



THE 20TH INTERNATIONAL OPERATIONS & MAINTENANCE
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Reducing SFC/MFC Contract Cycle Time Through Lean Six Sigma Project

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Lean Six Sigma

What Is Lean Six Sigma?

A method to systematically improve organizational performance:

- ✓ Structured
- ✓ Data driven
- ✓ Applicable to any process/activity
- ✓ Well-proven by other companies

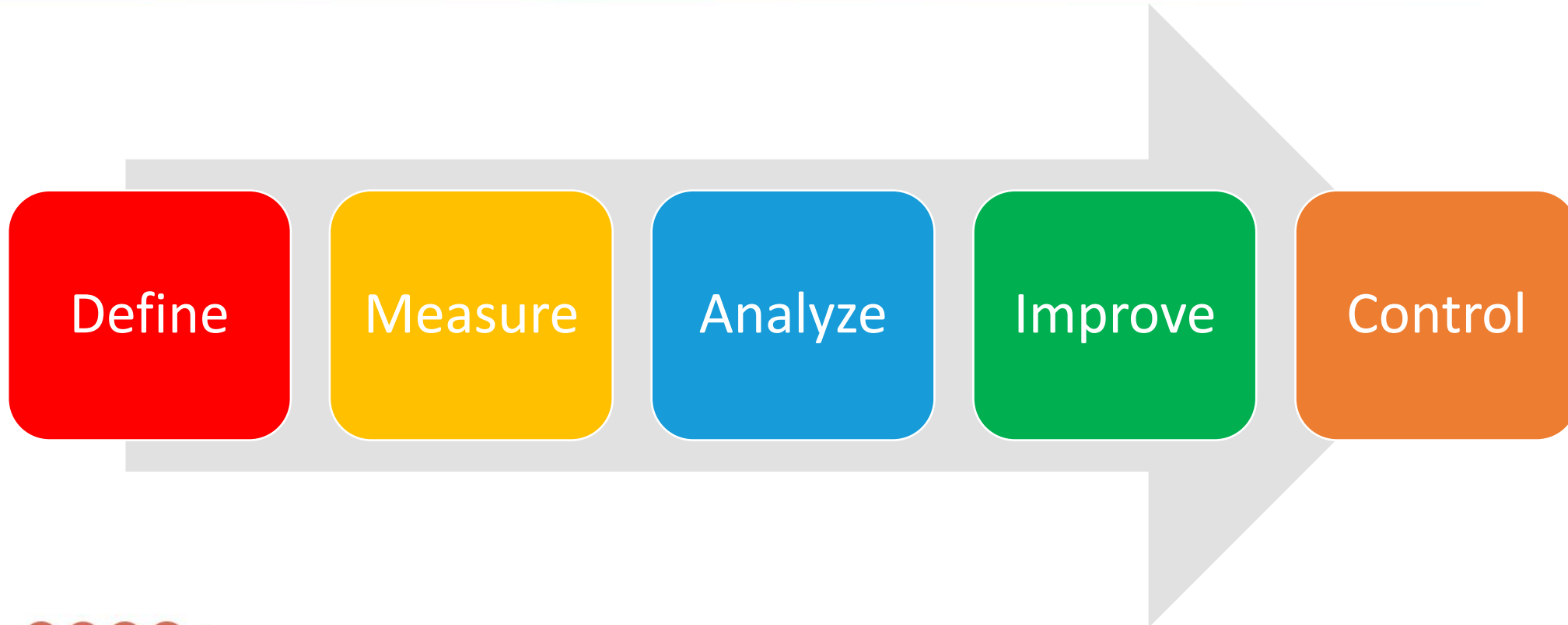


LSS achieves process excellence, enhance customer/proponent satisfaction and productivity, improves reliability and results in business growth



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Lean Six Sigma





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Background

Short (SFC) and Mid (MFC) contract forms procurement Agreements are types of procurement method that categorized based on duration and cost in accordance to procurement manual.

The cycle of procurement variation is caused by several factors that might lead to longer procurement period. This project will study causal factors to determine the root causes that could affect the procurement cycle and establish recommendation and action plan to tackle these issues to enhance the procurement cycle.



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Project Team

- **Project Champion:** Qahtani, Mohammad S (SyPD)
- **Process Owner:** Alhelal, Nawaf A (ACAU)
- **OCD Coach:** Alfahdah, Ali H (OCD)
Chandramouli, Ramasubramanian (OCD)
- **Green Belt:** Owaid, Yazeed A (SYPD)
- **Team Members:**
 - Alhelal, Nawaf (ACAU)
 - Garni, Abdullah G (SYPD)
 - Onazi, Abdullah A (SYPD)
 - Jumaiah, Abdulwahab A (SYPD)



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Project Definition

Problem Statement

Based on the data observed from 2017 to 2022, Shaybah Producing Department (SyPD) encounters an average cycle-time from PR approval date to Award Date is 158 days with Standard deviation of 133 days for Short and Mid form contracts in which 65% exceeding the target of 90 days. The delay is impacting SyPD Operating/Business Plan.

Project Goal

- To reduce average cycle-time from 158 to 90 days (43%) by December 2023.
- To reduce the variation by 30% (StD from 133 to 80 day).

Potential Benefits

- Enhancing overall organization reliability.
- Optimizing the overall cost efficiency of cycle time per contract.
- Increase and sustain contracting services quality.
- Improve the contract mobilization and schedule compliance by 50%.



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Project Scope

In Scope

- Short Form Contracts.
- Mid Form Contracts.
- SyPD Size and geographical consideration.
- SAP System.
- Resources , procedures , processes , capabilities and competencies.

Out of Scope

- Long Form Contract.

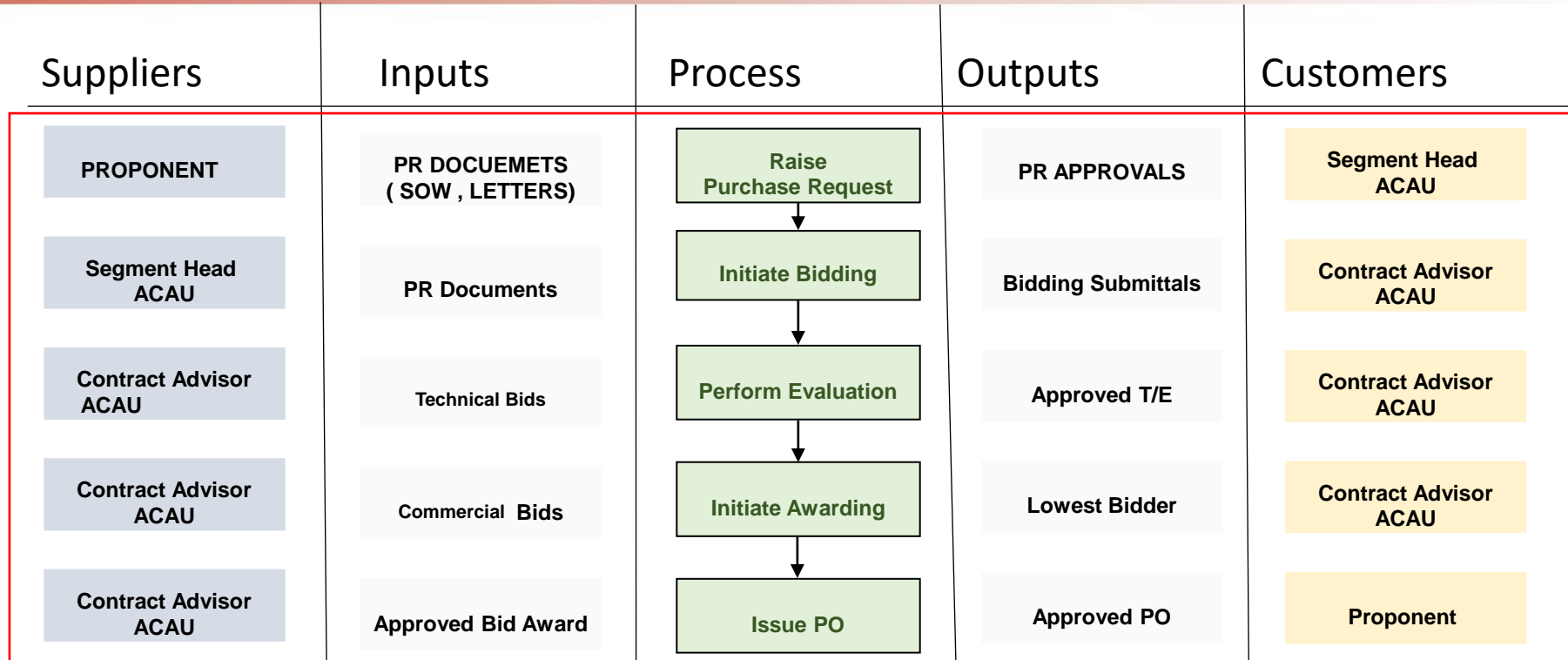
Potential Replication

- NAOO & SAOO



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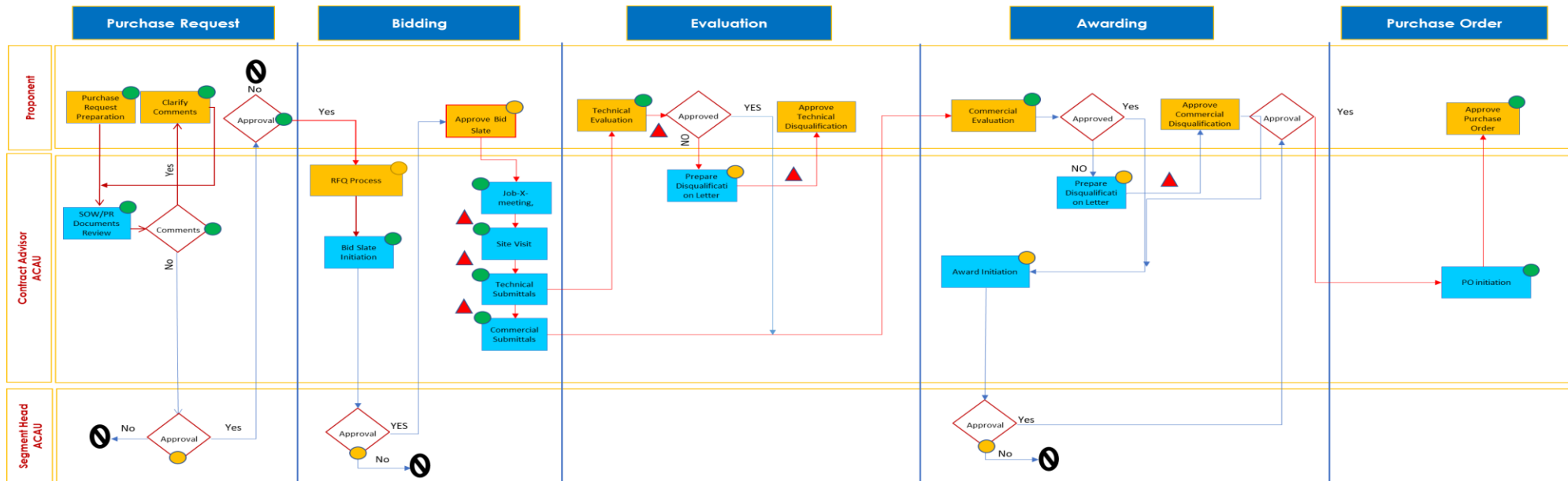
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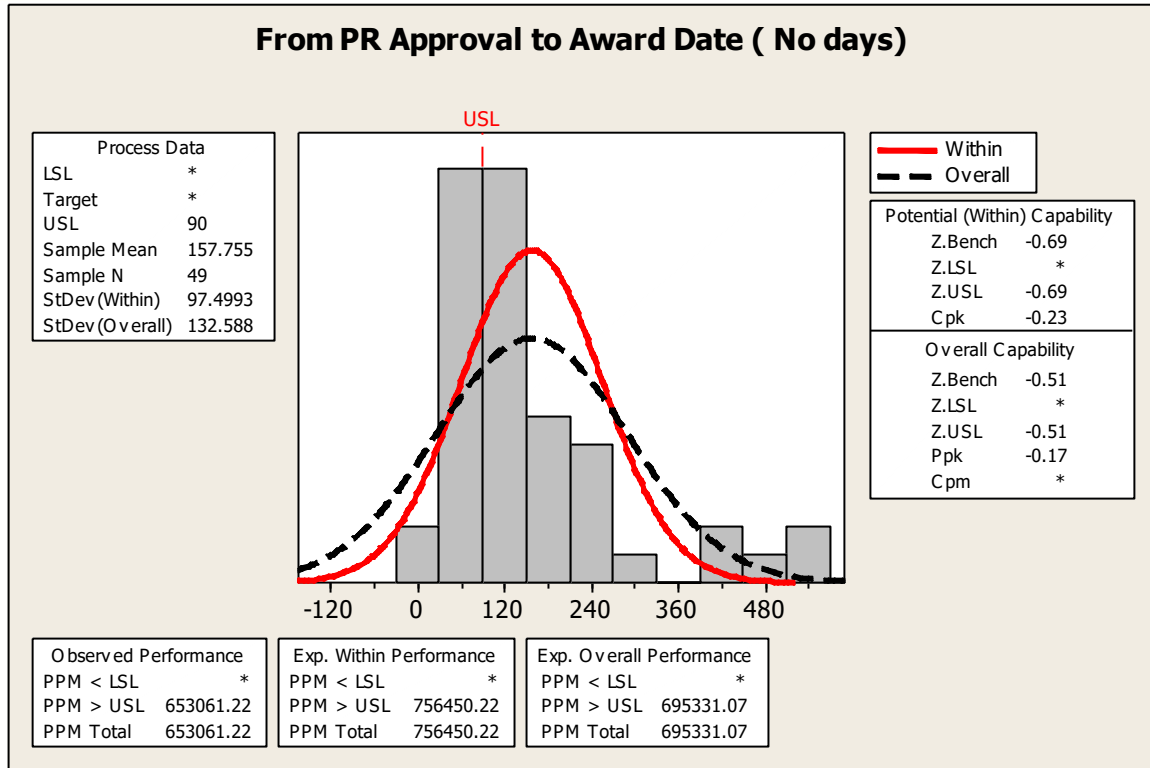
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As-Is Process Map

● VA
 ● BVA
 ▲ Lag Time
 ⊘ Start from the beginning

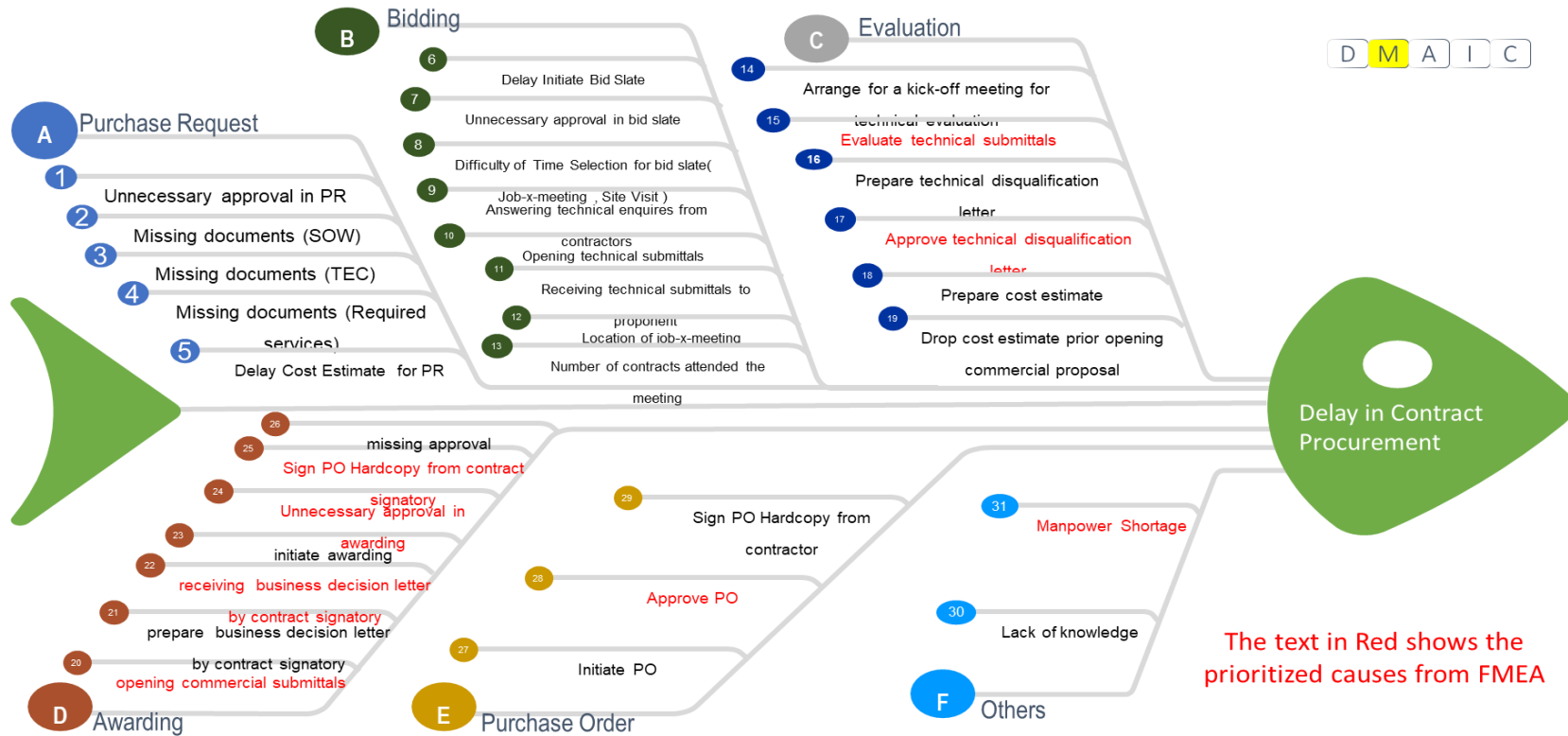


Process Capability



- PPM Total : 653061
- 65.31% data falls outside the specification limits(defects). As the data is not normal, we have considered the observed performance of 65.31%.

FISHBONE DIAGRAM





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Causes Prioritization

Category	Causes for PO delays	Severity (1=None, 3=Low,6= Medium, 9=High)	Occurrence (1=None, 3=Low,6=Me dium, 9=High)	S*O	Detectability (1=Highly Detectable, 3=Medium Detectable, 6=Low Detectable, 9=Not Detectable)	RPN
Evaluation	approve technical disqualification letter	9	9	81	9	729
Purchase Request	Lack of experince	9	9	81	6	486
Evaluation	evaluate technical submittals	9	6	54	9	486
Awarding	opening commercial submittals	9	6	54	9	486
Awarding	Sign PO Hardcopy from contract at signatory	6	9	54	6	324
Purchase Order	approve PO	6	9	54	6	324
Awarding	receiving business decision letter by contract signatory	9	3	27	3	81
Awarding	Unnecessary approval in awarding	9	9	81	1	81
Others	Manpower Shortage	9	9	81	1	81
Bidding	difficulty of Time Selection for bid slate(Job-x-meeting , Site Visit)	6	9	54	1	54
Others	Lack of knowledge	3	3	9	6	54
Purchase Request	Missing documents (SOW)	6	6	36	1	36
Bidding	Answering technical quires from contractors	1	6	6	6	36
Bidding	opening technical submittals	6	6	36	1	36
Evaluation	prepare cost estimate	6	6	36	1	36
Bidding	Unnecessary approval in bid slate	3	9	27	1	27
Purchase Request	Missing documents (TEC)	3	6	18	1	18
Bidding	Delay Initiate Bid Slate	3	3	9	1	9
Purchase Request	Unnecessary approval in PR	1	1	1	1	1
Purchase Request	Delay Cost Estimate for PR	1	1	1	1	1
Bidding	receiving technical submittals to proponent	1	1	1	1	1
Bidding	location of job-x-meeting	1	1	1	1	1
Bidding	number of contracts attended the meeting	1	1	1	1	1
Evaluation	arrange for a kick-off meeting for technical	1	1	1	1	1
Evaluation	prepare technical disqualification letter	1	1	1	1	1
Evaluation	drop cost estimate prior opening commercial proposal	1	1	1	1	1
Awarding	prepare business decision letter by contract signatory	1	1	1	1	1
Awarding	initiate awarding	1	1	1	1	1
Awarding	missing approval	1	1	1	1	1
Purchase Order	Initiate PO	1	1	1	1	1
Purchase Order	Sign PO Hardcopy from contactor	1	1	1	1	1



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Data Collection Plan

SN#	Measure	Definition	Who?	Where?	Frequency
17	Duration to approve technical disqualification letter	Time taken to approve disqualification letter from issuance date to return date	Alhelal, Nawaf A	SyPD - SAP System	Upon issuance.
4	Amount of Missing documents (Required services)	Measure the number of missing documents that are required to process the contract procurement(Number of document submitted/number of required document).	Garni, Abdullah G	Shared Folder	BI-Weekly
15	Duration to evaluate technical submittals	Time taken from receiving to reviewing technical submittals	Garni, Abdullah G	SyPD - SAP System	BI-Weekly
20	Duration to Open commercial submittals	Time taken from receiving to opening commercial submittals	Alhelal, Nawaf A	Shared Folder	BI-Weekly
25	Duration Sign PO Hardcopy from contract at signatory	Time taken form sending to recivigng the PO hard copy	Garni, Abdullah G	Shared Folder	BI-Weekly
28	Duration to approve PO	Time taken form proccsiing to approving the PO soft copy through system	Alhelal, Nawaf A	SAP System	BI-Weekly
22	Duration for receiving business decision letter by contract signatory	Time taken form requesting to recieving signed decision letter	Garni, Abdullah G	SAP System	BI-Weekly



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Analyze Phase

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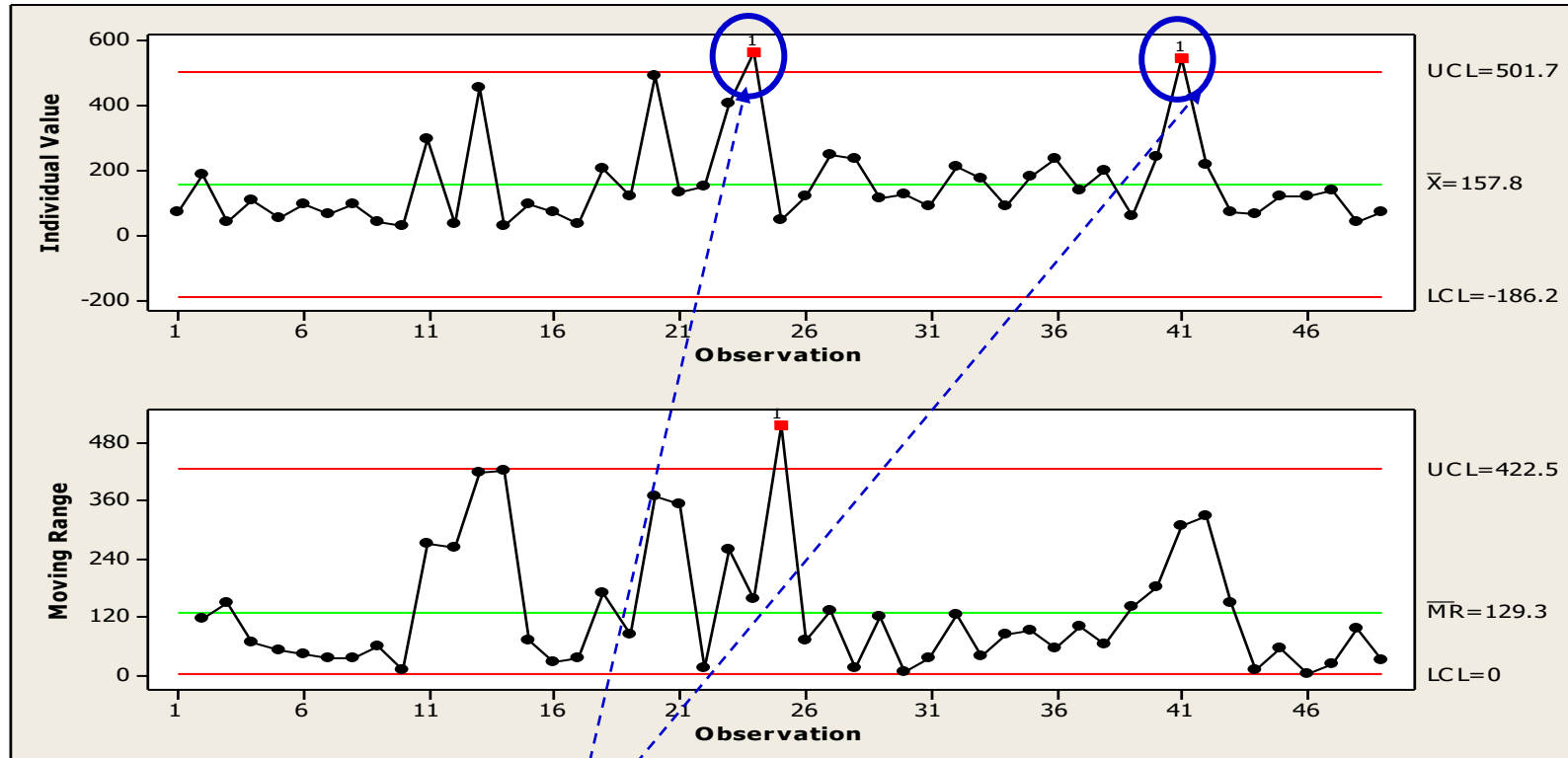


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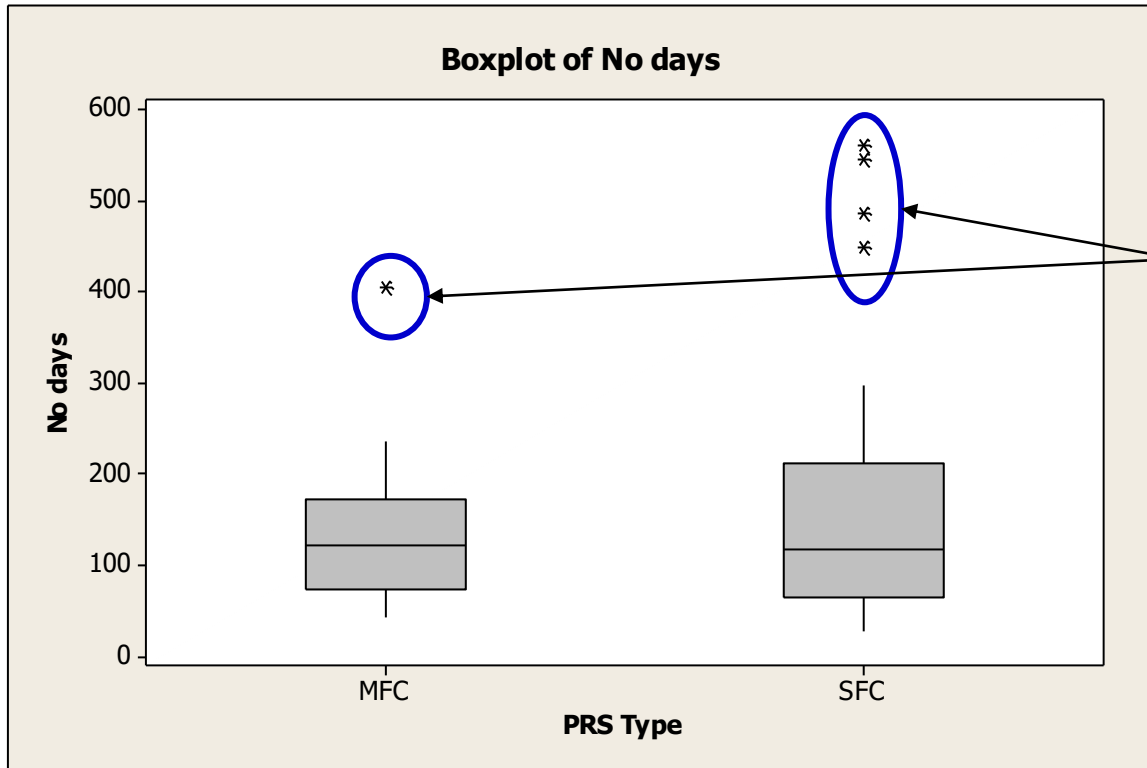
Current-state control chart

Causes for out-of-control points:

- Lack of experience
- Approval Workflow for PO
- Readiness for Scope of Work



Comparison – Procurement Type



Causes for out-of-control points:

- Lack of experience
- Approval Workflow for PO
- Readiness for Scope of Work

Two-Sample T-Test and CI: No days, PRS Type

PRS Type	N	Mean	StDev	SE Mean
MFC	11	143	102	31
SFC	38	162	141	23

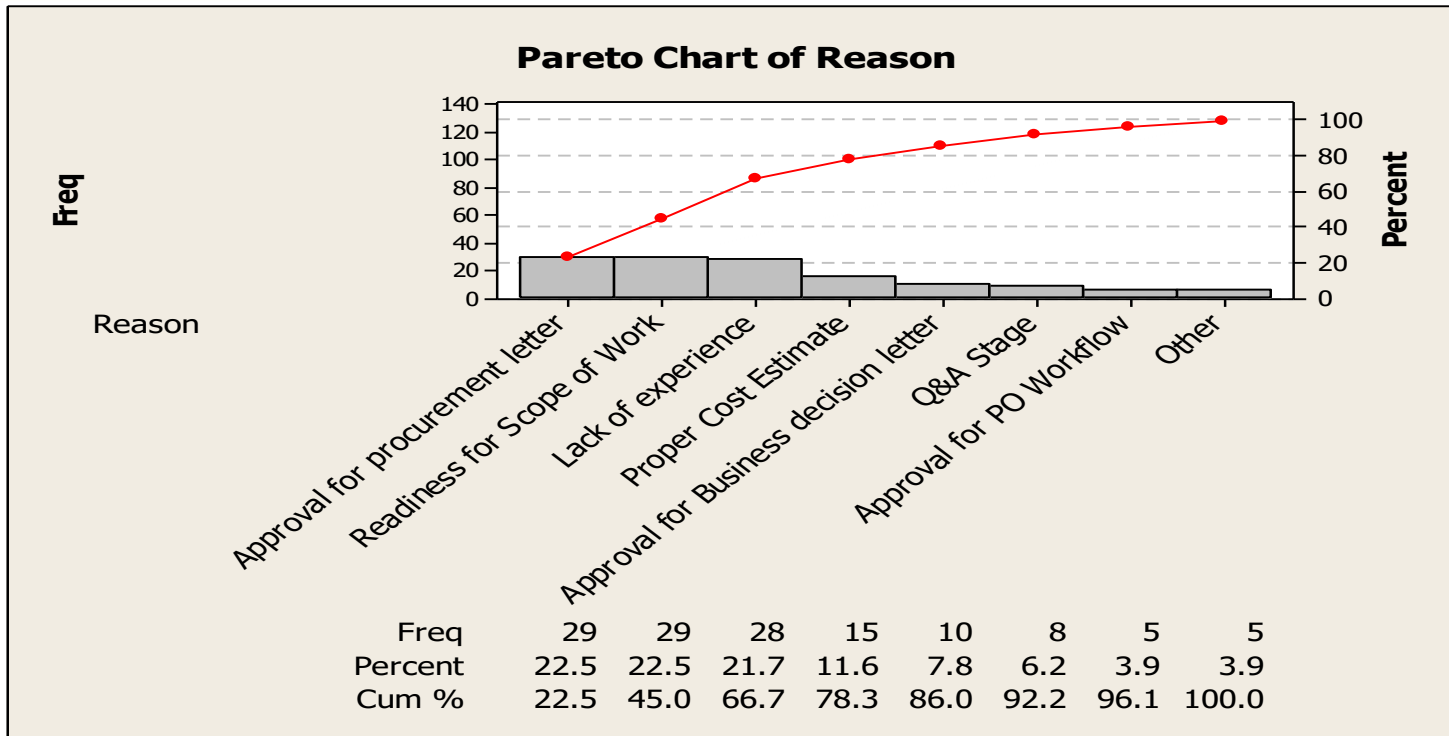
Difference = mu (MFC) - mu (SFC)
T-Test of difference = 0 (vs not =): T-Value = -0.50 P-Value = 0.625
DF = 22

H0: There is no difference in the average # no of days between MFC & SFC

Ha: There is a significant difference in the average # no of days between MFC & SFC

As the P value is > 0.05, there is no significant difference in averages # no of days between MFC & SFC

Prioritizing causes – actual data



- **29 out of 49 data points** were found exceeding the target of 90 days.
- The historical data were analyzed for these 29 data points to identify the causes for delays.
- First five (05) causes contributes to 80% of the problem.



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Root Cause Analysis (5 Whys)

#	Cause	Why 1	Why 2	Why 3	Why 4	Why 5
1	Delay for approval of procurement letter	lack of management awareness	not derived about the contract	not planned contract		
		approval higher hierarchy	lack of management awareness	not deprived about the contract	not planned contract	
2	lack of experience	no employee dedicated to handle SyPD Contracts	no group established contracts requirement			
3	lack of readiness for Scope of work	lack of knowledge	lack of training	not part of development plan		
		INCONSISTENCY AND DELAYS IN DEVELOPING SOW	no standard template of SOW			
4	improper cost estimate	lack of training	not part of development plan			
5	issuance of business decision letter	Lack OF proper cost estimate				



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Improve Phase

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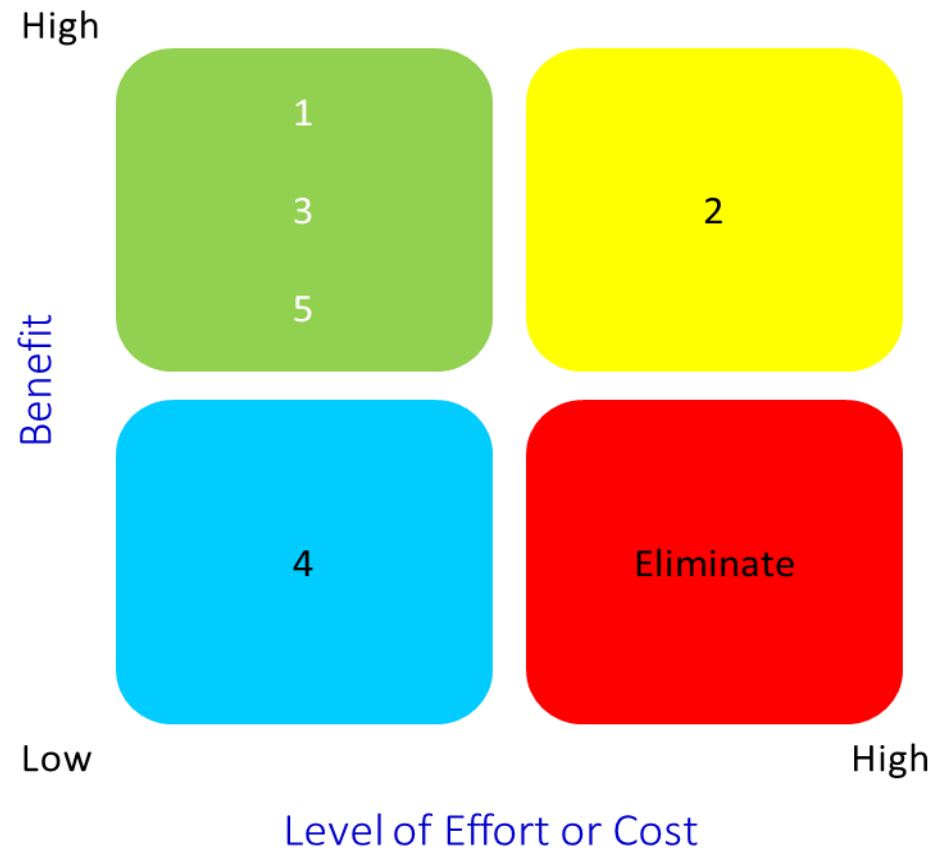
Recommendations

Causes	Root Causes	Recommendations
Delay for approval of procurement letter	not planned contract	1. To issue a form for unplanned contracts signed by contacts signatory supported by all procurement requirement
Lack of experience	no group established contracts requirement	2. To develop a unified and customized contracts guidance to ensure consistency. To develop a dedicated group to handle all Shaybah contracts
Lack of readiness for Scope of work	not part of development plan	To develop a training matrix that covers all contracts requirement. To standardize a unified template for SOW.
Improper cost estimate	not part of development plan	To develop a training matrix that covers all contracts cost estimate requirement.
Issuance of business decision letter	Lack of proper cost estimate	To develop a training matrix that covers all contracts cost estimate requirement.



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Prioritize Recommendations





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Implementation Plan

Root Causes	Recommendations	Assigned to	ETC	Status
Not planned contract	To issue a form for unplanned contracts signed by contracts signatory supported by all procurement requirement	Garni, Abdullah G	07/24/2022	COMPLETED
No group established contracts requirement	To develop a unified and customized contracts guidance to ensure consistency.	Alhelal, Nawaf A	08/24/2022	Completed
	To develop a dedicated group to handle all Shaybah contracts	Qahtani, Mohammad S	12/30/2021	COMPLETED
Not part of development plan	To develop a training matrix that covers all contracts requirement.	Alhelal, Nawaf A	08/24/2021	COMPLETED
	To standardize a unified template for SOW.	Garni, Abdullah G	12/30/2021	COMPLETED
Not part of development plan	To develop a training matrix that covers all contracts cost estimate requirement.	Alhelal, Nawaf A	08/24/2021	COMPLETED
Lack of proper cost estimate	To develop a training matrix that covers all contracts cost estimate requirement.	Alhelal, Nawaf A	08/24/2022	COMPLETED



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Implementation Plan

	Recommendation	Assigned to	ETC	Status
General Recommendations	To establish a common SLA to combine repeated activities.	Garni, Abdullah G	TBD	Completed
	To develop an internal dashboard to monitor the progress and highlighted the pitfalls	Garni, Abdullah G Alhelal, Nawaf A	01/30/2023	Completed
	To establish Long Form Contract at AA level for common required contract	Garni, Abdullah G	06/20/2022	Completed
	To automate the letters to ease the process and expedite the approval	Alhelal, Nawaf A	06/20/2022	Completed



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Control Phase

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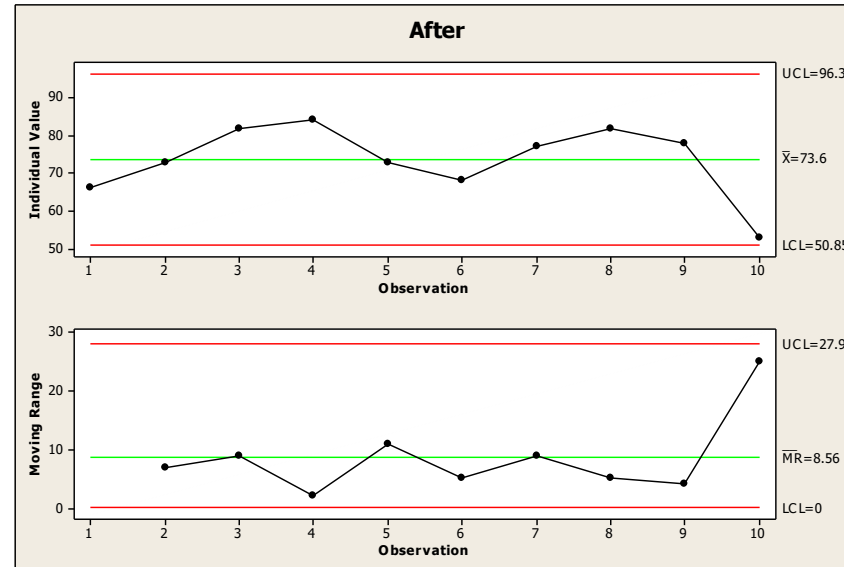
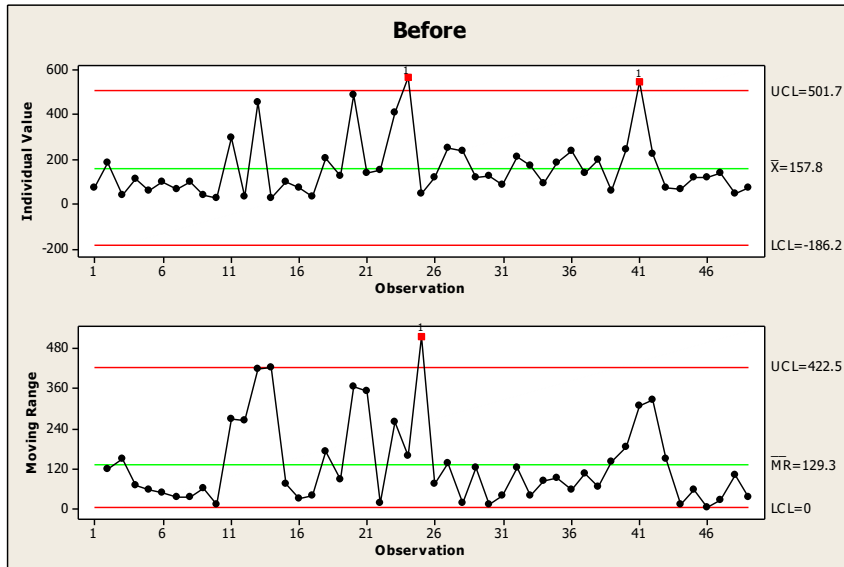


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Validate Process Improvement



- The average cycle time has been reduced from 158 days to 74 days.
- New process is within control and stable.



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Implementation Results

Baseline:

Average Cycle time is 158 Days

Goal:

Average Cycle time is 90 Days

Actual Achieved:

Average Cycle time is 74 Days



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Control Plan

Variable	Description of Measure	Frequency of Measurement	Specification Limits	Criteria to trigger Corrective action	Control Method (How)	What Corrective action to be taken	Action Owner	Comment
	%Compliance of PR Documents submittals	Monthly	100%	Incomplete PR Documents	Compliance to PR Documents checklist	Conduct 5-Why	Garni , Abdullah G	
	Duration of PR Approval to Initiate Bidding	Weekly	10 days	Exceeding 8 days from PR approval with out change in status	Dashboard	Assessment	Alhelal , Nawaf	
	Awareness Level of contractual requirement	Quarterly	95% awareness level	Below 95% of awareness level	Survey results	re-conduct the awareness session based on survey result	Garni , Abdullah G	
	Duration of technical evaluation	Monthly	5 days	More than 4 days in monthly basis	Dashboard	<ul style="list-style-type: none"> Send a reminder Conduct RCA 	Garni , Abdullah G	
	Duration for Awarding Approval workflow	Monthly	3 days	More than 2days in monthly basis	Dashboard	<ul style="list-style-type: none"> Send a reminder Conduct face-to-face meeting with approvers 	Garni , Abdullah G	



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