



What Business Demands.

# Experiential Learning: Establishing Successful Metrics Program

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# Agenda

- Overview
- Approach
  - Metrics Selection
    - Balanced Scorecard & Goal Question Metrics (GQM)
  - Metrics Design
  - Metrics Implementation
    - Metric Dash Board & Quality Radar
- Conclusion

**“Measurements are important, but what is  
measured is more important”  
-Francis S. Patrick**

# Overview

**Balanced Scorecard  
&  
GQM**

**Applied  
To**

**Software  
Processes,  
Product &  
Services**

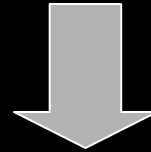
**To  
Supply**

**To  
Improve**

**Management  
Information**

# Approach

**1. Metrics Selection**



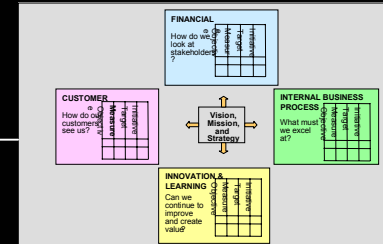
**2. Metrics Design**



**3. Metrics  
Implementation**

# 1- Metrics Selection

Vision  
Mission



**1.1 Organization Vision through Balanced Score Card**



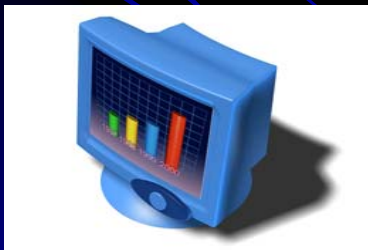
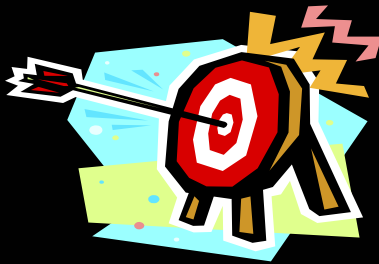
**1.2 Goal Setting**



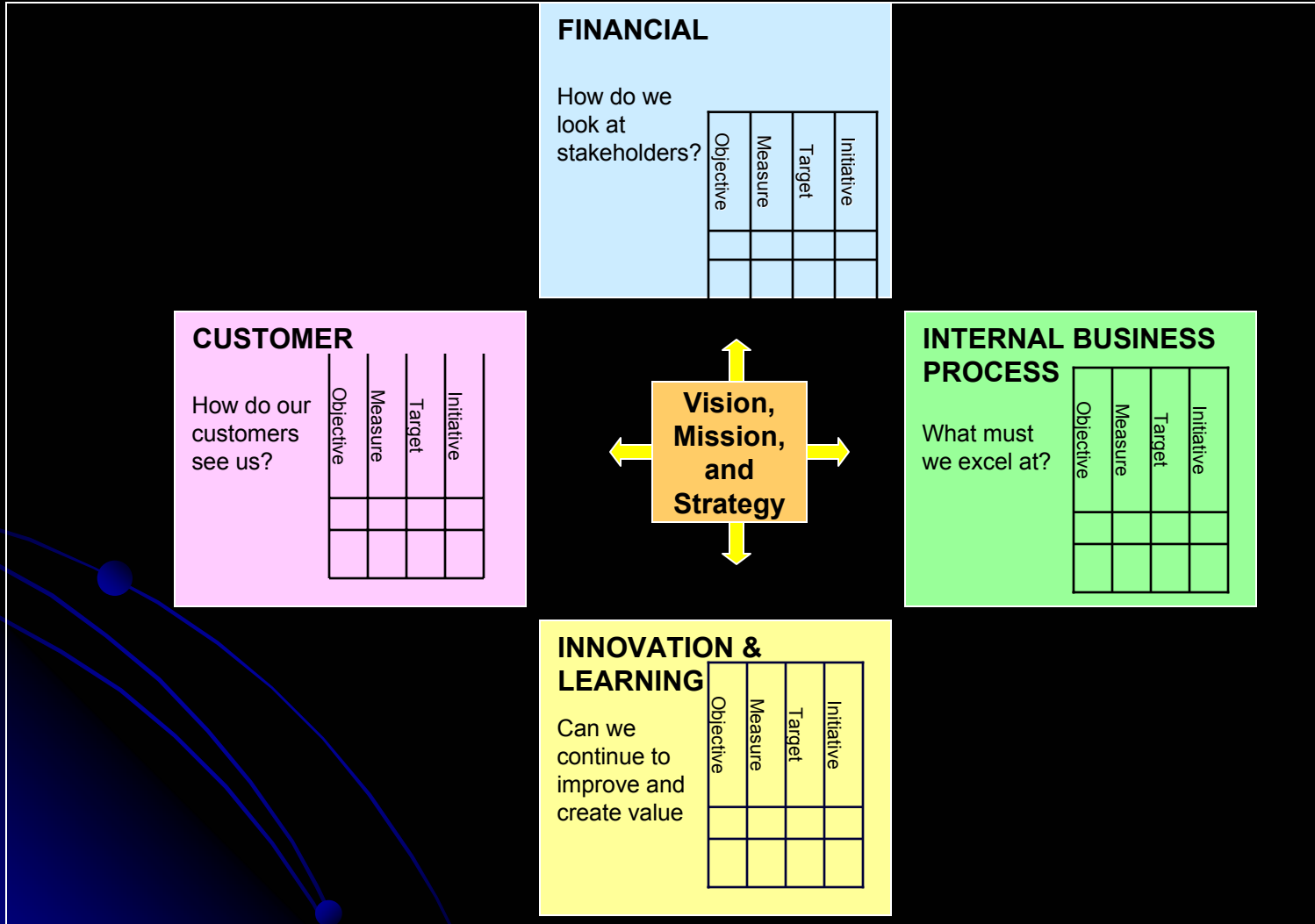
**1.3 Ask Questions**



**1.4 Defining Metrics Mapping to Goal**

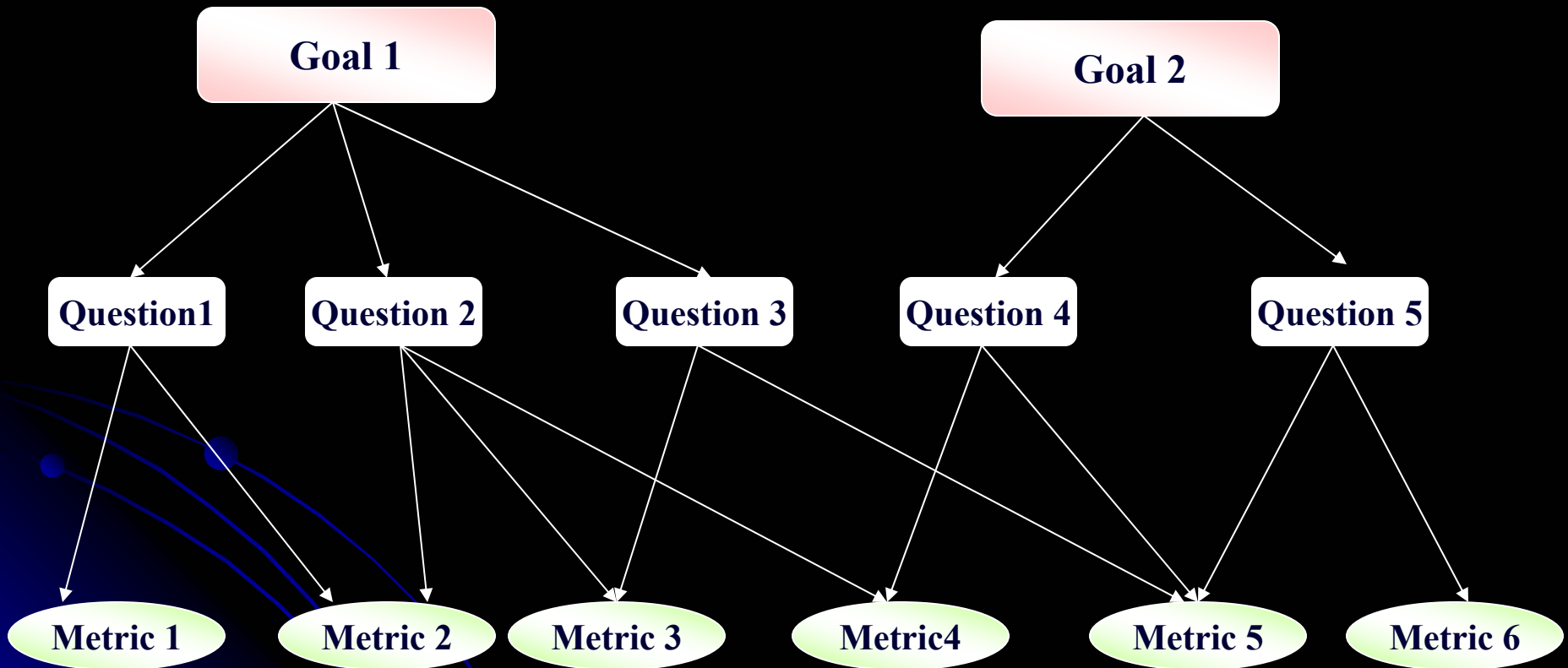


# Balanced Scorecard



Ref : "A Management Guide for the Deployment of Strategic Metrics" developed at Raytheon Corporation

# Goal Question Metrics (GQM)





A guiding principle for of what people want  
Metrics to show:  
“ Better, Faster, Cheaper”

## Organization Vision through Balanced Score Card & Goal Setting

- In this step, strategic goals and sub goals are mapped to the Balanced Scorecard

Balanced Scorecard	Organization Goal
Internal Business Process	<ul style="list-style-type: none"> <li>▪ Optimize defect detection and removal</li> <li>▪ Improve Review/Inspection process</li> </ul>

### 1. Metrics Selection

#### 1.1 Organization Vision through Balanced Score Card

#### 1.2 Goal Setting

#### 1.3 Ask Questions

#### 1.4 Defining Metrics mapping to Goal

## Ask Questions

Goal	Questions asked about the goal
Optimize defect detection and removal	<ul style="list-style-type: none"> <li>▪How much effort is spent in testing versus reviews?</li> <li>▪How many defects are discovered in testing versus reviews?</li> <li>▪How much effort is spent repairing defects discovered in reviews and Testing?</li> <li>▪How efficient is testing in removing defects?</li> <li>▪What is the optimal defect detection efficiency to achieve in reviews prior to testing?</li> </ul>

## 1. Metrics Selection

1.1 Organization Vision through Balanced Score Card

1.2 Goal Setting

**1.3 Ask Questions**

1.4 Defining Metrics mapping to Goal

## Defining Metrics mapping to Goal

Organization Goal	Questions asked about the goal	Metrics
Optimize defect detection and removal	How efficient are reviews in removing defects?	Defect Removal Efficiency (Reviews)
	How efficient is testing in removing defects?	Defect Removal Efficiency (Testing)

### 1. Metrics Selection

1.1 Organization Vision through Balanced Score Card

1.2 Goal Setting

1.3 Ask Questions

1.4 Defining Metrics mapping to Goal

# 2 Metrics Design



2.1 Identify Data and Data Collection method



2.2 Define Metrics



2.3 Establish Metrics Database



2.4 Establish Metrics Reporting System



## Identify Data and Data Collection method

Metrics	Data to Collect	When to Collect
<b>Defect removal efficiency (Review)</b>	<ul style="list-style-type: none"> <li>▪ <b>Number of defects discovered in review</b></li> <li>▪ <b>Total number of defects found in Software</b></li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>End of each Review</b></li> <li>▪ <b>End of software life cycle</b></li> </ul>

## 2. Metrics Design

2.1 Identify Data and Data Collection method

2.2 Define Metrics

2.3 Establish Metrics Database

2.4 Establish Metrics Reporting System

# What & What not to Measure

## What to

- Schedule
- Process
- Quality
- Defects
- Cost
- Performance
- Size
- Effort
- Requirements
- Design
- Code
- Test

## What Not

- Programmers by LOC
- Testers by defects found
- Coders by output volume

## Define Metrics

- Important to standardize definition
- The terms are interpreted by different people in their own context, with meanings that may differ definition

Attribute	Definition
Defect	<ul style="list-style-type: none"> <li>▪ A software fault that requires a correction</li> </ul>
Open	<ul style="list-style-type: none"> <li>▪ Status of the defect when a correction has not been completed by the Analyst</li> </ul>

## 2. Metrics Design

2.1 Identify Data and Data Collection method

2.2 Define Metrics

2.3 Establish Metrics Database

2.4 Establish Metrics Reporting System



## Establish Metrics Database

- Organizational Collection Vs Project Collection
  - Some to be reported centrally for organizational aggregation and analysis
  - Some to be retained at project level and do not need to be aggregated
- Need to aggregate drives the need for tool
- Metrics not collected at integral part of work will not be consistent

### 2. Metrics Design

2.1 Identify Data and Data Collection method

2.2 Define Metrics

2.3 Establish Metrics Database

2.4 Establish Metrics Reporting System

## Establish Metrics Reporting System

- **Report Format**
  - Bar, line, area graph, pie charts etc
  - Tables and graphs stand alone
- **Timing**
  - Reporting cycles for metrics may be different,
  - Example defect arrival rate may be extracted daily during system testing phase and extracted monthly and reported quarterly when software is implemented.
- **Reports Delivery –**
  - Hard copy or electronically or e-mail are made.

### 2. Metrics Design

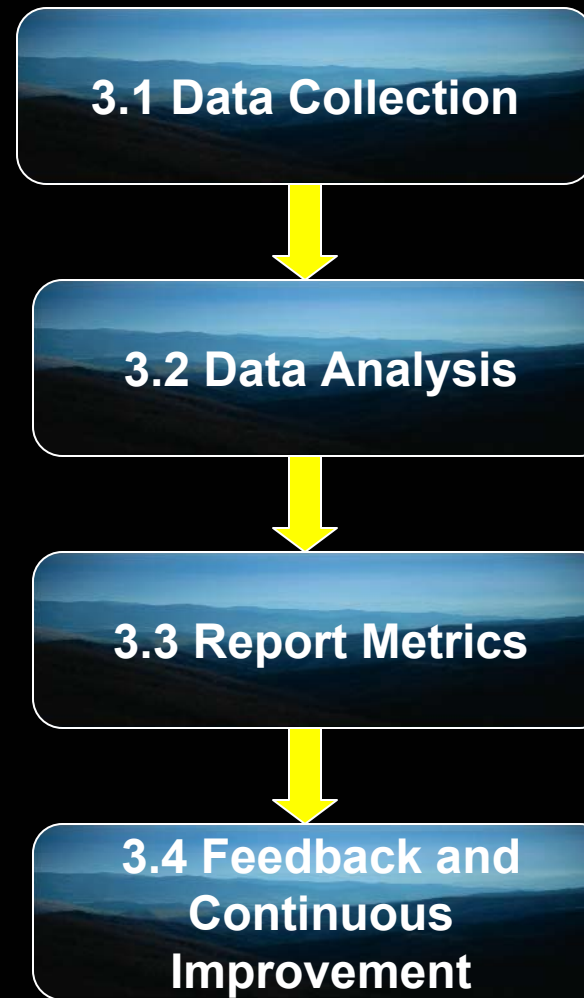
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# 3 - Metrics Implementation



## Data Collection

- Start Small and Some non-perfect data is more useful than no data
- To Learn to measure you have to measure
- Data Collection needs to happen at a point that cannot be avoided through process tailoring or selection
- Make data collection unavoidable and verifiable
- Determining these locations is important
- Quality Assurance (QA) must be involved in monitoring of metrics collection to be successful
- To be part of QA compliance check

### 3. Metrics Implementation

#### 3.1 Data Collection

#### 3.2 Data Analysis

#### 3.3 Report Metrics – Metrics Dashboard

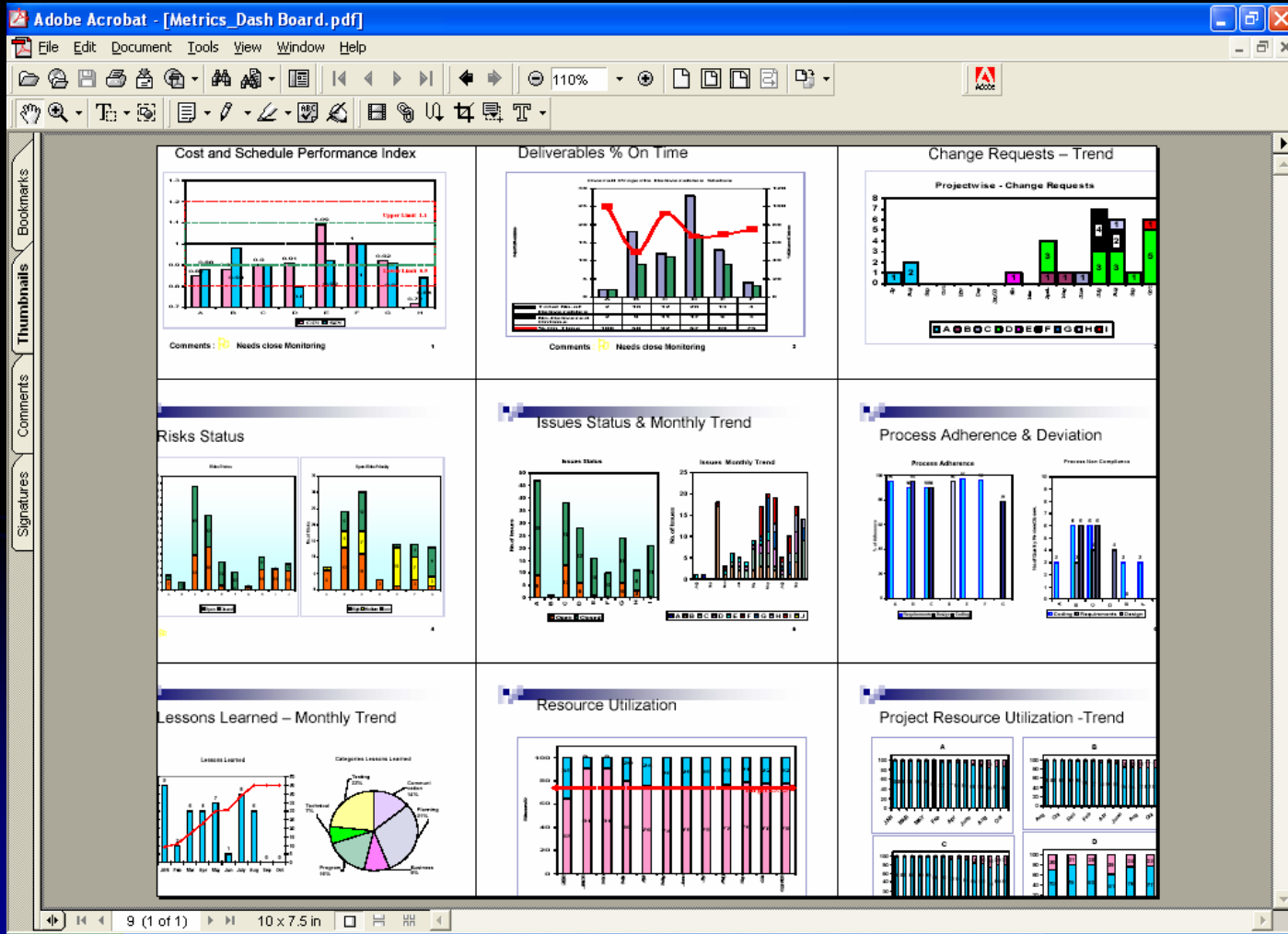
##### 3.3.1 Quality Radar

#### 3.4 Feedback and Continuous Improvement

# Measurement Infrastructure

- Systems
- People
- Process / Procedures
  - Selection of measurement ( Goal Driven)
  - Collection
  - Analysis and interpretation
  - Measurement Specs

## Data Analysis & Report Metrics – Metrics Dashboard



### 3. Metrics Implementation

3.1 Data Collection

3.2 Data Analysis

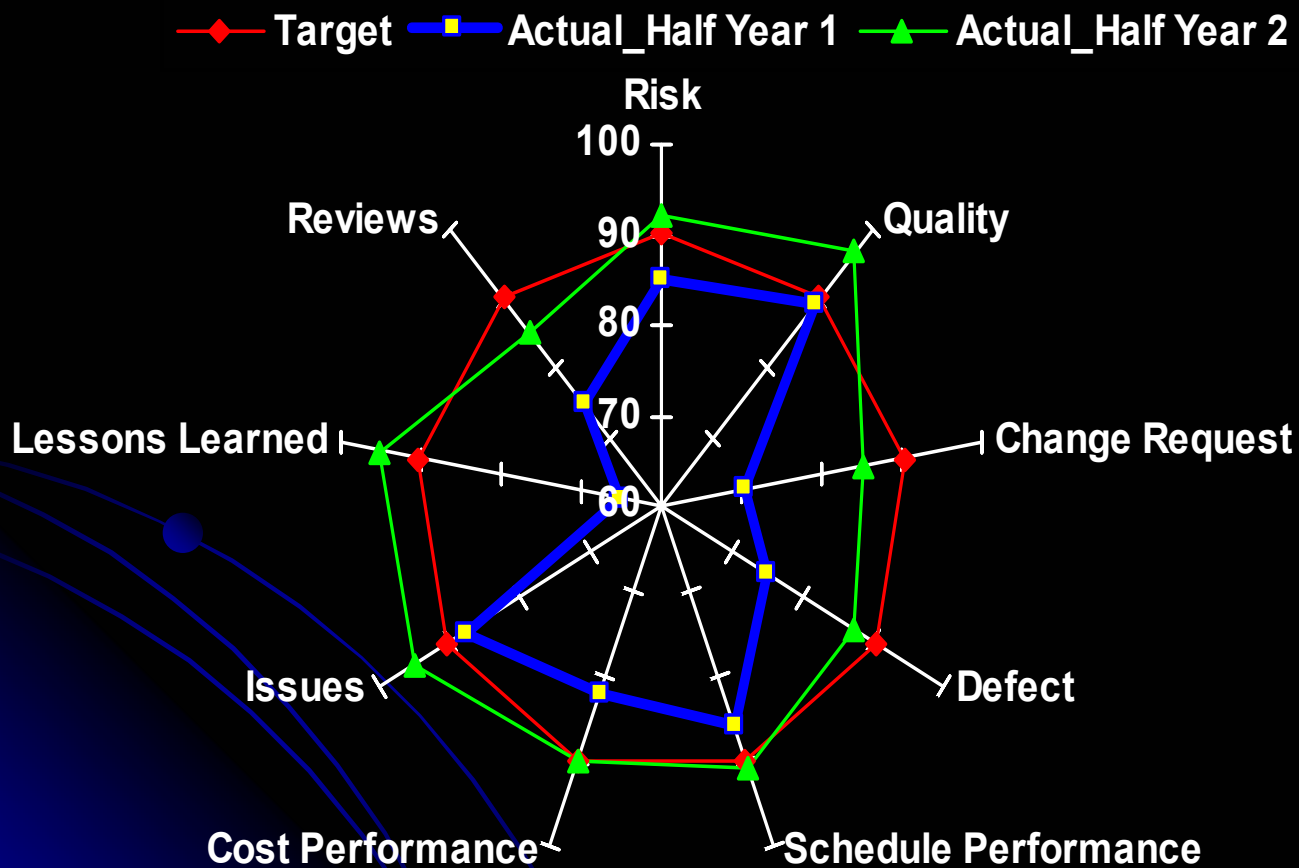
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## Report Metrics – Quality Radar



### 3. Metrics Implementation

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3.2 Data Analysis

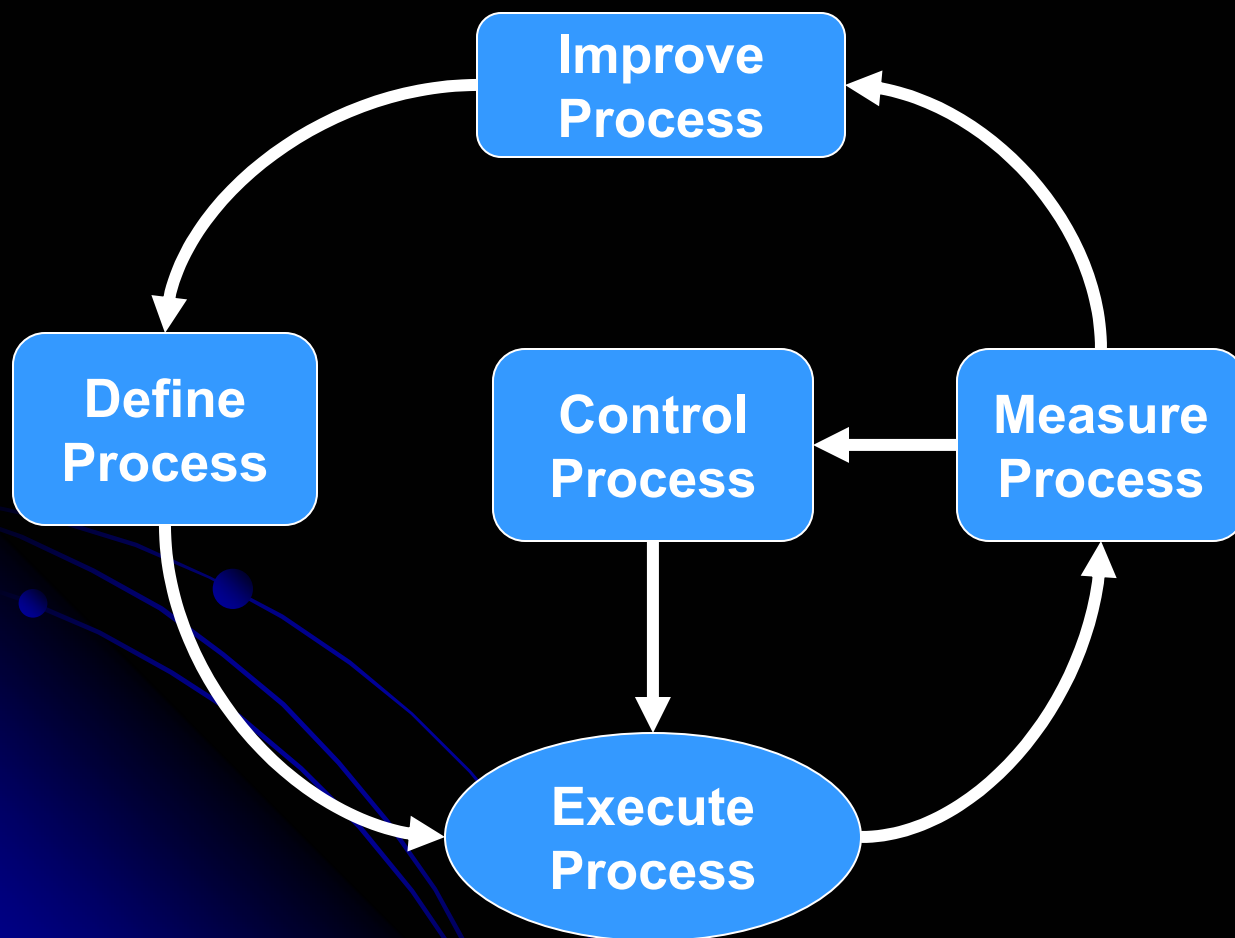
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## Feedback and Continuous Improvement



### 3. Metrics Implementation

3.1 Data Collection

3.2 Data Analysis

3.3 Report Metrics –

3.3.1 Metrics Dashboard

3.3.2 Quality Radar

3.4 Feedback and Continuous Improvement



# Management Support

- Speak the Language
- ROI
- Champion involvement
- Expect resistance
- Get management hooked so that they will pull the organization for you
- Communicate and manage expectation

# CMM, CMMI and Measurement

- Measurement provides visibility into the process
- To be ready for CMM level 4, must have solid measurement at level 3
- CMMI - The new PA Measurement and Analysis puts focus on “measurement capability that is used to support management information needs.”

# Benefits

## Successful Organizations....

- Analyze how their measurement programs support business objectives and information needs
- Invest serious time and effort into developing meaningful measurement specifications
- Collect measures “painlessly” and as a side effect of performing the work
- Perform real continuous quantitative improvement

<b>Category</b>	<b>Savings</b>
<b>Reduction in Cost &amp; Schedule Over Run</b>	<b>\$1,500,000</b>
<b>Savings due to Improved Defect removal efficiency</b>	<b>\$28,000</b>

# Summary

- The step by step approach helps to follow this successful practice.
- Metrics Dash Board and Quality Radar help making effective decisions at different levels of management based on data
- The graphically represented data is easy to understand
- Ensure accountability to goals.
- Organization able to rely on this objective data to assess and motivate progress towards its goals.
- Reinforces Metrics process deployment
- Ensures alignment with organizational process improvement goals.

# Questions?



# Thank You!

## Contact

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