

Improving FPA Yield with Six Sigma

The background of the slide features a scenic landscape with snow-capped mountains and a calm lake reflecting the sky. The Accenture logo is overlaid on the left side of the image. The logo consists of a white chevron symbol (>) positioned above the word "accenture" in a lowercase, sans-serif font.

accenture

High performance. Delivered.

Sheikh Mohammed Kabir

**Accenture India
B1- Godrej Industries Complex
Off Eastern Express Highway
Vikhroli (East), Mumbai – 400079
Maharashtra , India**

Table of Content

No.	Topic	Pg #
1	Introduction	1
2	Six Sigma - Definition	2
3	Hypothetical Case & Proposition	3
4	Six Sigma Define Phase	5
5	Six Sigma Define Measure and Analyze Phase	11
6	Six Sigma Define Improve Phase	19
7	Six Sigma Define Control Phase	22
8	Conclusion	23

Introduction

This paper is targeted towards those function point programs that have been into long-term strategic service agreement with specific engagements and have been doing effort estimations for ongoing projects every now and then. In this paper I am trying to propose a theoretical framework for **improving the FPA yield** for your long term engagements which implies **reducing the variation between Function Point Estimated Effort and the Actual Project Effort** , using Six Sigma as a tool.

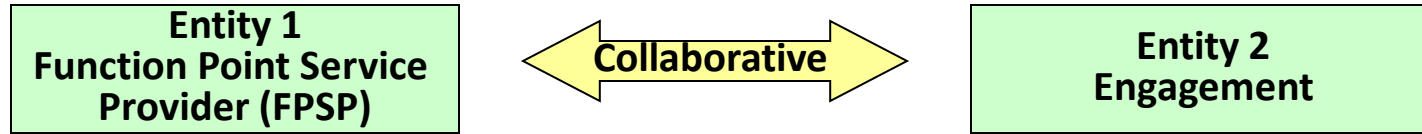
The theoretical framework is practically feasible and possible however it requires strong organizational leadership commitment, focus, effort and drive to translate it into a reality. This theoretical framework can also be made suitable for very short term engagements or those engagements giving ad-hoc/on-demand FPA estimation requests, but the only issue when applying this theoretical framework here is lack of past historical data, mutual understanding and bonding between the engagement and FPA team.

Six Sigma

Six Sigma : Why "Sigma"? The word is a statistical term that measures how far a given process deviates from perfection. The central idea behind Six Sigma is that if you can measure how many "defects" you have in a process, you can systematically figure out how to eliminate them and get as close to "zero defects" as possible. To achieve Six Sigma Quality, a process must produce no more than 3.4 defects per million opportunities. An "opportunity" is defined as a chance for nonconformance, or not meeting the required specifications. This means we need to be nearly flawless in executing our key processes.

(Reference www.ge.com/en/company/companyinfo/quality/whatis.htm)

Hypothetical Case



In this hypothetical case FPSP and Engagement have a long-term strategic partnership over a couple of years.

FPSP has been delivering FP sized numbers and FP estimated efforts to the Engagement. Here the effort estimation was being done simply assuming that project effort is directly proportional to Adjusted Function Point Count. There is also an internal SLA set which says that effort variation should not vary beyond +/- 10%

Major concern area today for both FPSP & Engagement is there is lot of variation in the FP estimated Effort and Actual Project Effort which has lead to a situation where the organizational leadership has committed to drive a Six Sigma based Effort Variation improvement program. Both FPSP and Engagement will have to collaboratively drive this Six Sigma program.

As a part of continuous improvement program for organizational excellence and providing innovative customer delight both the parties have mutually agreed upon to work together to improve the FPA yield by reducing the variations between FP estimated effort and actual project effort in order to have high degree of accuracy

Proposition

Objective

To propose a theoretical framework for improving the FPA yield by reducing variation between FP estimated effort and actual project effort using Six Sigma.

Problem Statement

FPSP has a long-term strategic relationship with Engagement. FPSP has been delivering FPA sizing and FP estimated effort to the Engagement for development , enhancements and maintenance projects. This FP estimated effort is used to derive project costs, resource planning, capacity planning, budgeting, scheduling. It is observed that FP estimated effort is different from the actual project effort which results in huge variation in the cost, budget, schedule, capacity plan and resource plan. There is room for lot of uncertainty due to this.

Need of this Framework

As the FPSP and Engagement share a long-term strategic partnership, as a part of continuous improvement program for organizational excellence and providing innovative customer delight both the parties have mutually agreed upon to work together to improve the FPA yield by reducing the variations between FP estimated effort and actual project effort in order to estimate/forecast/plan the cost, budget, schedule, resource, capacity etc with high degree of accuracy.

Six Sigma – Define Phase

IDENTIFYING CUSTOMER WORKSHEET		
(Step 1) Listing Of Customers		
No	Customers	Internal/External
1	Mr. A	Internal
2	Mr. B	External

IDENTIFYING CUSTOMER WORKSHEET	
(Step 2) Defining Customer Segment	
Customer Segment	Description
Internal	Closely involved with FPSP
External	Closely involved with Engagement

IDENTIFYING CUSTOMER WORKSHEET	
(Step 3) Listing Of Customer Segments That Are The Focus Of The Project	
Customer Segment	Rationale
Internal	Responsible member of the FPSP Team, well versed with FPA sizing and estimation. Have excellent ideas to improve our objective.
External	Responsible member of the Engagement Team, well versed with Project dynamics. Have excellent ideas to improve our objective.

Voice Of Customer

VOICE OF CUSTOMER "A"	
Customer Name : Mr. A	From : mm/dd/yy
Designation : FP Specialist	To : mm/dd/yy
Information Collector : Mr. S	Department : FPSP
Designation : Green Belt	
Problem Area	
1. Lack of adequate documentation from Engagement to enable sizing.	
2. Lack of adequate POC support to understand domain/functionality	
3. Data shared by engagement is only project effort data	
4. No access to system/application	
5. Lack of adequate support for domain/application/architecture knowledge	
6. Lack of support in determining GSC, Application Boundary, Scope	

VOICE OF CUSTOMER "B"	
Customer Name : Mr. B	From : mm/dd/yy
Designation : Engagement POC	To : mm/dd/yy
Information Collector : Mr. S	Department : Engagement
Designation : Green Belt	
Problem Area	
1. Inaccurate effort estimations	
2. Lack of time, documentation and resources	
3. On schedule delivery within budgeted efforts	

Affinity Diagram

Estimation

Higher accuracy of FP Estimated Effort

More factors to be considered for accurate estimation

Data for factors other than Project Effort needs to be captured

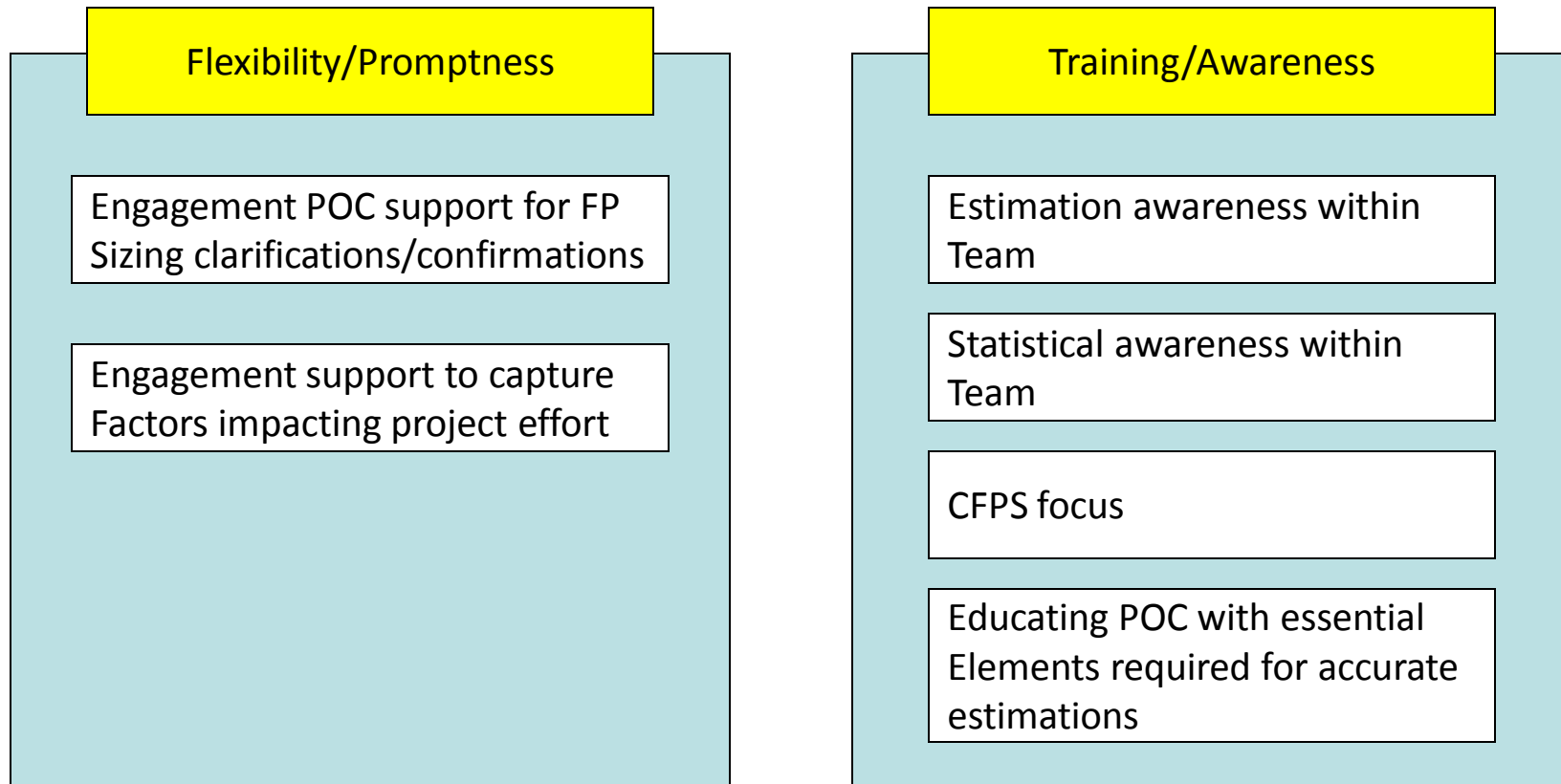
Documentation

Adequate and detailed documents to be provided for FP sizing

Assumptions/Justifications to be documented for each identified functions during sizing

Confirmation/Clarifications to be supported by Engagement POC

Affinity Diagram



Project Charter

Project Charter		Project Type		Green Belt		DMAIC					
Business Case / Metrics	Understanding the DMAIC model to move from the existing process to the revised process	Division	Resources	Project #	Sample	Project Objective	Reducing variation between FP estimated				
Problem Statement: Out of 62 assignments estimated FPSP was not able to meet the internal SLAs for effort variation of less than 10% for 3 projects. The mandate is to reduce variation in the FP estimated effort and actual project effort to less than 10% in the next one year for all projects.		Location	Mumbai								
Scope: (In Scope/ Out-of-Scope) In Scope: The project would cover analysing and minimising the variation in FP estimated effort and actual project effort. Out of Scope: NA		R e s o u r c e s	Name	Role	% Time	Sign-off					
			Mr. A	Project Sponsor	5-7%						
			Mr. S	Green Belt Lead	9.0%						
			Mr. B	Project Champion	1.0%						
			Mr. PQR	Black Belt / Mentor	2-3%						
			Mr. EFG	Team Member	2-3%						
Measurable Goal: The goal will be to meet the internal SLA for reducing the variation between FP estimated effort and actual project effort to less than or		Project Start Date		18-Feb-11	Project End Date		30-Jun-12				
Primary Metrics: Effort variation for each estimated project		Completion Date DMAIC Process		Feb 28th	Mar 15th	31st	Apr 15th	30th	May 15th	31st	June 30th
Consequential Metrics : NA		Define		[Yellow Bar]		Measure		[Yellow Bar]		Analyze	
Data Source: Engagement Project Factors data Project Documentation		Improve		[Yellow Bar]		Control		[Yellow Bar]		[Yellow Bar]	
Defects		Details		2011			2012				
Opportunity		Benefits		<u>USD</u>	<u>Man Hours</u>		<u>USD</u>	<u>Man Hours</u>			
Sigma		Investments									
		Net									
		Financial Impact									
No. of projects with variation : 3											
Total No. of projects : 62											
3.161											



Business Case

What are the Tangible benefits of this Project ?

The deliverable of this project will lead to :

- ⇒ Increased cost savings as estimated effort will become more accurate
- ⇒ Increased cost savings from resource planning perspective
- ⇒ Increased cost savings from capacity planning perspective
- ⇒ Increased cost savings from budgeting perspective
- ⇒ Enabling on-scheduled deliveries as more accurate estimates are available
- ⇒ Enabling project to focus on weak-factors having negative impacts on effort estimates
- ⇒ Enabling projects to focus on imparting training and awareness on key challenging areas
- ⇒ Save cost by mitigating risks identified through this project

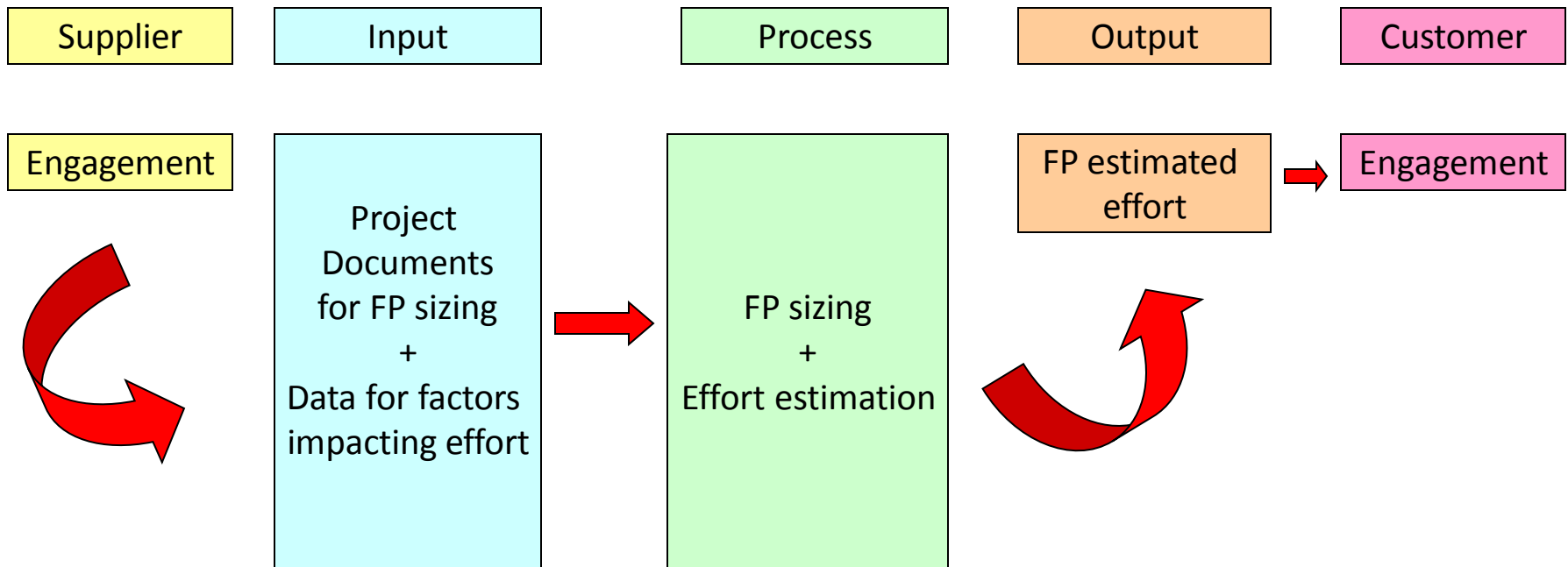
What are the Intangible benefits of this Project ?

The deliverable of this project will lead to :

- ⇒ Increased productivity of the FPSP and engagement team
- ⇒ Increased accuracy in FP sizing
- ⇒ Increased accuracy in FP estimated effort
- ⇒ Enable project focus on every factor impacting effort which may have been hidden so far
- ⇒ Enable projects have a holistic view of their project deliverables and documentation from the perspective of meeting client satisfaction and organizational CMMI 5 requirements/ eligibility.
- ⇒ Increasing Customer Satisfaction and delight
- ⇒ Reduced Risk
- ⇒ Better visibility

SIPOC

High Level AS-IS Process Map (SIPOC)

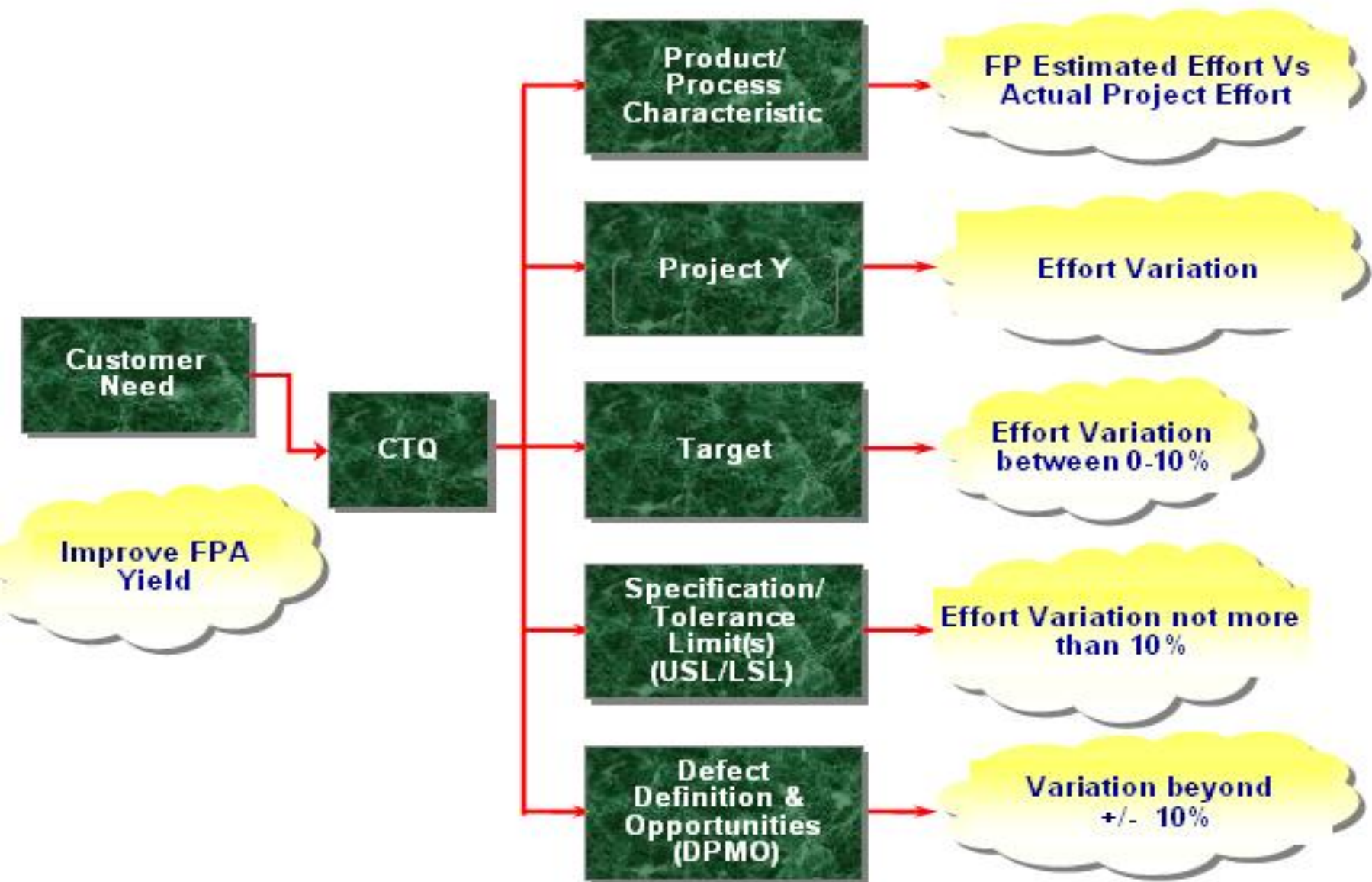


Measure Current Process Capability

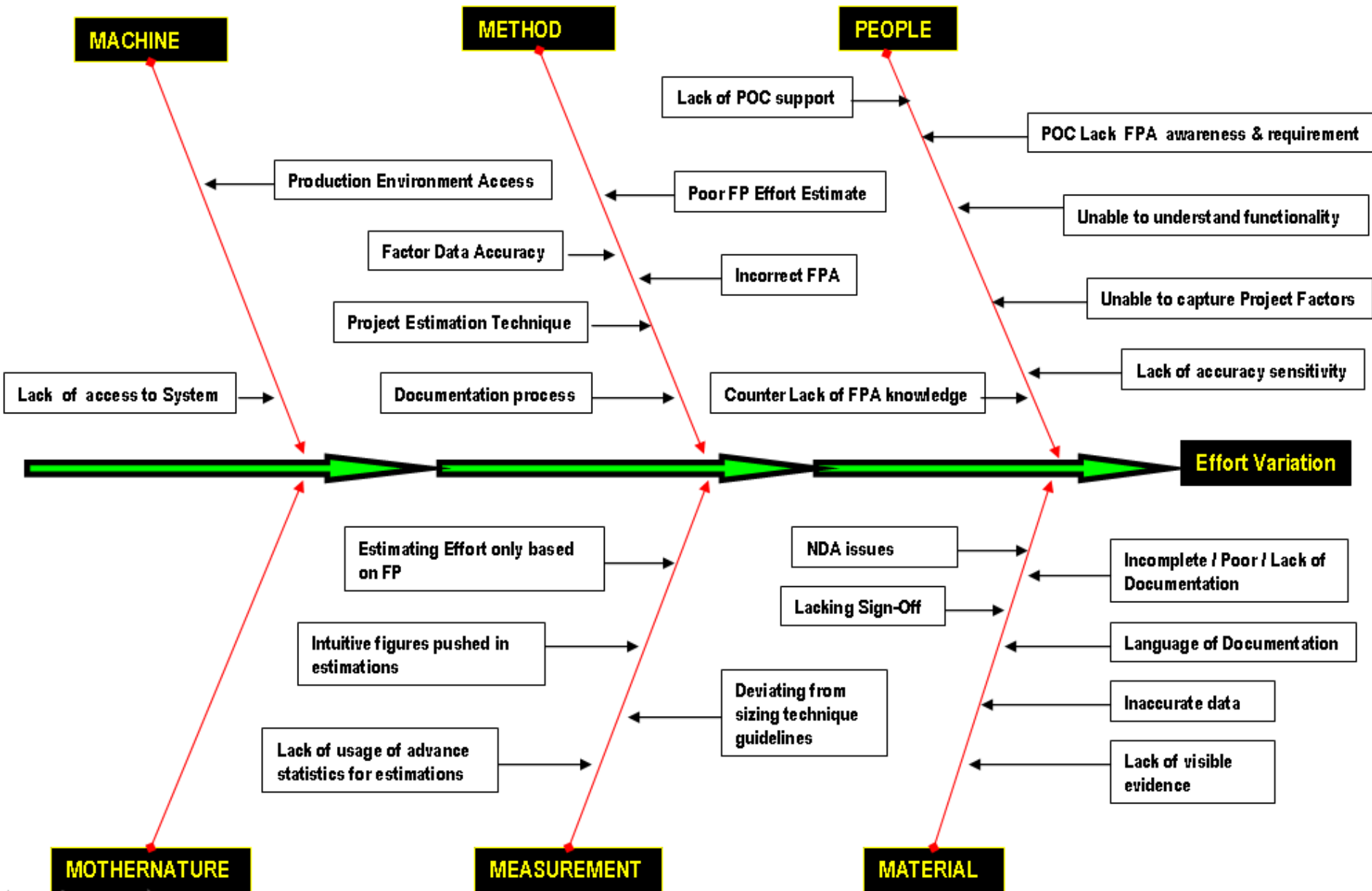
Measurement of Effort Deviation data	
Source of data	Engagement Effort Reports & FPSP Estimation Reports
Duration of the measurement	Last 3 years data
Sample size	62 projects

Z calculation for discrete data	
Enter total number of defects	3
Enter total defect opportunities	62
Defect %	4.84%
Yield %	95.16%
DPMO	48387
Sigma Value (Assuming 1.5 shift)	3.161

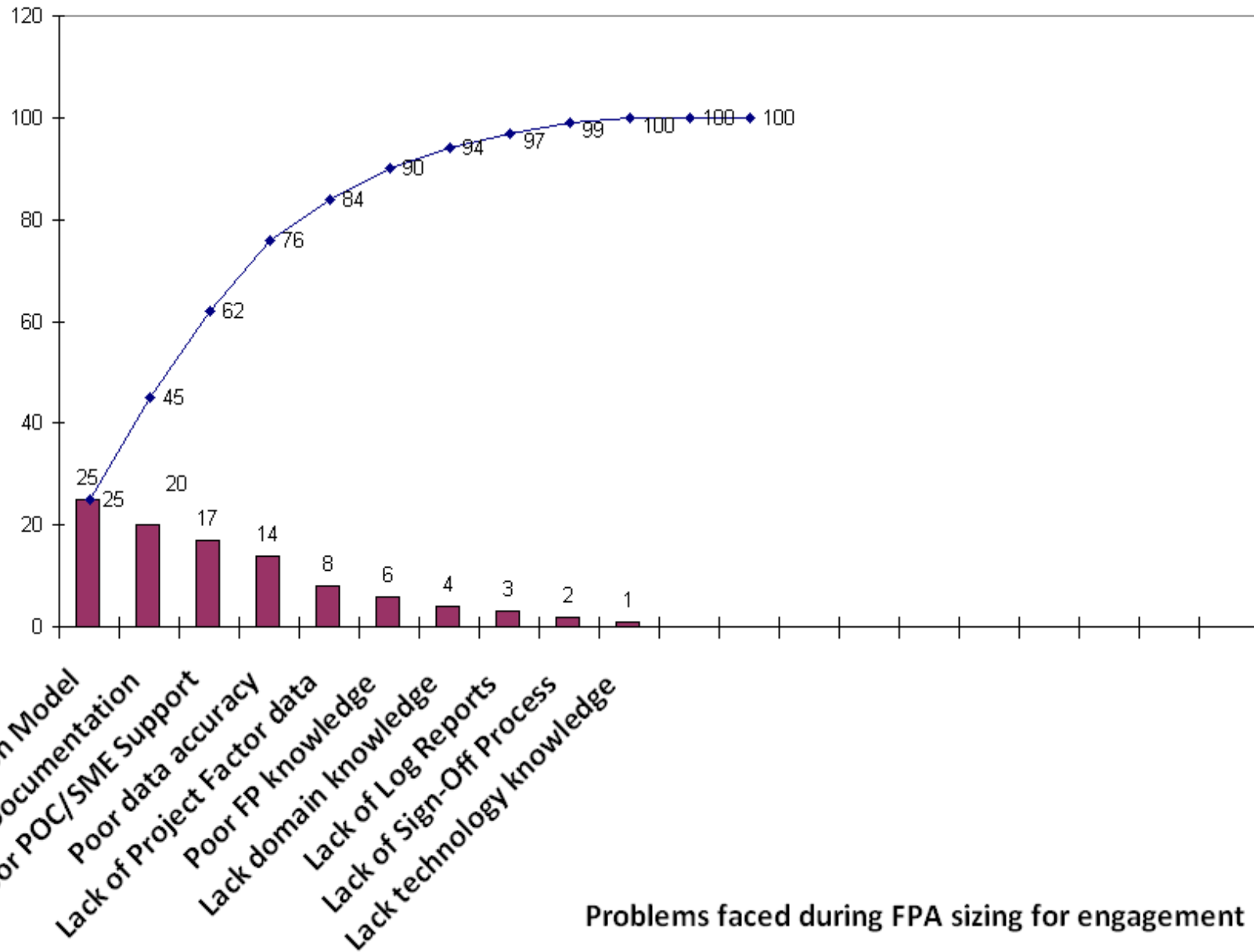
Defining Performance Standard (Alternate Visualization)



Causal Analysis

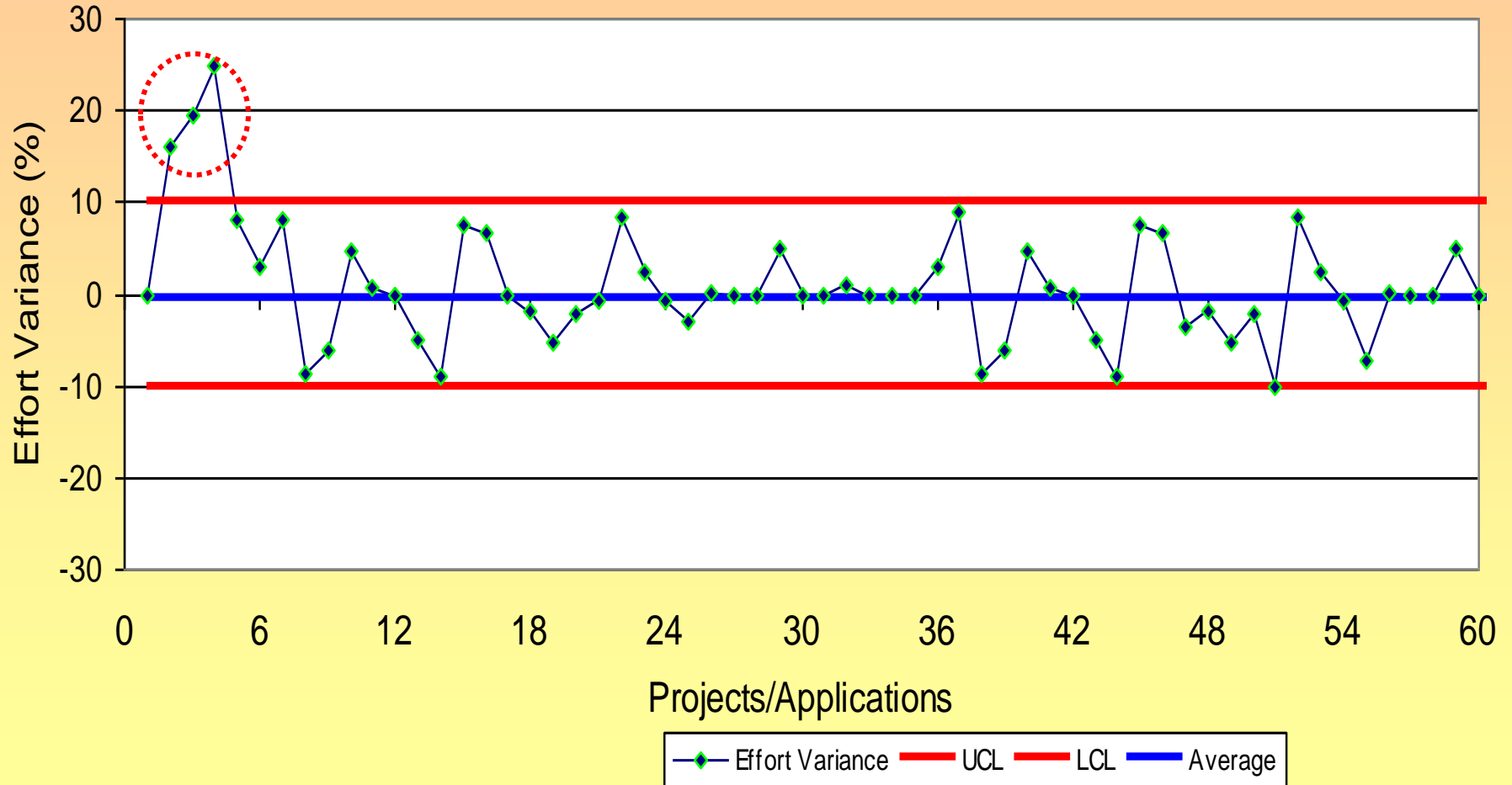


Pareto Analysis of Issues/Problems



Effort Variance Analysis using SPC

Effort Variance



Analysis & Recommendations

Area of Improvement	Documentation
	Adequate and detailed documents to be provided for FP sizing by Engagement
	Documents must completely explain the functionality delivered to end user
	Confirmation/Clarifications to be supported by Engagement POC
	FP Analyst to document every justification/assumption
	Maintain a detailed Log report to capture POC confirmation/clarification with visible evidence

Area of Improvement	Estimation using FP
	Engagement need to record accurate and authentic data
	FPSP should have considerable number of historical datapoints for sampling
	Engagement to capture more Project Management Factors apart from Effort data
	All factors that impact a project execution needs to be captured to get accurate estimation
	Usage of advance statsitcal techniques to perform customized estimation
	Create customized estimation model driven by FP
	Reduce dependency on 3rd party Tools which do not reflect intrinsic project parameters & environment factors

Area of Improvement	POC Support
	Making POC aware about FPA and its requirements
	Engagement Manager support required to direct POC's to support counters with resolutions
	Reducing Delays in communication / response
	Providing accurate data as requested by counter
	POC to capture accurate project factor data

Analysis & Recommendations

Area of Improvement	FP Counter Effort Estimate
FPSP needs to accurately track each counters sizing effort and its productivity	
Factors such as project complexity, POC support, Document adequacy needs to be considered when ascertaining Counter productivity	

Area of Improvement	FP Knowledge Management
Focussing on building FP competency of resources	
Encouraging Certifications in FP	
FP awareness training to be conducted for Engagements	

Area of Improvement	System Issues
Engagement can best support by providing direct system (application) access	
SME support required to walkthrough application	
Overcoming NDA issues	

Improvement Solutions

1	Engagement requires to maintain complete and meaningful set of documentation essential for understanding the functionality of the project
2	POC/SME need to support with complete clarification of the functional/process understanding. This will reduce any inconsistencies or misunderstanding from understanding correct functionality.
3	FP Analysts must document every justification/assumption based on their understanding of the application and POC clarification to reduce chances of incorrect sizing.
4	Getting sign-off on each and every FPA step from engagement.
5	Best Practices followed suggests maintaining Log Report to capture the detailed explanations, confirmation, clarifications about functionality, scope or application boundary.
6	Most often Engagements fail to capture the effort data and other project management factors with higher degree of accuracy. Engagements need to streamline their internal data capturing processes in order to have data with high degree of accuracy.
7	Engagements as part of Best Practices must maintain the effort and project management factor data for every datapoint/project/application as only projects with these data can be used for accurate estimations or baselining
8	Suggesting usage of either a market tool for estimation based on Function Points or building in-house estimation model having intrinsic and extrinsic factors. Having an in-house estimation model suiting organizational environment helps maintain diversified project repository
9	Collaborative training for POC/SME on FPA will help bridge the knowledge gap in terms of communicating the requirements to the engagements.
10	Generally it is observed that there are delays in communications from both POC and FPA end which often acts as bottleneck in smooth execution of a given sizing activity. It is advisable that we focus on reducing operational delays in communications. Have dedicated time
11	To develop a method to evaluate the productivity of their counters in order to estimate future FPA assignments accurately. Often the sizing efforts quoted by counters are inaccurate which leads to either tight schedule sizing plan leading to a hasty incorrect sizing.
12	Building competency of counters by encouraging certifications and knowledge sharing demonstrating it.

Improvement Implementations

(A) Proposed Effort Estimation Advance Model

$$\text{Effort} = A^*(\text{AFP}) + B^*(\text{Requirement Volatility Index}) + C^*(\text{Overall Team Competency}) + D^*(\text{Project Architecture Complexity}) + E$$

AFP alone is not the predictor for Project Effort. In order to arrive at Estimated Effort with higher accuracy it is essential to consider as many factors possible on which the Project Actual Effort depends.

For **Proposed Effort Estimation Advance Model** we have considered the above factors as critical for accurately estimating the Effort for future projects. **This model can also be enhanced by inclusion or exclusion of predictor factors by mutual discussion with Project team.**

(B) Setting SLA for POC response

POC Response Time Level 1 = 24 hours

POC Response Time Level 2 = 36 hours

POC Response Time Level 3 = 48 hours

(C) Improving Documentation for FPA

Engagements to work towards capturing the mandatory information required for FPA such as :

= > Functional Requirements

=> Technical Details

=> Database Schema

=> Screenshots / System Access

=> Business Domain and Scope details

Improvement Implementations

(D) Recording & Capturing Data accurately

Most engagements fail to capture Project Management Factors apart from Effort. These project management factors play a very crucial role in determining the actual estimates as they do have considerable impact on project efforts. Typical factors such as Project Architecture Complexity, Requirement Volatility Index, Resource Competency, Environment Factors etc.

Leadership needs to set-up a mechanism in place by which they can monitor/recognize capturing project factors and validating the accuracy of the same. Statistical Analysis of data can help figure out the normality, variation causes and accuracy of data.

(E) Improve FP Knowledge

FPSP must focus on building technical competency of its resources in FPA. Encouraging Certifications and Knowledge Sharing will help build competency. Moreover acquire knowledge in the area of Client domain will help additionally to understand the functionality accurately and completely.

(F) Sign-off and justification recording

FPSP must put in place a sign-off process at each step of FPA. Sign-off from Client will reduce tendency of error/inaccuracy. Further FP counters must inculcate habit of recording justification and clarification for identifying each and every functions (data/transactions).

Project Transition Plan

Project Title	Sample	Project Champion	Mr. B
Project Leader	Mr. S	Sponsor	Mr. A
Finance Approver	FS	Black Belt Mentor	Mr. PQR
Start Date	May 15th 2011	End Date	June 30th 2011
Problem Statement		Measurable Goal	Achievement
Out of 62 assignments estimated FPSP was not able to meet the internal SLAs for effort variation of less than 10% for 3 projects. The mandate is to reduce variation in the FP estimated effort and actual project effort to less than 10% in the next one year for all projects.		The goal will be to meet the internal SLA for reducing the variation between FP estimated effort and actual project effort to less than or equal to 10%.	Effort Variation between 0-10% for all sized projects
Control Metric	Before	After	Owner
Effort variation for each estimated			
Change Implemented			Key Checkpoint
Future Plan			

Conclusion

In this white paper I have tried experimenting a very new area of improving Function Point programs using widely well-known Six Sigma methodology. This theoretical framework is indeed practical however only requires strong drive and leadership support from both the engagement and FPSP. There is lot of scope of different ways of applying Six Sigma methodology for improving Function Point programs. I have tried to touch upon one such way. In future papers I shall try to showcase and experiment with new ways of doing so.

Declaration

“I confirm that I have not used any copyrighted material without permission or referencing the appropriate website. I also confirm I have not published Accenture data or Accenture proprietary techniques in this paper. “

About Author

Kabir is MBA in Operations with Marketing Management and Bachelor in Computer Engineering from India. He has 5+ years of IT experience across diverse projects from various industries. He was with Infosys Technologies for 3years as SAP Techno-Functional Consultant and has been System Analyst with Accenture for 2+years. In Accenture he has worked in Business Operations, Supply Chain Management, Six Sigma and Productivity Measurement areas. Prior to this he also has exposure in other areas such as Operations Management, Marketing & Branding, Quality & Continuous Improvement, Strategic Planning & Management. Kabir is Certified Function Point Specialist (CFPS), Certified Supply Chain Mgmt (APICS), Green Belt Six Sigma (KPMG), International Logistics(CII) and CSQA. Currently working with Delivery Performance Group in Productivity Measurement Center of Excellence as Function Point Specialist.

Email : Mohammedkabir.sheikh@accenture.com

Mobile : +91 – 99201 95369