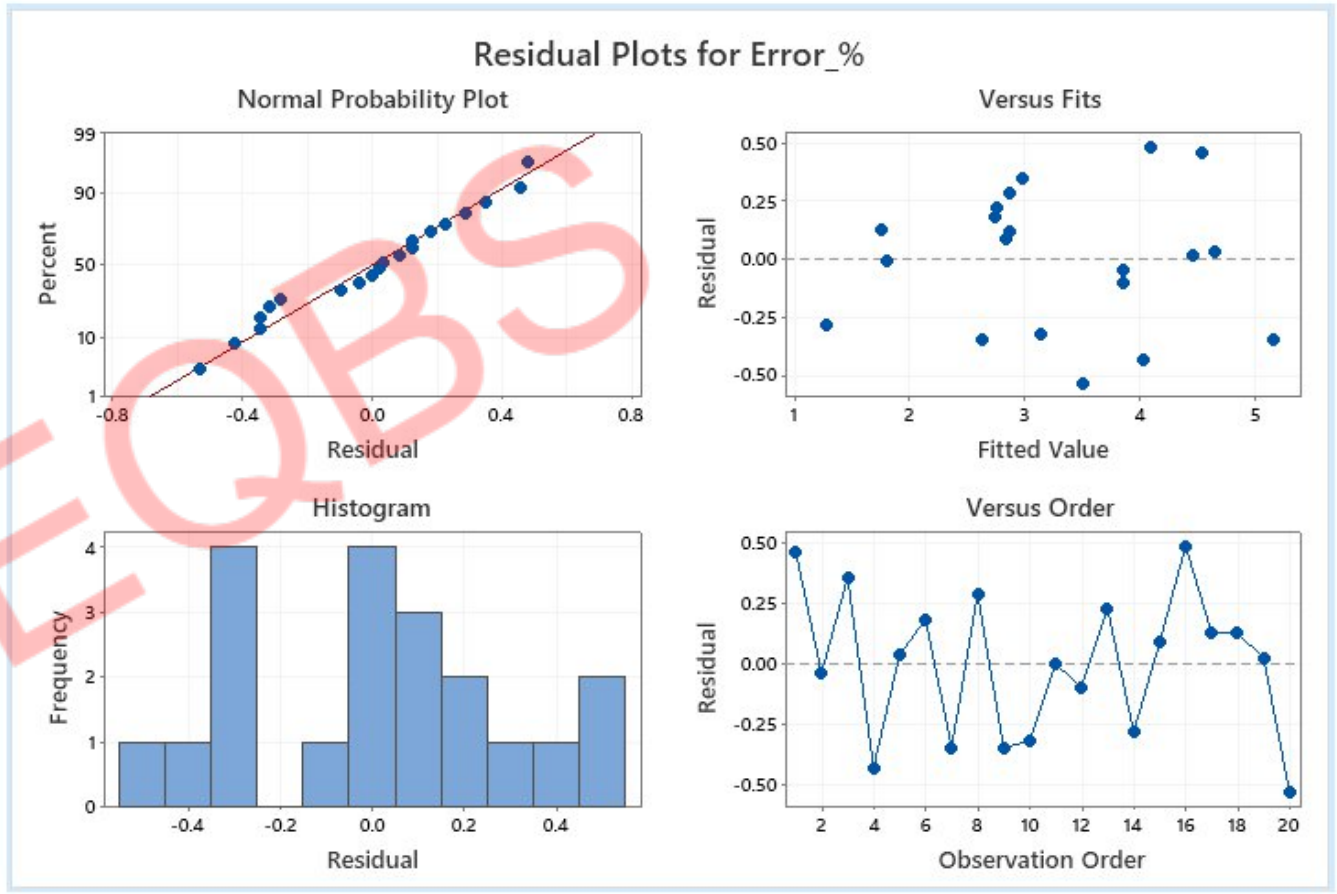
Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	-2.234	0.455	-4.91	0.000	
Validation_Missing_%	0.07634	0.00602	12.69	0.000	1.30
Manual_Reconciliation_%	0.05555	0.00641	8.66	0.000	1.20
Training_Hours	-0.0594	0.0191	-3.11	0.007	1.30

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
0.322248	92.48%	91.06%	88.75%

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	3	20.420	6.8066	65.55	0.000
Validation_Missing_%	1	16.728	16.7280	161.09	0.000
Manual_Reconciliation_%	1	7.796	7.7956	75.07	0.000
Training_Hours	1	1.008	1.0075	9.70	0.007
Error	16	1.662	0.1038		
Total	19	22.081			



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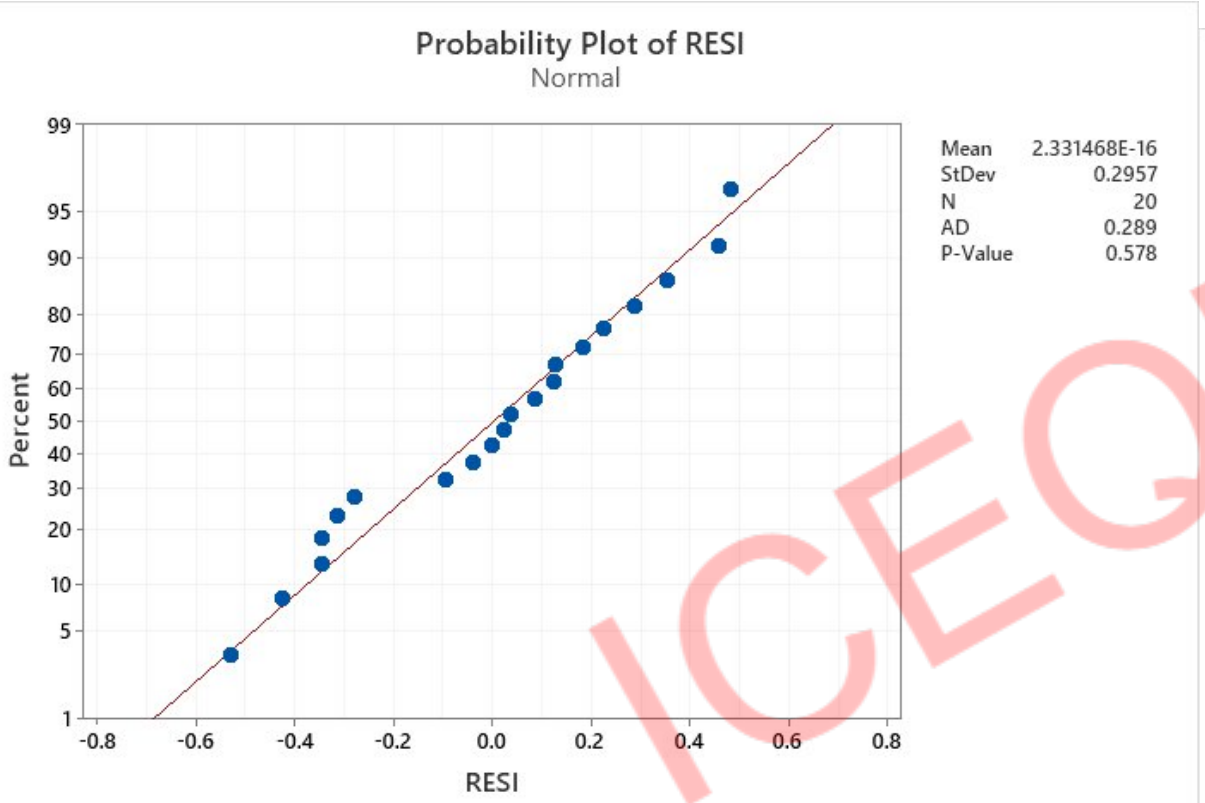
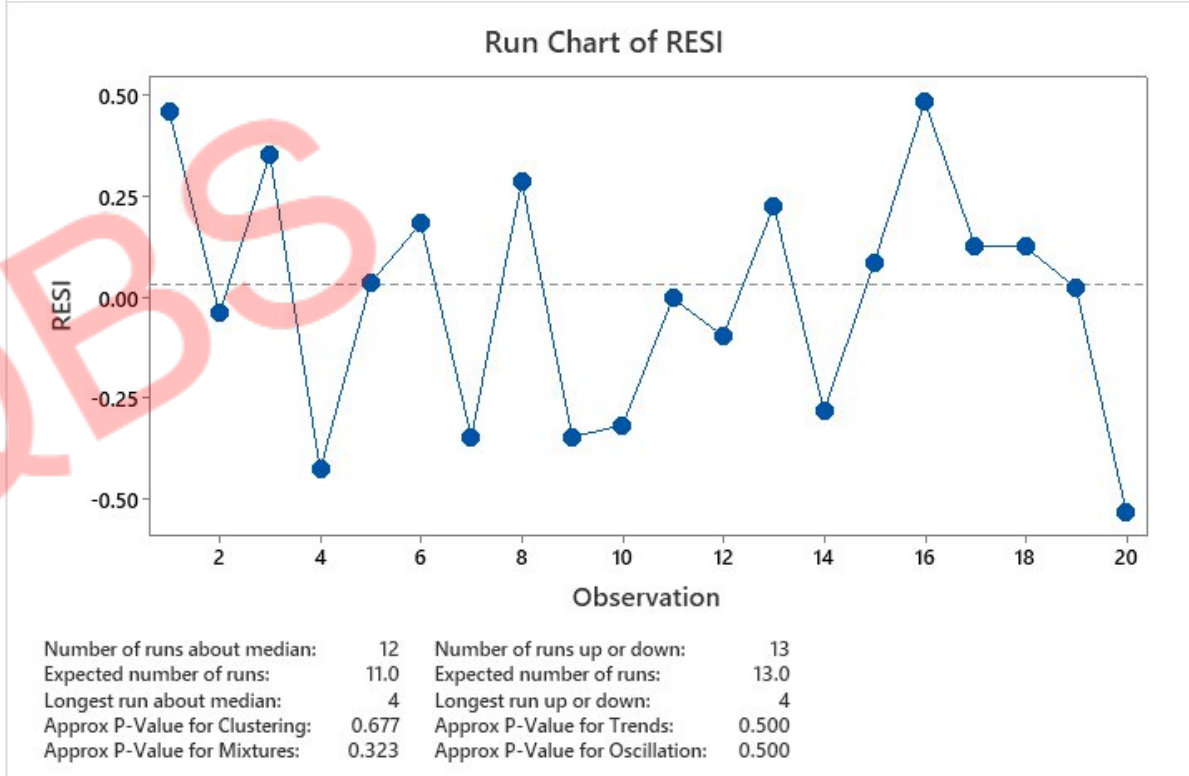
Inference :

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

Analyse – Hypothesis testing





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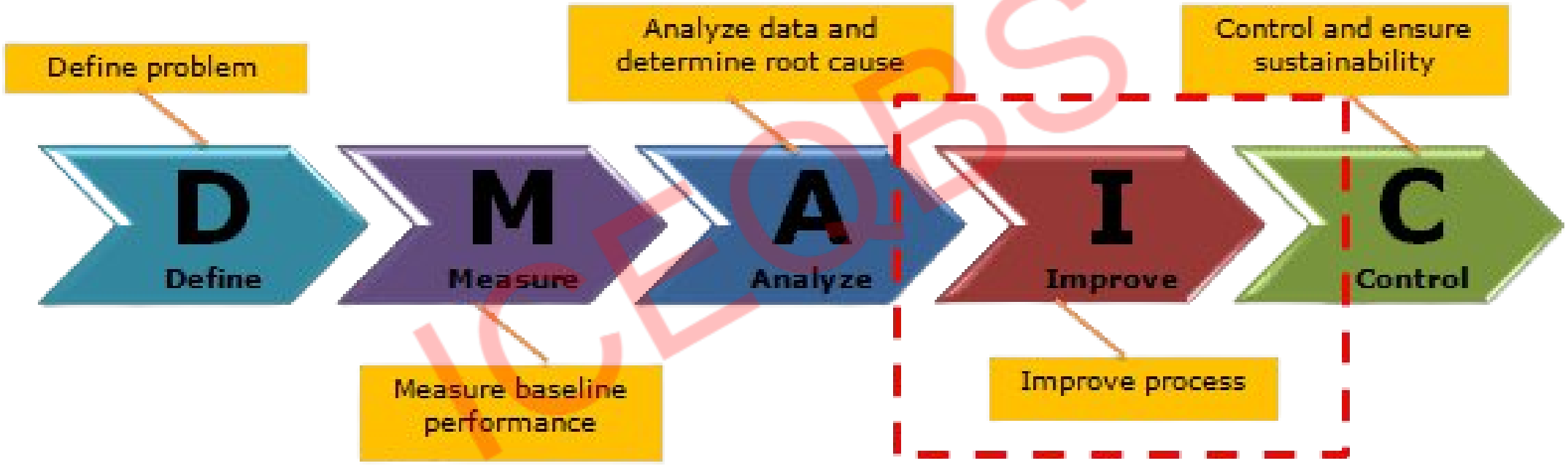
Inference :

•Both plots confirm that the residuals are normal, independent, and random — meaning the model fits the data well, and the underlying assumptions for regression or process analysis are satisfied.

IMPROVE PHASE



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Improve Design of Experiment

Root Cause	Improvement Action	Lean / Six Sigma Tool	Timeline	Expected Outcome	Success Metric
Lack of Automated Validation Checks	Implement automated validation rules in ERP system to flag incomplete or inconsistent financial entries.	Process Automation, Poka-Yoke (Error Proofing)	4 weeks	Reduced manual data entry errors	≥ 50% reduction in data entry errors
High Workload on Finance Staff	Redistribute workload, introduce cross-training, and implement RPA (Robotic Process Automation) for repetitive tasks.	Workload Balancing, Lean Resource Optimization	6 weeks	Reduced fatigue, faster task completion	30% reduction in processing time
Manual Reconciliation Process	Introduce AI-driven reconciliation tool for automated matching of transactions.	AI/ML Integration, Automation	8 weeks	Faster reconciliation cycle, fewer mismatches	40% reduction in reconciliation time
Inadequate Staff Training	Conduct refresher training sessions and develop digital learning modules for ERP usage and financial compliance.	Training Effectiveness (Kirkpatrick Model), Standard Work	3 weeks	Improved process compliance and user competence	≥ 90% of staff certified post-training
Inconsistent Process Documentation	Standardize SOPs and embed them into the ERP workflow for easy access.	5S (Standardize), Visual Management	2 weeks	Consistent process execution	Zero deviation in audit reports
Limited Real-Time Visibility	Deploy dashboards for real-time tracking of error rates, closing progress, and exception alerts.	Visual Control, Dashboarding	5 weeks	Improved decision-making speed	Real-time data accuracy ≥ 95%

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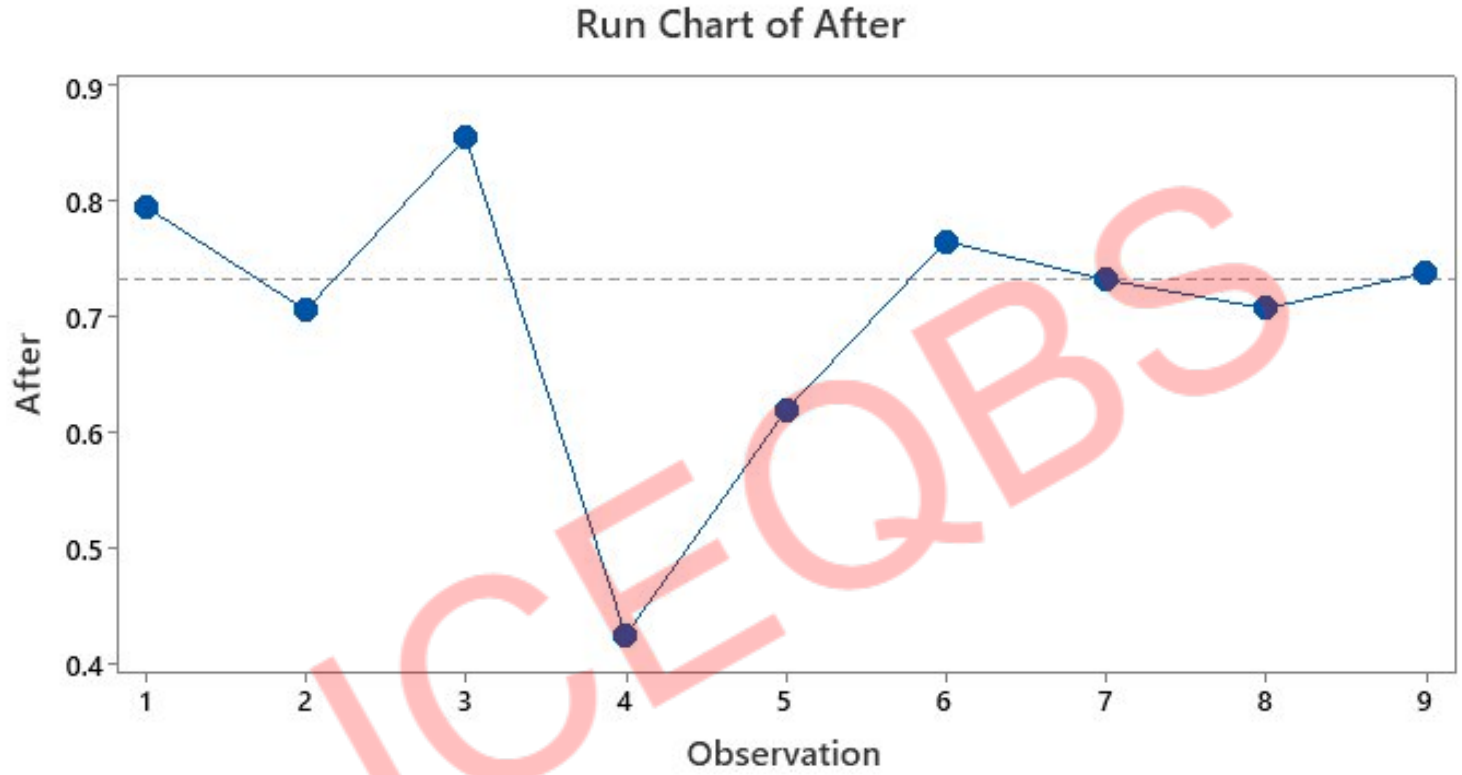
Improve



Number of runs about median:	7	Number of runs up or down:	6
Expected number of runs:	5.4	Expected number of runs:	5.7
Longest run about median:	2	Longest run up or down:	2
Approx P-Value for Clustering:	0.870	Approx P-Value for Trends:	0.616
Approx P-Value for Mixtures:	0.130	Approx P-Value for Oscillation:	0.384

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Inference:

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

Improve

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Inference:

- Normality test – Data are normally distributed

Improve

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.

Descriptive Statistics

Sample	N	Mean	StDev	SE Mean
Before	9	3.211	0.382	0.13
After	9	0.704	0.123	0.041

Estimation for Difference

Difference	95% CI for Difference
2.507	(2.204, 2.810)

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
18.72	9	0.000

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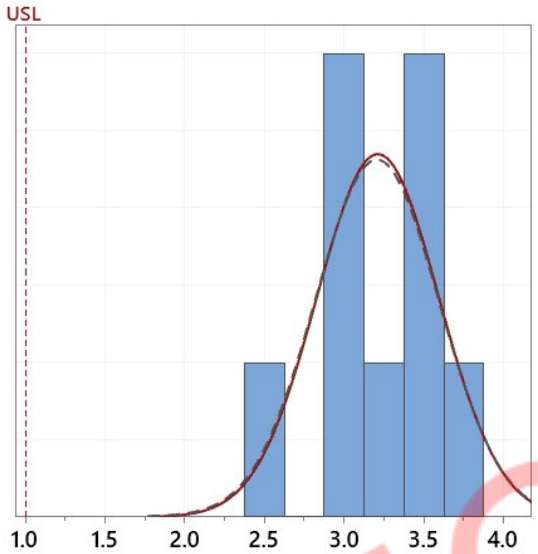
Inference:
Since p-value < 0.05, the before and after means are significantly different, confirming that the intervention produced a real improvement.

Improve – Process capability – Before & After Improvement

Process Capability Report for Before



Overall
Within

Process Data	
LSL	*
Target	*
USL	1
Sample Mean	3.21111
Sample N	9
StDev(Overall)	0.382245
StDev(Within)	0.387855

Overall Capability	
Pp	*
PPL	*
PPU	-1.93
Ppk	-1.93
Cpm	*

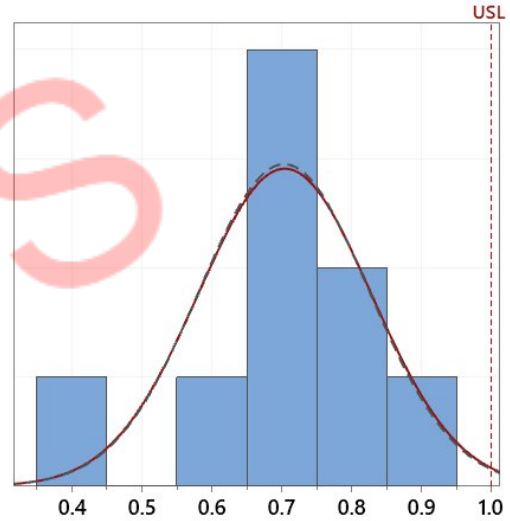
Potential (Within) Capability	
Cp	*
CPL	*
CPU	-1.90
Cpk	-1.90

Performance

	Observed	Expected Overall	Expected Within
PPM < LSL	*	*	*
PPM > USL	1000000.00	1000000.00	999999.99
PPM Total	1000000.00	1000000.00	999999.99

The actual process spread is represented by 6 sigma.

Process Capability Report for After



Overall
Within

Process Data	
LSL	*
Target	*
USL	1
Sample Mean	0.704266
Sample N	9
StDev(Overall)	0.123418
StDev(Within)	0.121619

Overall Capability	
Pp	*
PPL	*
PPU	0.80
Ppk	0.80
Cpm	*

Potential (Within) Capability	
Cp	*
CPL	*
CPU	0.81
Cpk	0.81

Performance

	Observed	Expected Overall	Expected Within
PPM < LSL	*	*	*
PPM > USL	0.00	8283.12	7515.42
PPM Total	0.00	8283.12	7515.42

The actual process spread is represented by 6 sigma.

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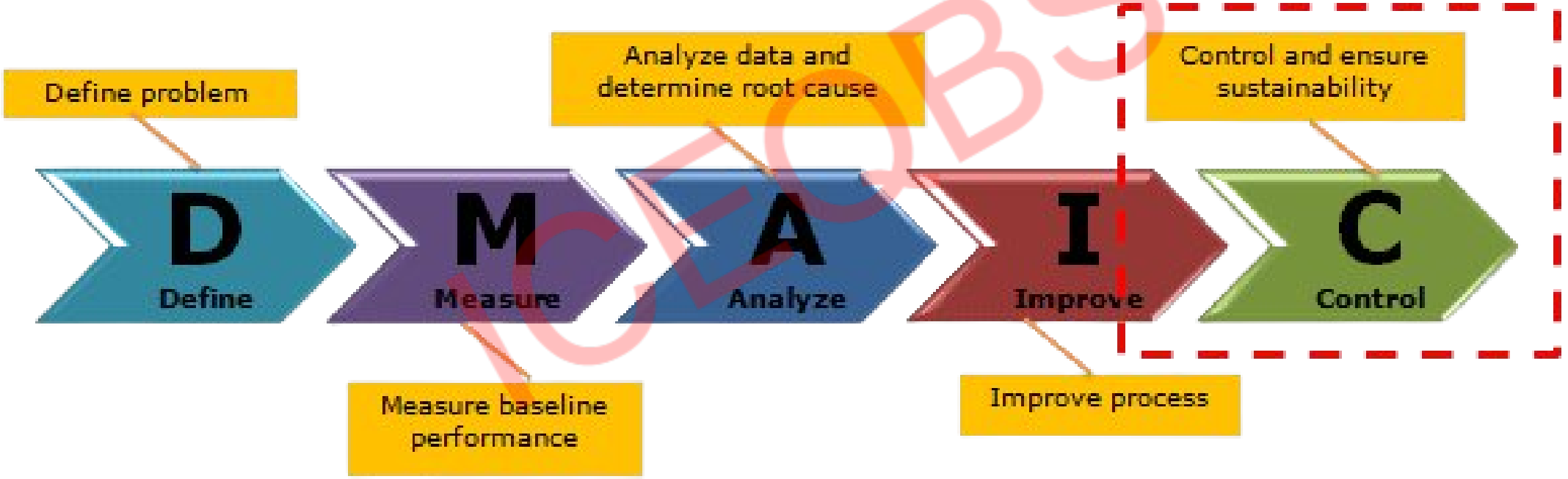
Inference :

- Before Cpk < 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

CONTROL PHASE



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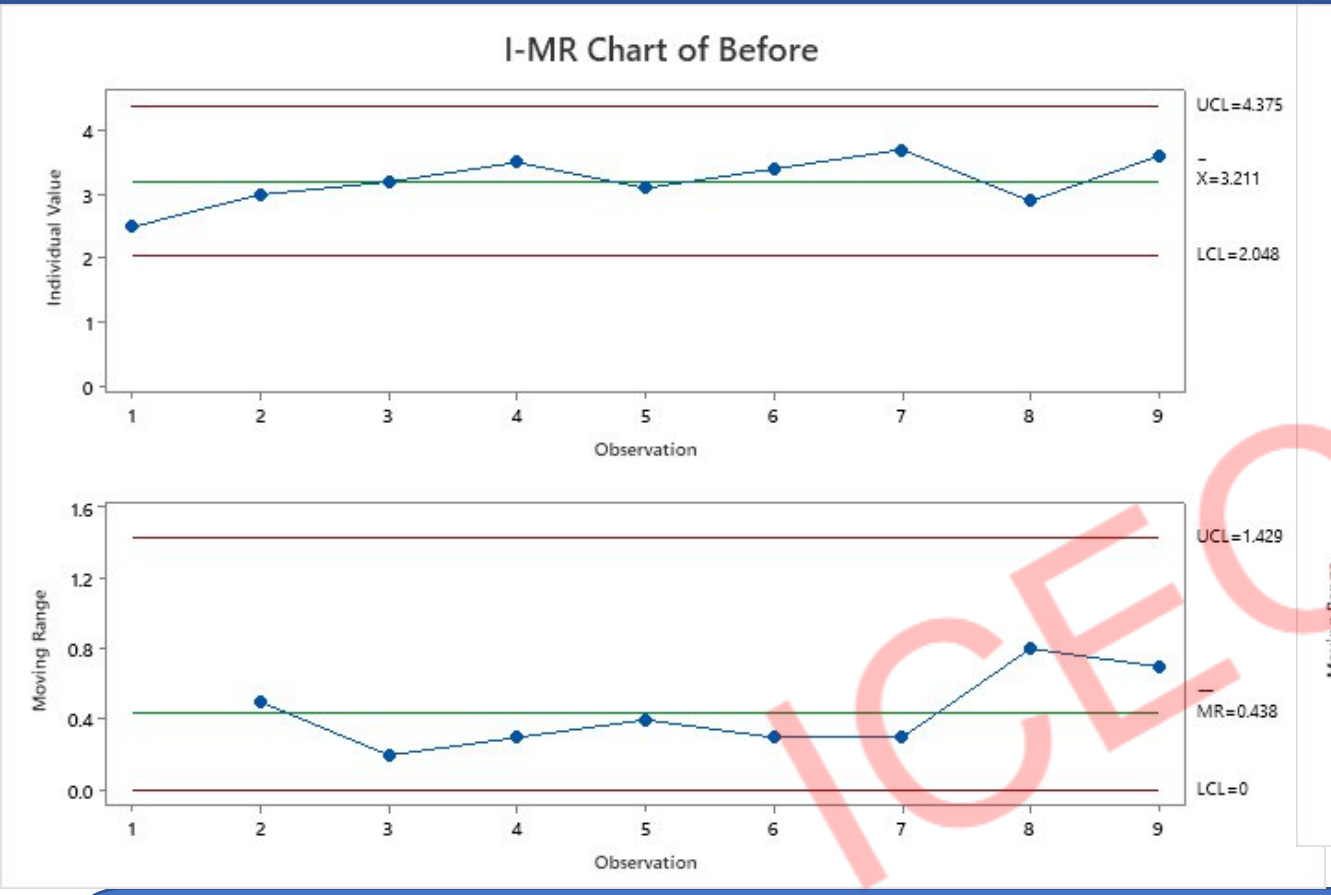
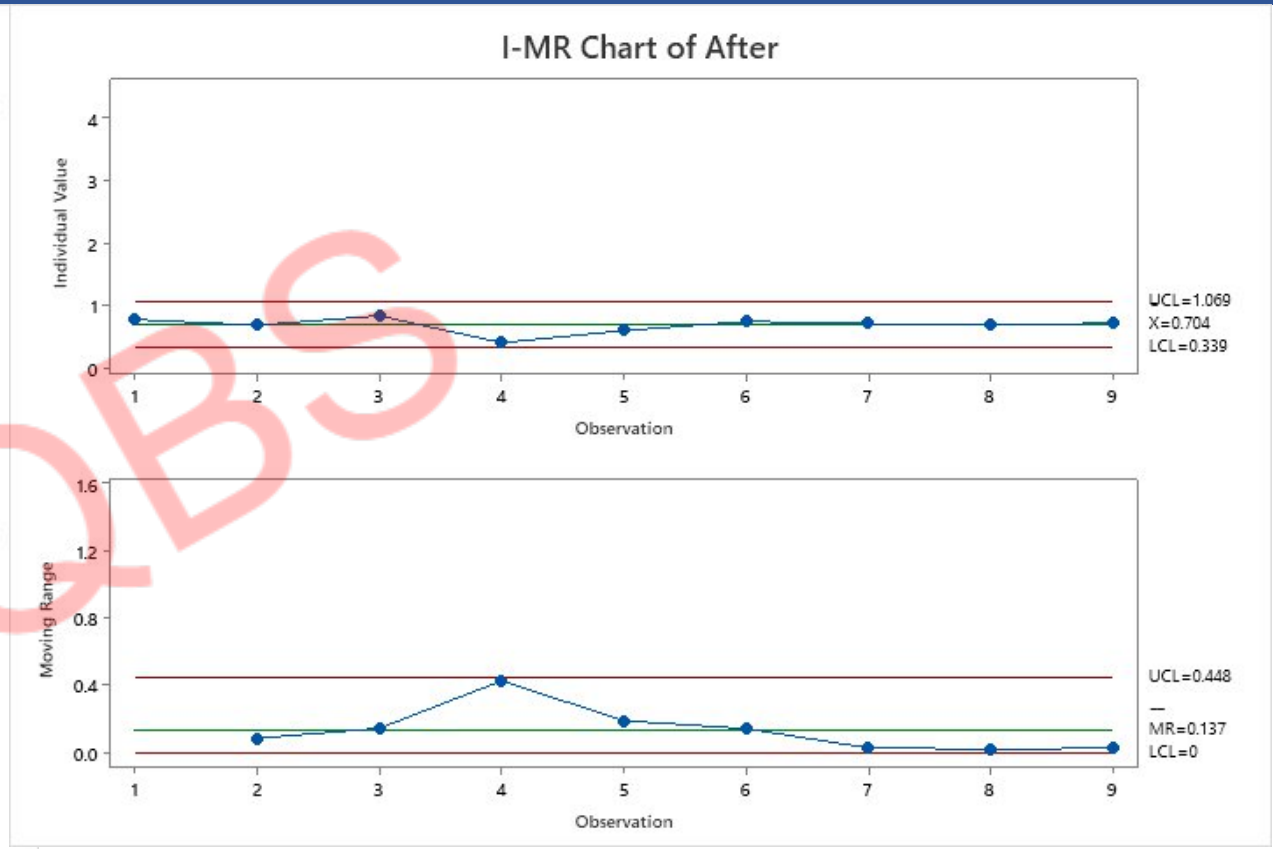
Improve (Statistical validation for Improvement – I-MR Chart)





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Inference:

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

Control Plan

Process Step	Potential Failure Mode	Potential Effect of Failure	Severity (S)	Potential Cause	Occurrence (O)	Current Controls	Detection (D)	RPN (S×O×D)	Recommended Action
Data Entry	Incorrect data entered (GL code, amount)	Wrong reporting / audit issue	8	Manual entry, fatigue	6	Manual verification	6	288	Implement data validation rules in ERP, introduce dropdowns
Document Upload	Missing invoice or document	Delay in approval & reconciliation	7	Incomplete documentation	5	Manual file check	7	245	Set mandatory attachment rule & auto reminders
Data Verification	Verification Missed verification step	Errors go undetected	8	Work overload / lack of SOP	5	Spot checks	6	240	Automate verification workflow & assign roles
Reconciliation	Transaction mismatch	Rework and delay in reporting	7	Data inconsistency between modules	4	Manual reconciliation	7	196	Use AI-based reconciliation script
Approval Process	Delay in approval	Missed reporting deadlines	6	High volume, unclear hierarchy	6	Email reminders	5	180	Implement automated routing and Escalation workflow
Reporting	Incorrect financial summary	Management misinformed	9	Inaccurate data source or mapping	3	Review by senior accountant	4	108	Implement data integrity validation before finalization
Training	Inadequate user training	Increased error rate post-implementation	8	New staff turnover	4	Ad-hoc sessions	5	160	Schedule quarterly structured training sessions

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Control plan to sustain data entry process Improvements

Process Step	Process Characteristic / Metric	Control Method / Tool	Specification / Target	Frequency of Monitoring	Reaction Plan (If out of control)
Data Entry	Error Rate (%)	Control Chart, Error Logs	≤ 2.5%	Weekly	Investigate incorrect entries, re-train user, implement validation update
Document Upload	% of Missing Documents	ERP Auto-Check Report	0% missing	Weekly	Send auto-reminder to uploader, enforce attachment rule
Data Verification	% of Verified Entries	System Audit Trail	100% verified	Daily	Escalate missed verifications, trigger automated alert
Reconciliation	# of Mismatched Transactions	Automated Reconciliation Tool	≤ 1%	Weekly	Review mismatch pattern, recalibrate AI reconciliation rules
Approval Process	Average Approval Time (days)	Workflow Report	≤ 2 days	Weekly	Notify approver, reassign overdue tasks, adjust approval hierarchy
Reporting Accuracy	Variance between ERP and Reports (%)	BI Dashboard	≤ 0.5%	Monthly	Review report generation logic, cross-validate with ERP
Training & Competence	% of Trained Staff	Training Log	100% trained	Quarterly	Schedule refresher course, audit knowledge gaps
System Downtime	ERP Availability (%)	System Log	≥ 99.5% uptime	Monthly	Trigger escalation protocol, perform root cause analysis
Data Governance	Master Data Accuracy (%)	Data Quality Dashboard	≥ 98% accuracy	Monthly	Run cleansing routine, lock inconsistent master records

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Conclusion

Results after improvement

- **Project has achieved its intended results by identifying the variation cause and arresting them**

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