
Anexas Lean Six Sigma Summarized Tools

Lean and Six Sigma Attitude and Discipline

- Customer Focus
 - View Quality externally from the customer's perspective
 - Measure the same way that the customer does
- Meet customer expectations every time
 - Continuous improvement cycle
 - Systematic
 - Scientific
 - Fact-based
 - Data-driven
 - Process focus

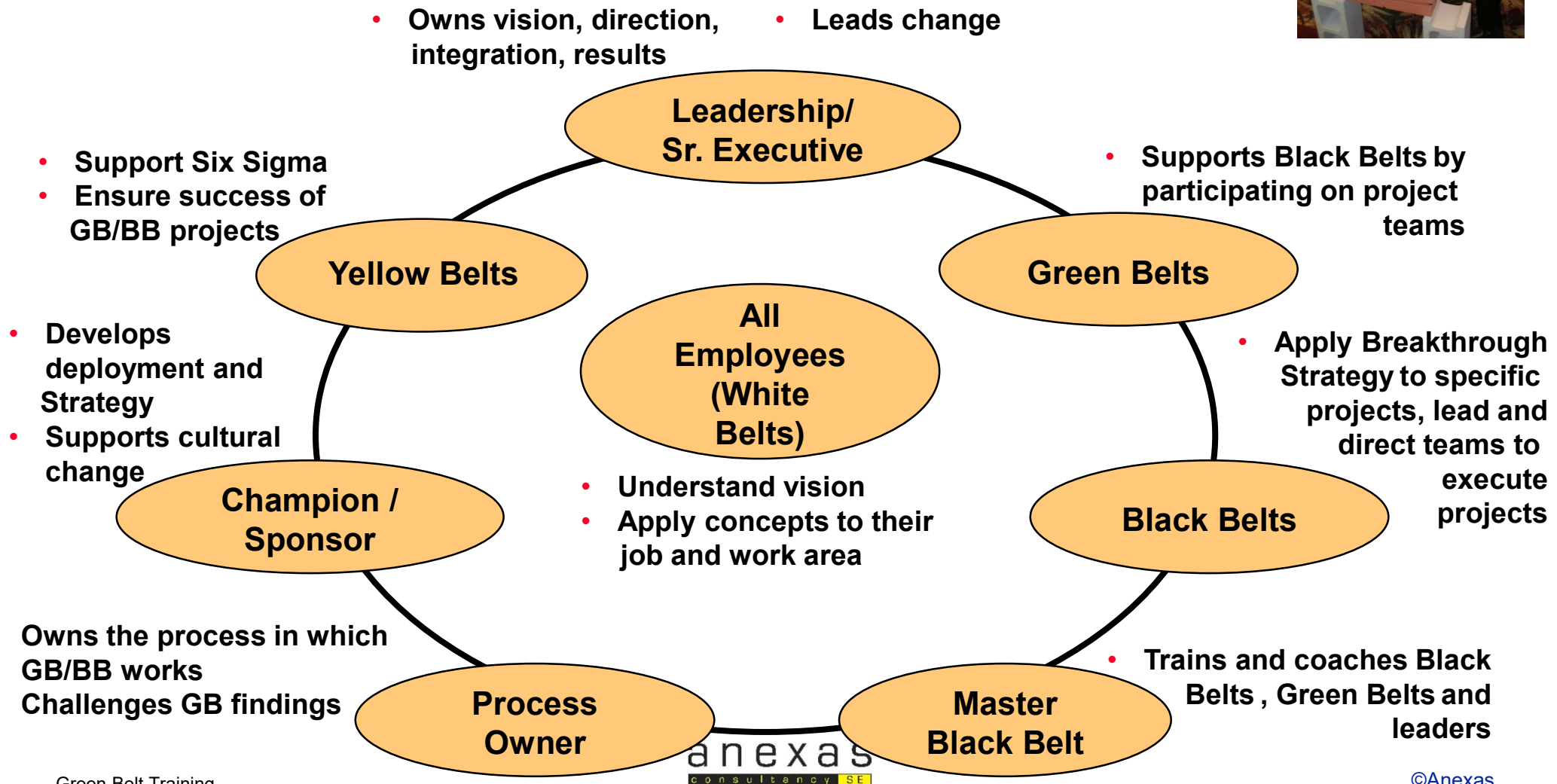
*Customers Have All The Votes Concerning
Extent Of Satisfaction And Value*

Operational Excellence

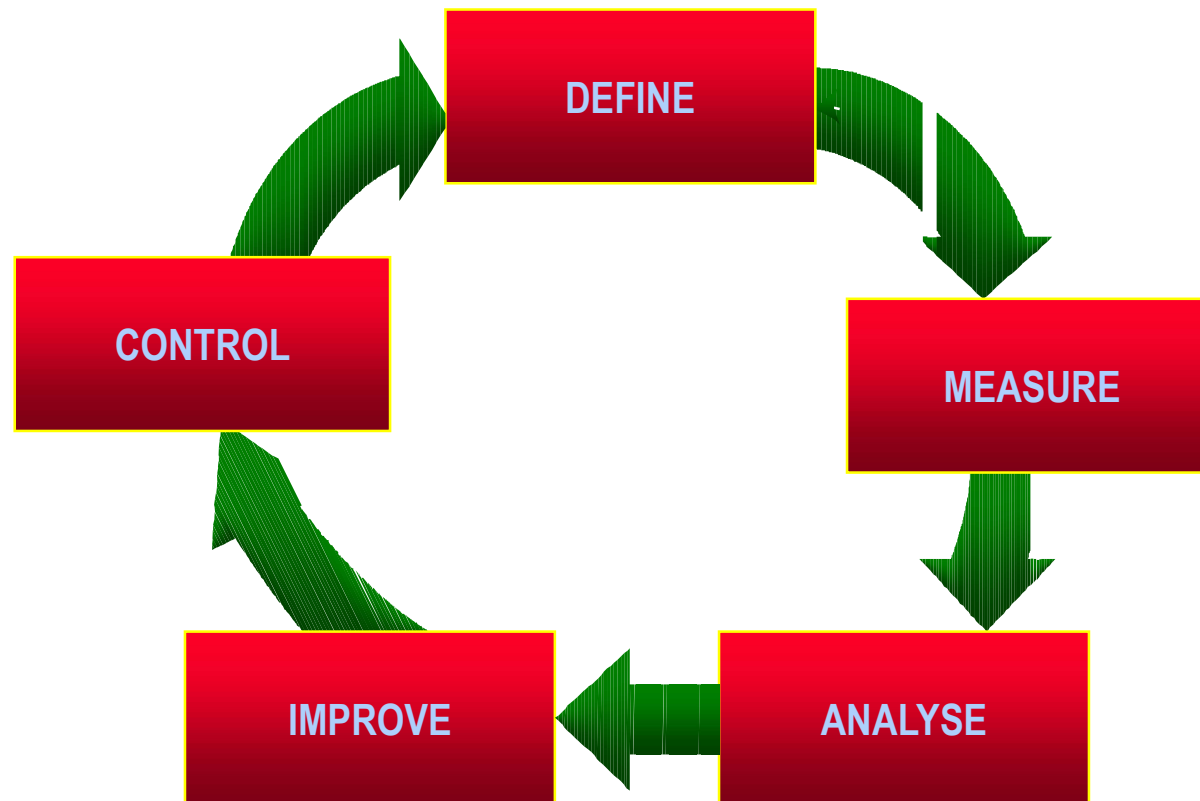
- "Eighty-five percent of the reasons for failure to meet customer expectations are related to deficiencies in systems and processes, not to the fact that our employees are not up to the challenge..."
- "The Manager's role is to promote process improvement."

DEMING

Roles & Responsibilities



DMAIC : An Improvement Methodology

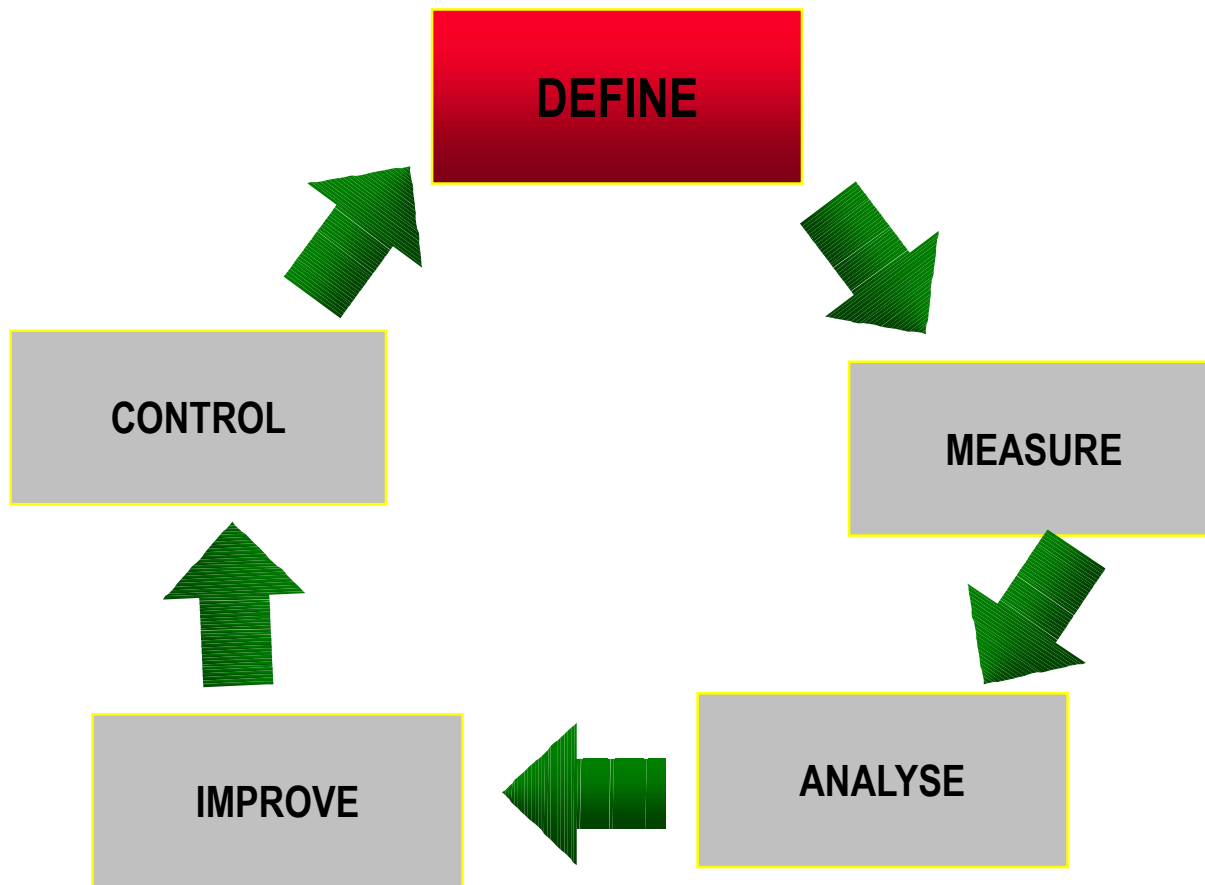


DMAIC : An Improvement Methodology

- **DEFINE:** Set direction for improvement
- **MEASURE:** Collect reliable data to understand current process performance
- **ANALYSE:** Identify problem's root causes through process and data analysis
- **IMPROVE:** Determine new improved process design
- **CONTROL:** Ensure improvement effectiveness over time

Module 2: Define Phase

DMAIC : An Improvement Methodology

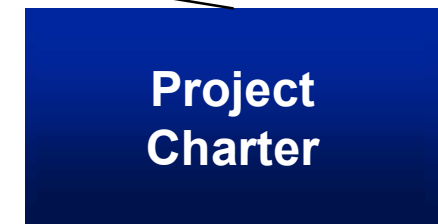




- Process Definitions
- Connecting the Customer to Your Process



- Types of customers
- Methods of collecting customer requirements
- Translate customer needs into specific requirement
- Customer requirements analysis and prioritization



- Business Opportunities
- Preliminary Problem Statement
- Goal statement
- Project Scope
- Milestones
- Roles

Define

Objectives :

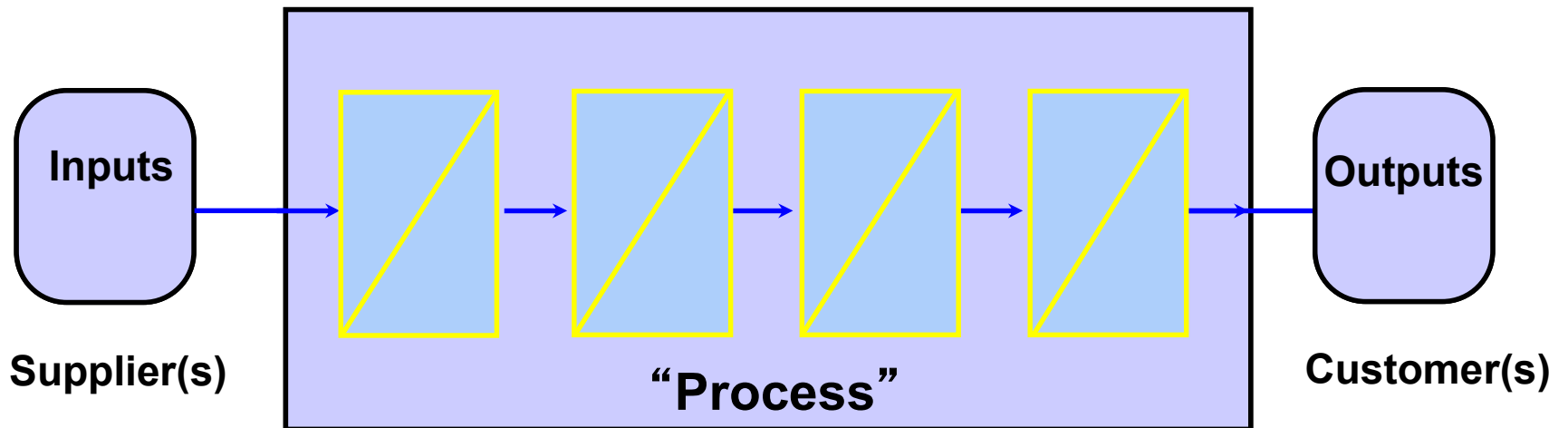
- Set direction for improvement

Steps

- Have a high level view of the process
 - SIPOC
- Know the customers' needs and identify their key performance requirements
 - CTQs
- Formalise the charter of the improvement project
 - Charter

What is a process ?

A set of activities that takes one or more inputs and transforms them into outputs that are of value to the customer



The 5 Key Elements of a Process



Supplier

The provider of inputs to your process

Input

Materials, resources or data required to execute your process

Process

A collection of activities that takes one or more kinds of input and creates output that is of value to the customer

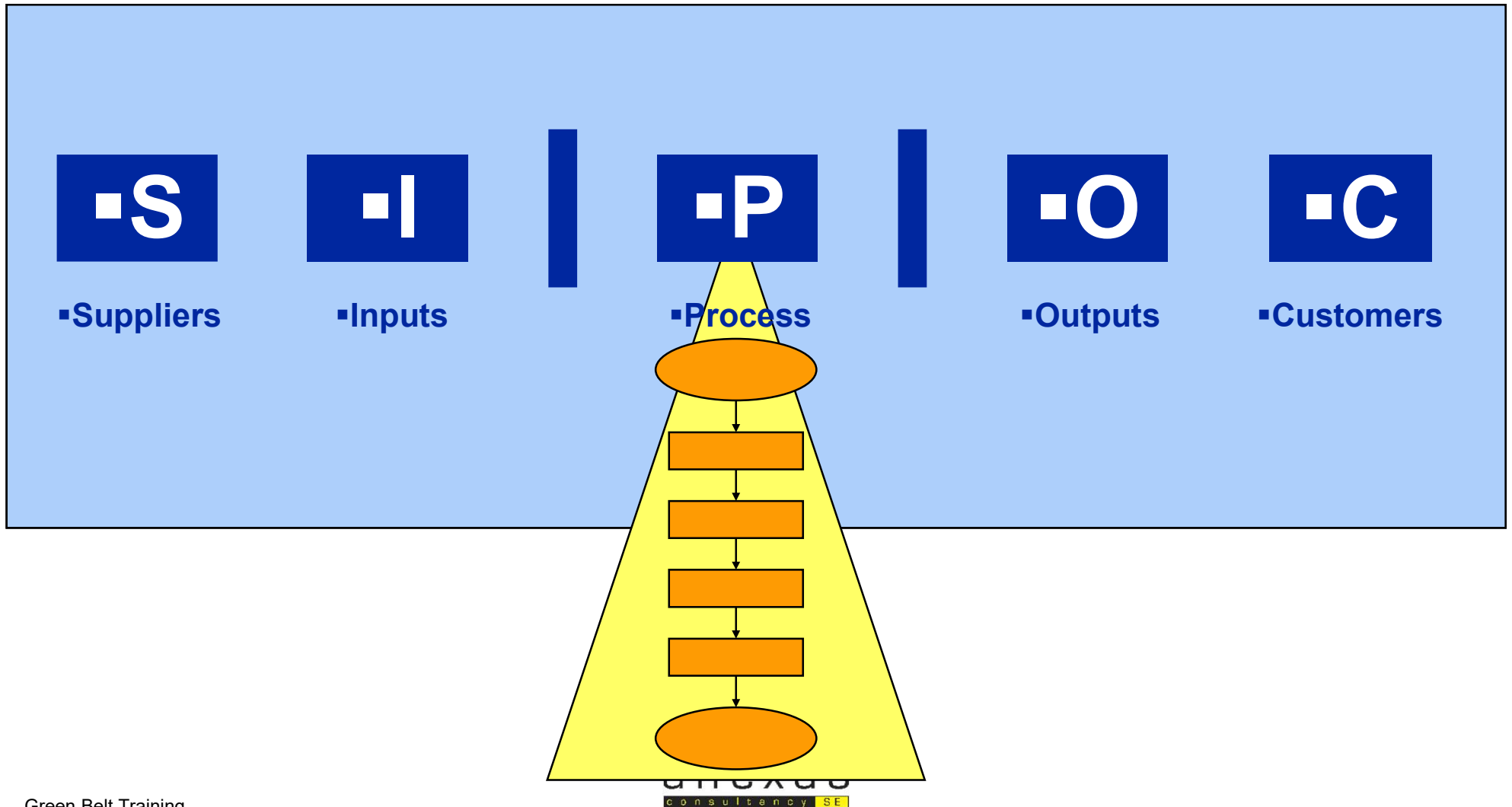
Output

The products or services that result from the process

Customer

The recipient of the process output

High Level Process Mapping



What is a CTQ? (Critical to Quality)

Any measurable product / service

characteristics that is

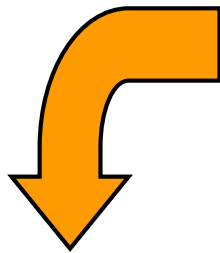
important to the customer

from the customer's point of view.

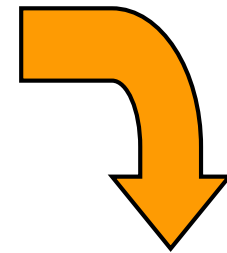
CTQ is also known as KPI

Who is a Customer?

Customers are recipients of products and/or services.



▪ *Customer*



External
Product/Service

Internal
Product/Service

Different Ways to Listen to the Voice of the Customer

<p>■ + +</p> <p>■ Interview</p>	<p>■ Learn about a specific customer's point of view on service issues, product/service attributes, and performance indicators/measures. Supports development of hypothesis about customer needs.</p>	<p>■ \$\$\$</p>
<p>■ Focus Group</p>	<p>■ Organize information from the collective point of view of a group of customers that represent a segment. Helps clarify and define customer needs.</p>	
<p>■ External Survey</p>	<p>■ Measure the needs or the importance and performance of a product, service or attribute across an entire segment or group of segments. Furnishes quantitative data.</p>	
<p>■ Internal Customer Survey</p>	<p>■ It is the organization initiative to achieve the delivery of the brand promise. It consists in measuring customer satisfaction versus customer expectations through a well thought questionnaire.</p>	
<p>■ . . .</p> <p>■ Customer Complaint Data</p>	<p>■ Collect and classify customer feedback about product performance, features and attributes – classify by type across product lines. Furnishes qualitative and quantitative data.</p>	<p>■ \$</p>

Voice Of Customer Translation Matrix

VOC High-Level Need	Service/ Quality Issue	Specific Needs Statement	Output Characteristic
Example: “It takes too long to get my audit completed”	Speed	I want to complete audit within 10 days it is initiated	Turnaround time from audit initiation to audit completion

DMAIC Project Charter

Project No.: _____

Project Name:

Process :

Resource Plan

Team Members

Champion / Sponsor:
Green / Black Belt:
Functional Managers/Process Owner:
Coach / Master Black Belt:

Text

Problem Statement

Scope

Text

Text

Goal Statement

Customer CTQ's

Text

Text

Estimate Financial Opportunities / Intangible Benefits

High Level Project Milestone

Text

Text

Validation

<p>Green / Black Belt</p> <p>CEO</p>	<p>Master Black Belt</p> <p>Financial Analyst</p>	<p>Process Owner</p> <p>Champion / Sponsor</p>
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Problem and Goal Statements: Definitions

The purpose of the problem statement is to describe what is wrong

The goal statement defines the team's improvement objective

Problem Statement: Description of the Problem

- What is wrong in not meeting our customer's needs?
- When and where does the problem occur?
- How big is the problem?
- What's the impact of the problem?
- **What, Where**, Since **When**, **How** big, **How** it impacts
- Do not write **Why**? And **Who** is responsible for the problem

Goal Statement

- Defines what improvement the team is seeking to accomplish, i.e., what do we want the defect rate to be?
- Tends to start broadly – eventually should include measurable target or specification limit and completion date
- Must not assign blame, presume cause, or prescribe solution
- Has four parts:
 - Starts with a verb (reduce, eliminate, control, increase)
 - Focus of project (cycle time, accuracy)
 - Target (by 50%, by 75%)
 - Deadline
- Needs to be SMART

DEFINE SUMMARY

Purpose: To set set direction for improvement project by developing a team charter. By defining the customers and their requirements (Critical To Quality = CTQs), mapping the high level business process to be improved.

High Level Map - SIPOC

Suppliers	Inputs	Process	Outputs	Customers
~~~~~	~~~~~	□ → □ → □ → □ → □	~~~~~	~~~~~
~~~~~	~~~~~		~~~~~	~~~~~
~~~~~	~~~~~		~~~~~	~~~~~

- Complete high level “as-is” process map, identifying suppliers, inputs, 5-7 high level activities, outputs & customers

Use Survey or Focus Groups?

## Voice of Customer (VOC)

VOC	Key Issues	Requirements
~~~~~	~~~~~	~~~~~
~~~~~	~~~~~	~~~~~
~~~~~	~~~~~	~~~~~
~~~~~	~~~~~	~~~~~

- Gather and display data verifying customer requirements (CTQs)

## Project Charter

Problem Statement:	~~~~~
Goal:	~~~~~
Business Opportunity:	~~~~~
Scope:	~~~~~
Roles and responsibilities:	~~~~~
Milestones:	~~~~~ ~~~~~ ~~~~~ ~~~~~

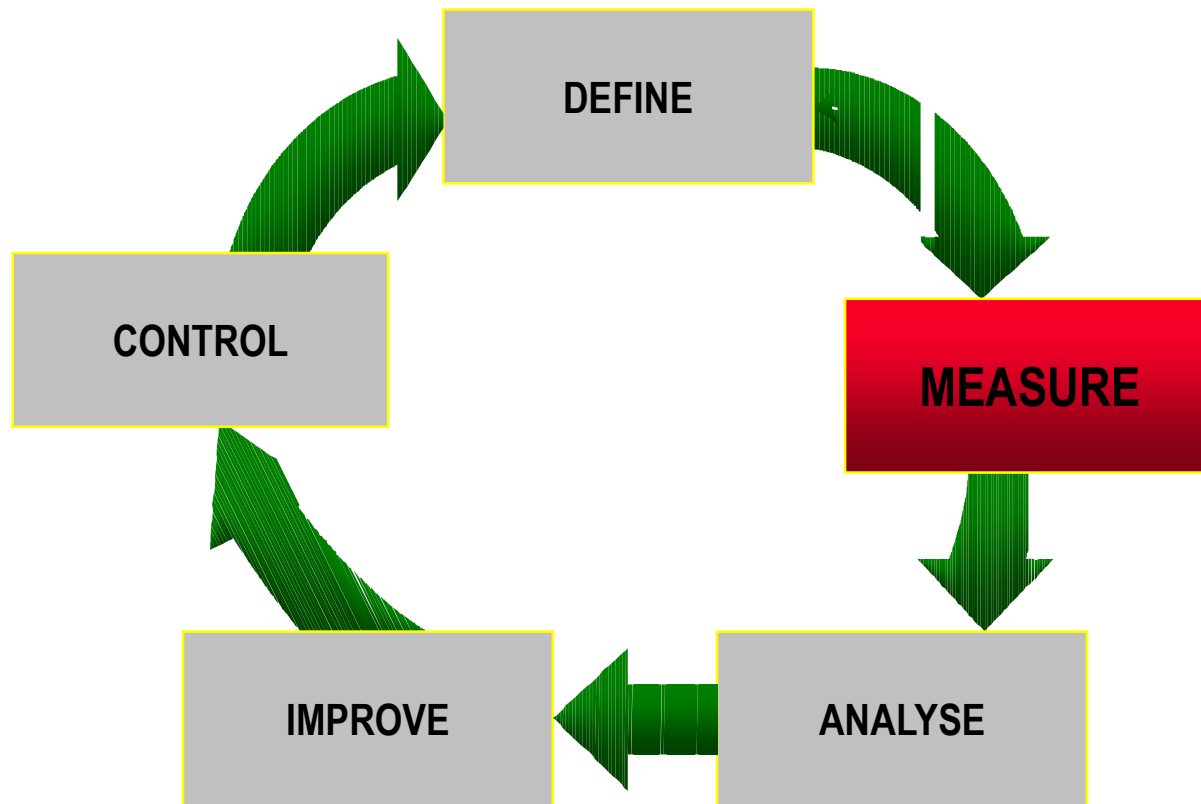
- Develop charter to include:
  - Problem statement
  - Goal for improvement
  - Business opportunity
  - Scope of project
  - Milestones for completion
  - Roles

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# Module 3: Measure Phase

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# DMAIC : An Improvement Methodology





# Measure

Objective :

- Collect reliable data to understand current process performance

Steps :

- Choose the data to be collected (output measures, process and input measures)
- Organize the data collection plan (What ? Why ? When? Who? How? How many ?)
- Study process variation
- Understand the capability of the process

# Choose the data to be collected

## Input measures

The key quality and delivery expectations from your suppliers.  
(performance predictors)



## Process measures

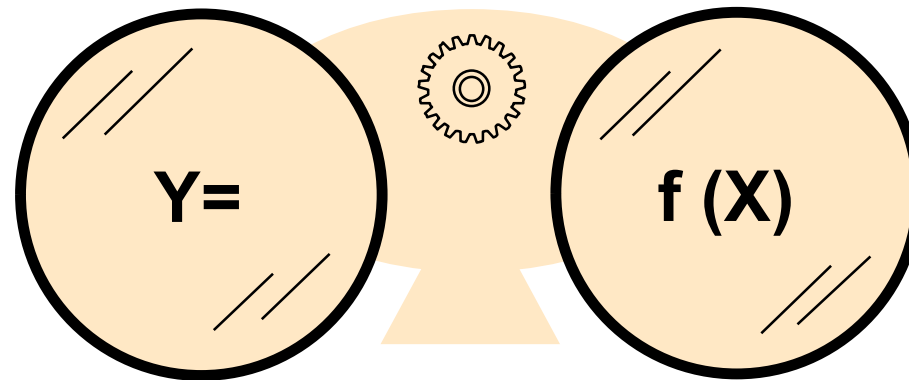
Internal process measures predict the end performance when correlated to output measurements.



## Output measures

Output measurements enable you to verify that the process satisfies the expected performance level

# Key principles for investigation



## Response

- Y
- Dependent
- Output
  
- Effect
- Symptom
- Monitor

## Predictor

- $X_1 \dots X_N$
- Independent
- Input-Process variables
  
- Cause
- Problem
- Control

# Data Types

# Attribute Data

- **Attribute (category) data is labeled**
- **Qualitative**
- **Measured on nominal or ordinal scales**
  - **Nominal – data placed in categories**
    - **Examples** Heads/Tails on coin flip  
Facility A, B, or C
  - **Ordinal – data placed in categories that have order**
    - **Examples** Low, Medium, High  
Freshman, Sophomore, Junior  
1st, 2nd, 3rd
- **Attribute data can be represented as Discrete numbers or counts e.g.**  
Males =45, Females =25
- **Thumb Rule : 200-1100 is a good sample size for attribute data**

# Variable Data (Continuous data)

- **Variable data can be represented on a scale or number line.**
- **The scale might have**
  - **decimal places**
  - **continuous and unlimited levels**
    - **Examples: Cycle time, distance, temperature, height, weight**
- **Thumb Rule : 30 is a good sample size for continuous data**

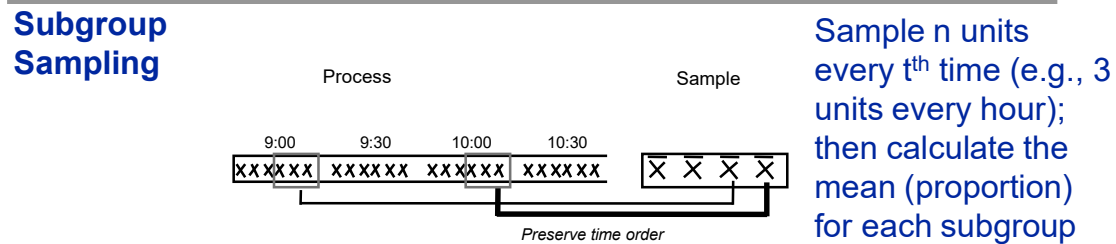
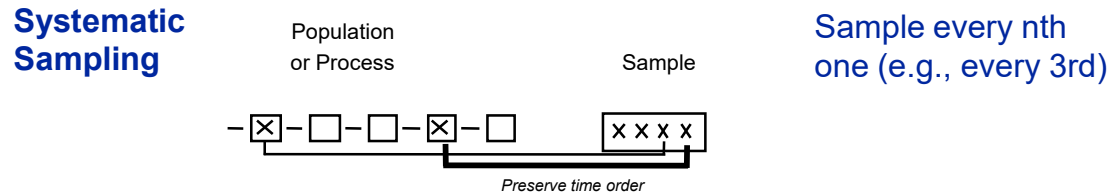
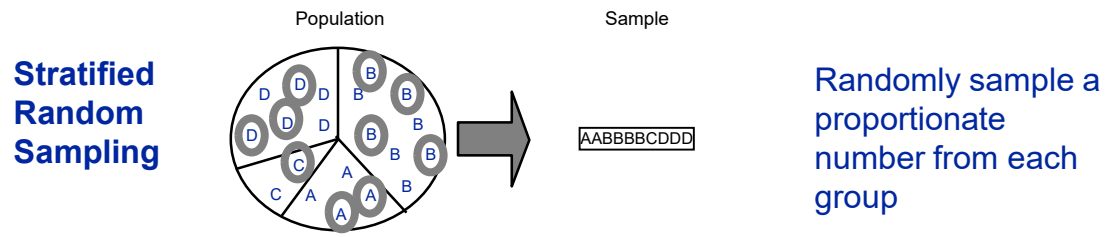
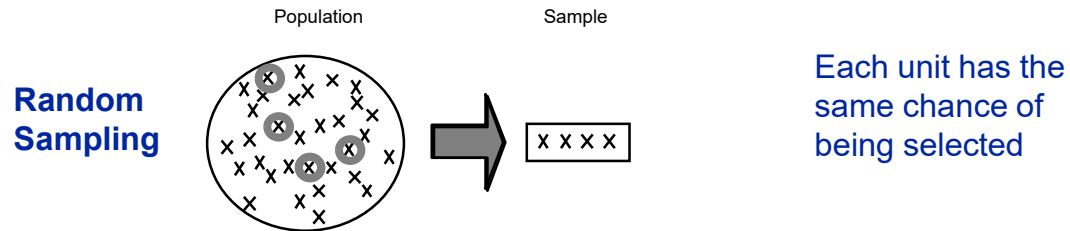
# Sampling

# Sampling Considerations

- **Sampling is a procedure for selecting units to estimate a characteristic of the population**
  - **Representative of the population**
  - **Sufficient size**
    - **Risk**
    - **Variation**
  - **Cost**
  - **Ability to continue data collection**



# Sampling Techniques



# Data Collection

# Sampling Plan Worksheet

Questions	Measure 1	Measure 2	Measure 3	Measure 4
What ?				
Why ?				
When ?				
Who ?				
How ?				
How many ?				

# Measure

## Objectives :

- Collect reliable data to understand current process performance

## Steps :

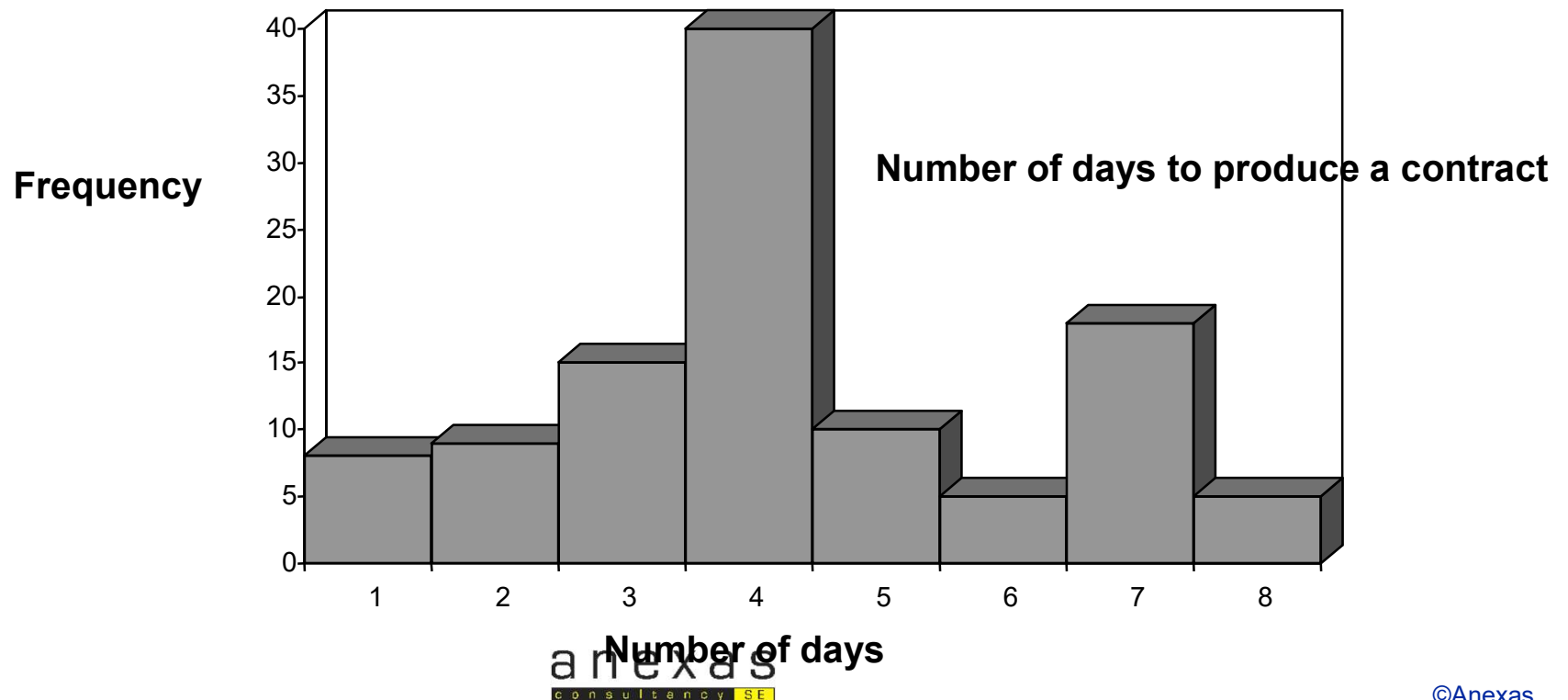
- Choose the data to collect (output measures, process and input measures)
- Organise the data collection plan (What ? Why ? When? Who? How? How many ?)
- ➔ **Study process variation**
- ➔ **Understand the capability of the process**

# Variation over a period of time : histogram

## Definition

The histogram illustrates the shape (or distribution) of the data by indicating how often different values appear

## Example



# Interpretation of the histogram

## Key Questions :

- **What is the shape of the distribution ?**
- **What is the central trend (“center”) of the distribution ?**
- **What is the variation (“spread”) of the distribution ? Is the curve wide or narrow?**
- ➔ **Are we confronted with a problem of “process centring” within the limits of customers' expectations or do we have a problem of “too much variation” ?**

# Basic Statistics

# Measures of Location (Central Tendency)



# Measures of Location (Central Tendency of data)

**Mean:** Average of a set of values

**Median:** Midpoint in a string of data, where 50% of the observations, or values, are below and 50% are above

**Mode:** The most frequently occurring value

# Measures of Spread (Variation)

# Range

- Range is the difference between the largest and the smallest observations
- Its purpose is to measure the dispersion between the highest and lowest values of a data set

Range = Maximum Observation – Minimum Observation

# Deviation

- Deviation is the distance between a data point and the mean
- Its purpose is to measure and describe the variation in a set of data

# Standard Deviation

Measure of the average distribution about the mean

Standard Deviation ( $\sigma$ ) Formula for the Population

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (X_i - \mu)^2}{N}}$$

$\sum_{i=1}^N$  = Sum all values from the first to last

# Standard Deviation

Measure of the average distribution about the mean

Standard Deviation (s) Formula for samples

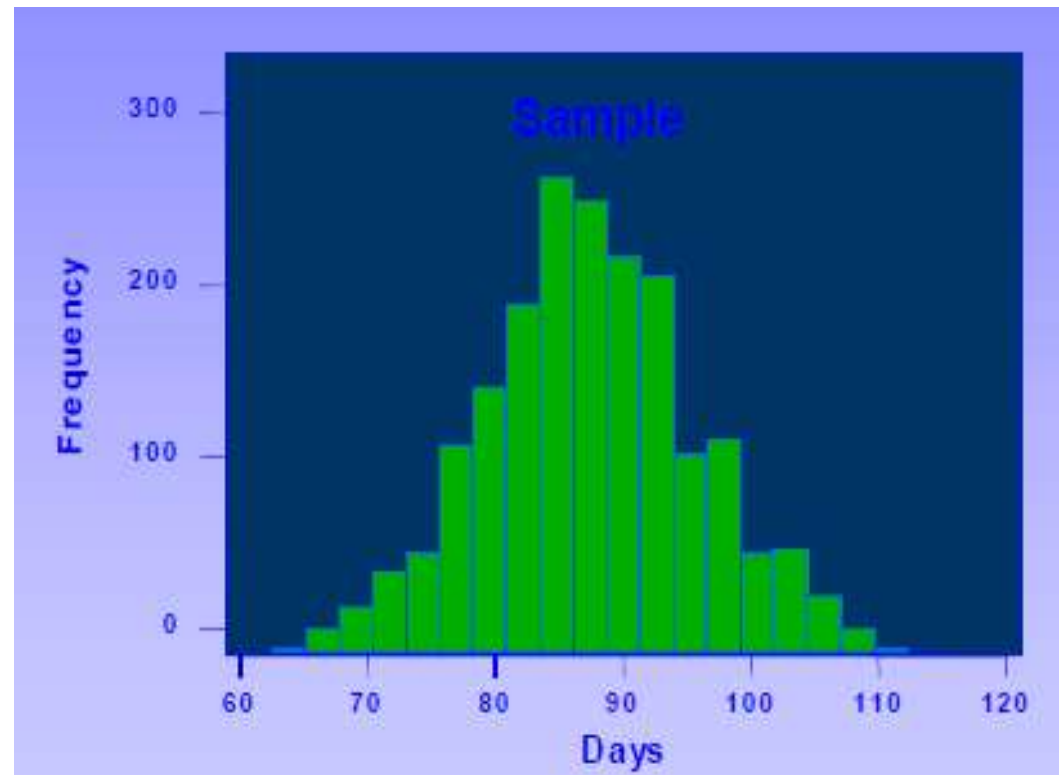
$$s = \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{N - 1}}$$

$\sum_{i=1}^N$  = Sum all values from the first to last

# Distributions

# Data Frequency Plot

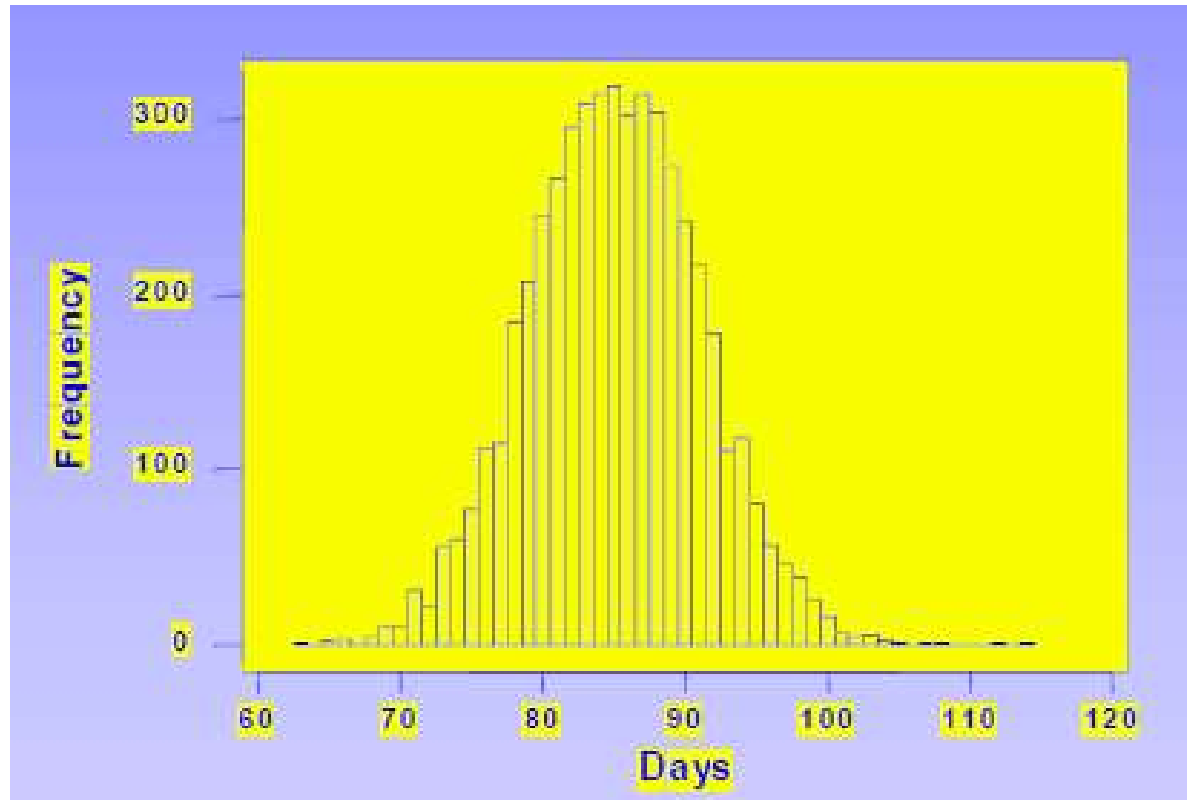
- A data frequency plot is a visual display of a set of measurements showing:
  - General location
  - Spread
  - General shape of data distribution



600 observations of aging  
in account receivables



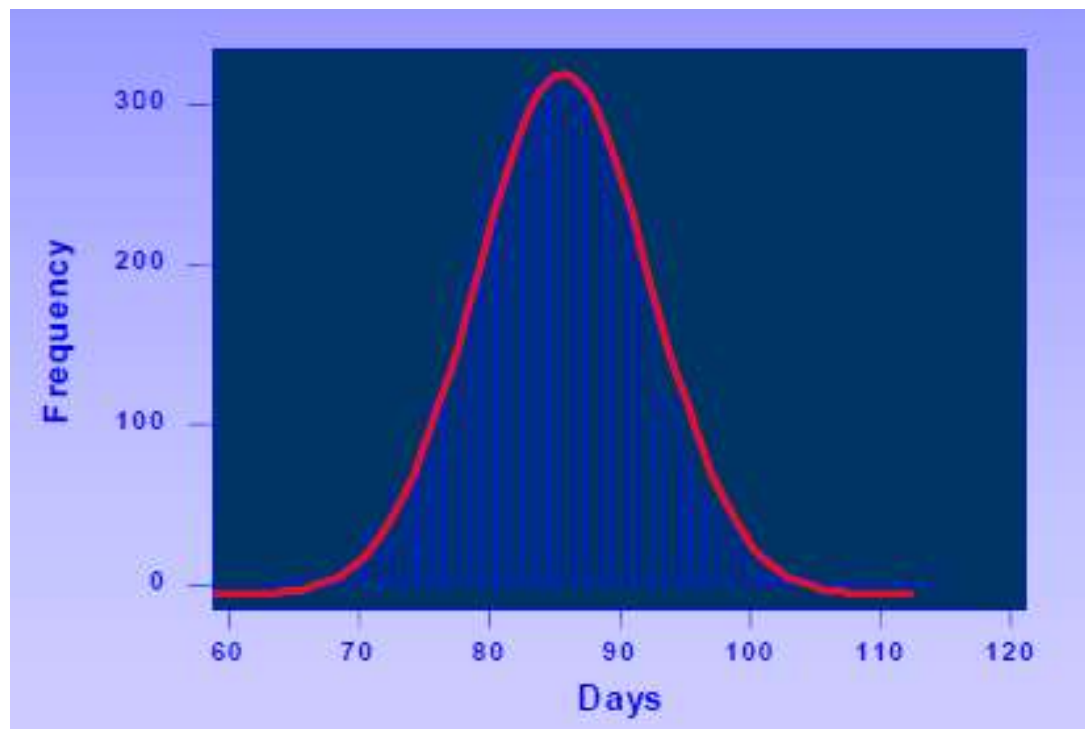
# Approaching a Continuous Distribution



5,000 observations of aging in account receivables

# Approaching a Continuous Distribution

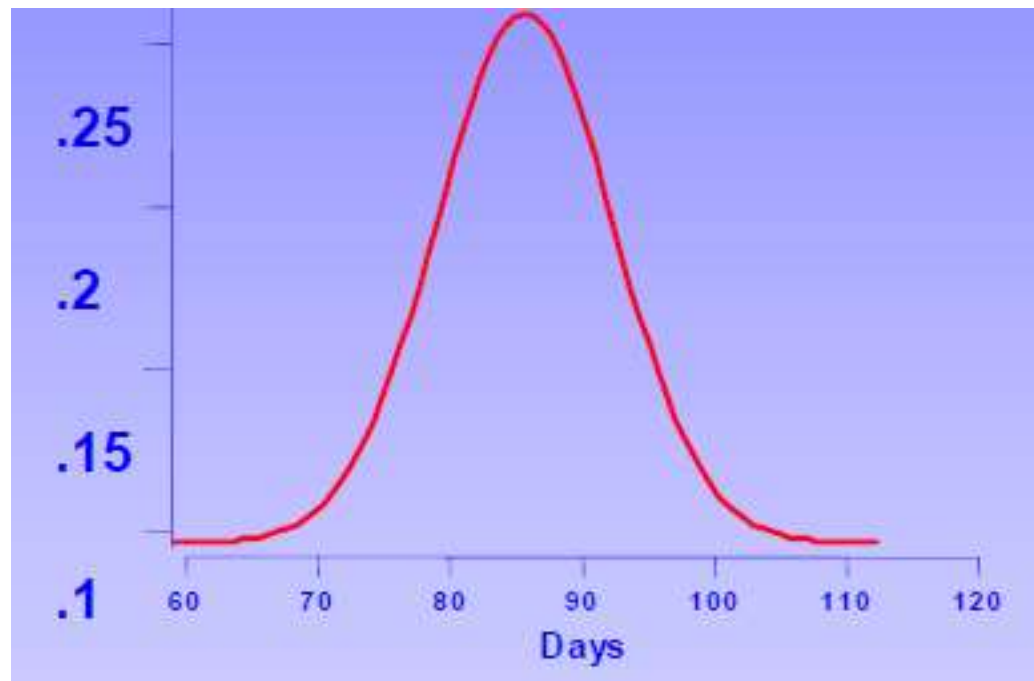
Imagine the grouping interval in the histogram to be made smaller and smaller until the distribution becomes continuous...



5,000 observations of aging in account receivables

# Probability Distribution

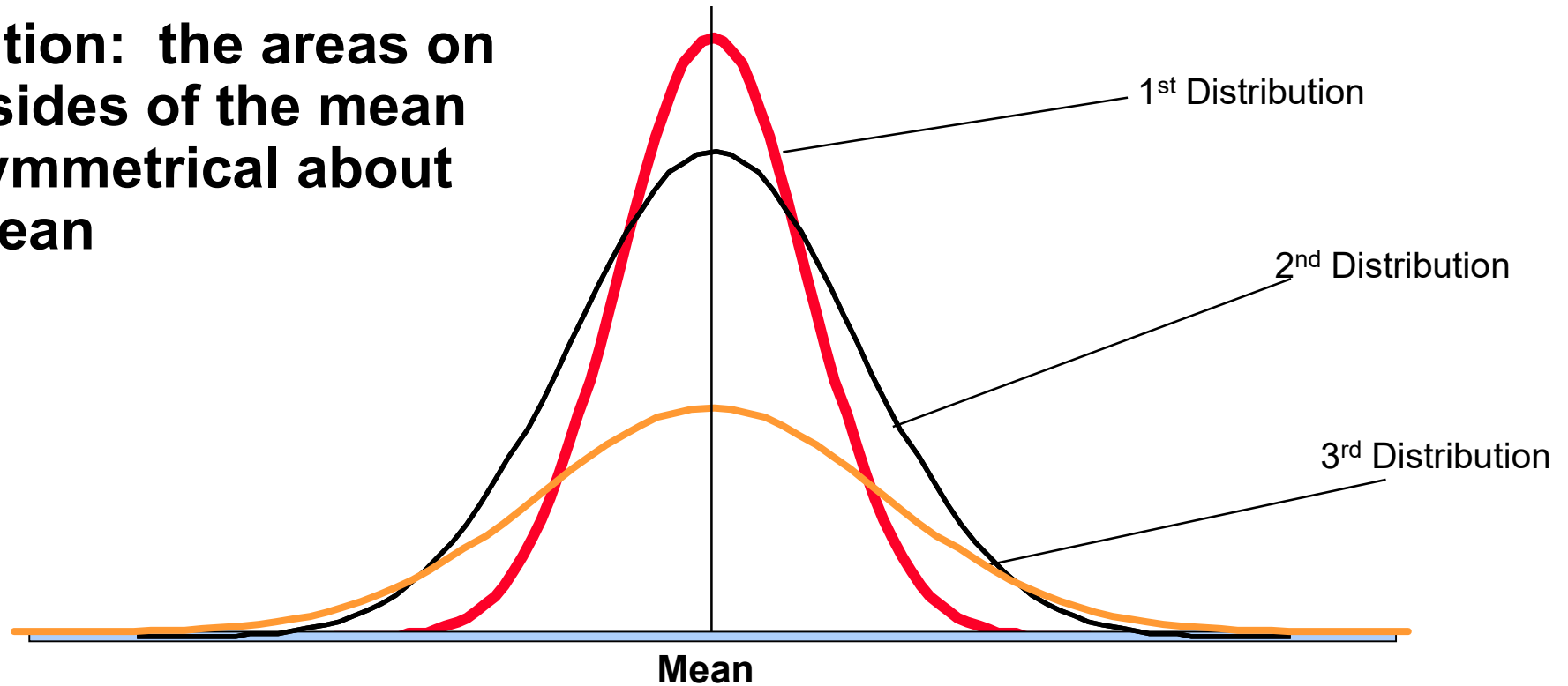
Area under curve can be used to estimate the occurrence probability of an “event”.



**The area under the curve is 100%**

# Normal Distribution

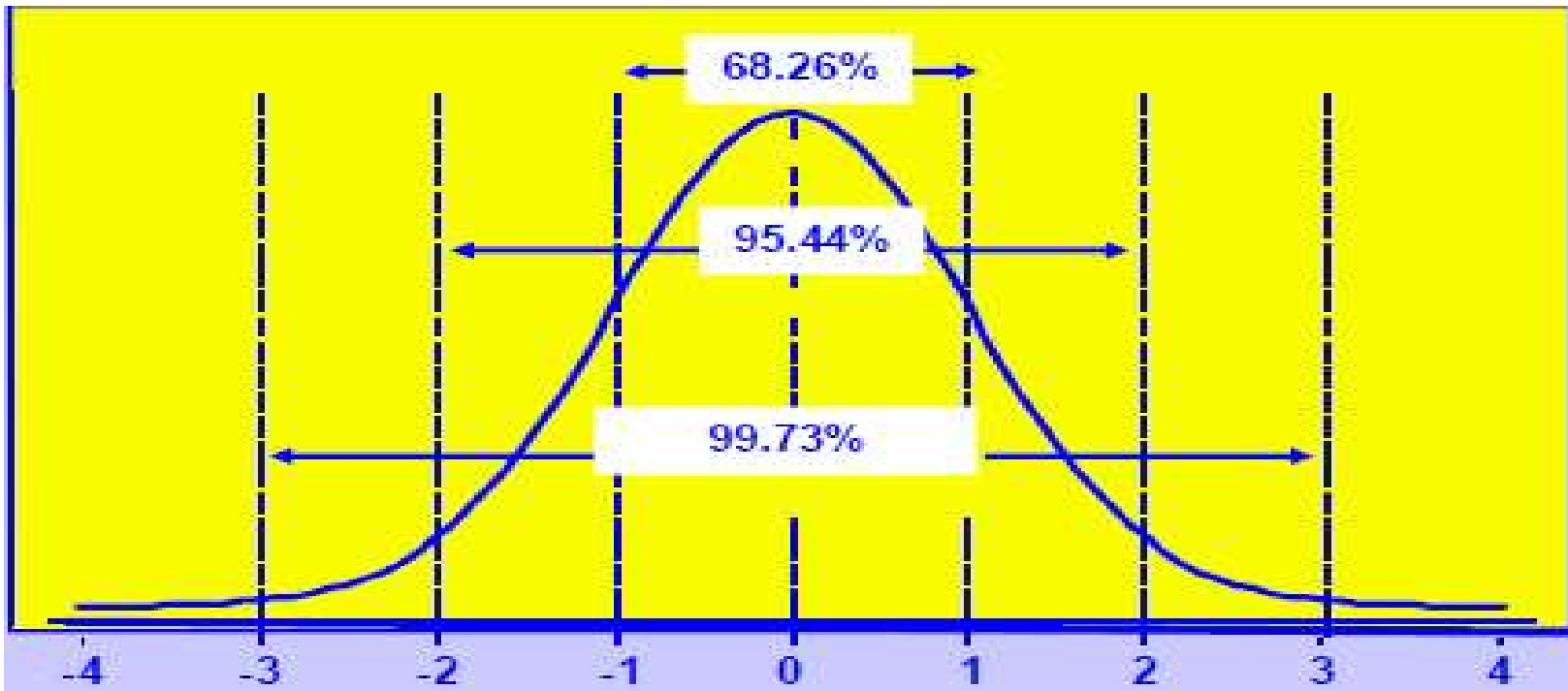
**Definition: the areas on both sides of the mean are symmetrical about the mean**



The means are the same but the standard deviations differ

# The Standard Normal Curve

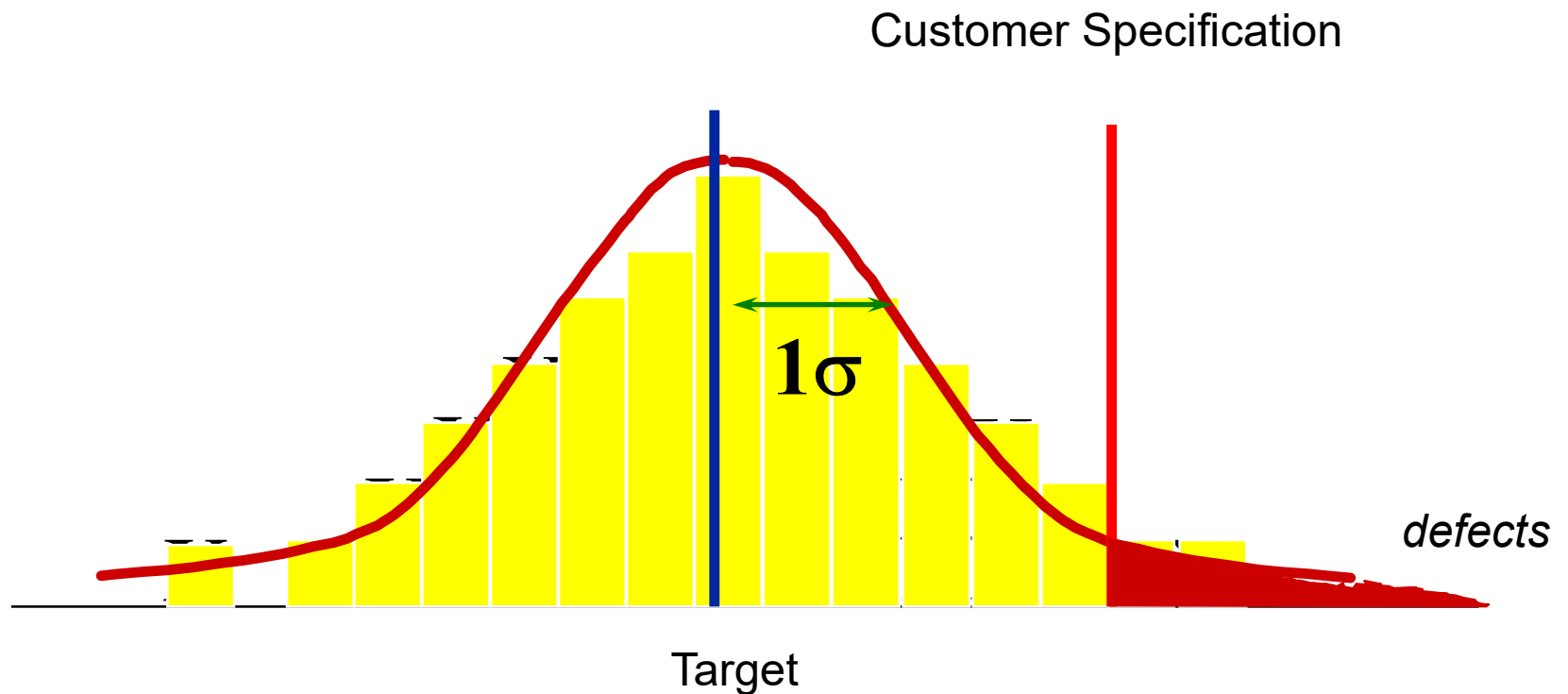
The standard normal curve is a special case of the normal distribution where the mean = 0 and the standard deviation = 1



**95% of the population is within approximately +/- 2 standard deviations of the mean**

# The sigma of the process

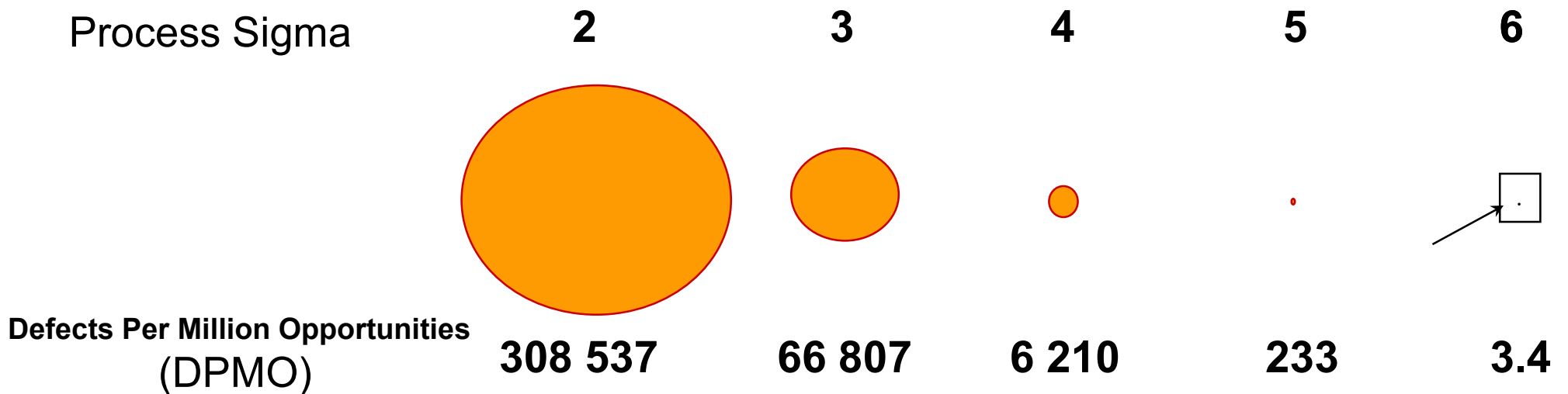
Every human activity has variability....



Comparing process variation and customer specification is the essence of Six Sigma

# What is 6 sigma ?

- A measurement scale which compares the output of a process to the customer's requirements



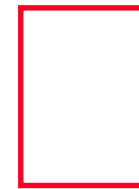
# Compute Process Sigma

## Key Definitions

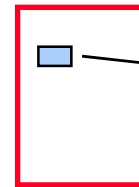
**Unit:** the item produced or processed

**Defect:** any event that does not meet the specification of a CTQ as defined by the customer

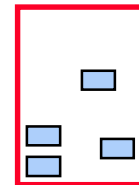
**Defect opportunity:** any event which can be measured that provides a chance of not meeting a customer requirement (specification)



*Form*



*Critical field  
with missing  
Information*



*# Critical fields  
on the form*



# Calculate process sigma : formula

Calculate the number of Defects Per Million Opportunities

(No. of Defects)

$$\text{DPMO} = \frac{\text{(No. of Defects)}}{\text{No. Of Units x No. of opportunities}} \times 1\,000\,000$$

**In the Sigma table, look at the Sigma value relating to the DPMO determined**

# Conversion Table

Long term Yield Rendement Long terme	Process Sigma Sigma du processus	Defects per 1,000,000 Défauts par 1.000.000	Long term Yield Rendement Long terme	Process Sigma Sigma du processus	Defects per 1,000,000 Défauts par 1.000.000
99.99966%	6.0	3.4	93.320%	3.0	66,800
99.9995%	5.9	5	91.920%	2.9	80,800
99.9992%	5.8	8	90.320%	2.8	96,800
99.9990%	5.7	10	88.50%	2.7	115,000
99.9980%	5.6	20	86.50%	2.6	135,000
99.9970%	5.5	30	84.20%	2.5	158,000
99.9960%	5.4	40	81.60%	2.4	184,000
99.9930%	5.3	70	78.80%	2.3	212,000
99.9900%	5.2	100	75.80%	2.2	242,000
99.9850%	5.1	150	72.60%	2.1	274,000
99.9770%	5.0	230	69.20%	2.0	308,000
99.9670%	4.9	330	65.60%	1.9	344,000
99.9520%	4.8	480	61.80%	1.8	382,000
99.9320%	4.7	680	58.00%	1.7	420,000
99.9040%	4.6	960	54.00%	1.6	460,000
99.8650%	4.5	1,350	50%	1.5	500,000
99.8140%	4.4	1,860	46%	1.4	540,000
99.7450%	4.3	2,550	43%	1.3	570,000
99.6540%	4.2	3,460	39%	1.2	610,000
99.5340%	4.1	4,660	35%	1.1	650,000
99.3790%	4.0	6,210	31%	1.0	690,000
99.1810%	3.9	8,190	28%	0.9	720,000
98.930%	3.8	10,700	25%	0.8	750,000
98.610%	3.7	13,900	22%	0.7	780,000
98.220%	3.6	17,800	19%	0.6	810,000
97.730%	3.5	22,700	16%	0.5	840,000
97.130%	3.4	28,700	14%	0.4	860,000
96.410%	3.3	35,900	12%	0.3	880,000
95.540%	3.2	44,600	10%	0.2	900,000
94.520%	3.1	54,800	8%	0.1	920,000

# Exercise

*In plenary.*

**Calculate the Sigma of your process assuming the problem statement to be correct**

■ DPMO

■ **Process Sigma =**

# MEASURE

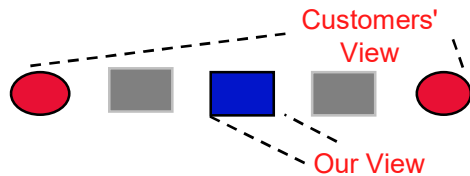
**Purpose :** To measure and understand baseline performance for the current process by collecting reliable data (quantitative & qualitative)

## Data Collection

What	Who	Where	Formula
~~~~~	~~~~~	~~~~~	~~~~~
~~~~~	~~~~~	~~~~~	~~~~~
~~~~~	~~~~~	~~~~~	~~~~~

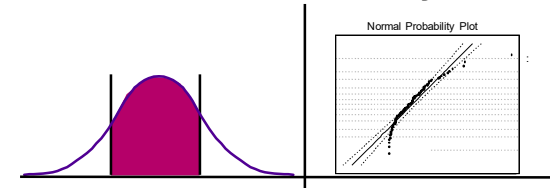
- Develop a data collection plan
 - Operational definition
 - Sampling

Customer oriented mindset



- Select the measure your customer uses to judge your performance (Key Output Measure Y)
- Plan to collect CONTINUOUS data

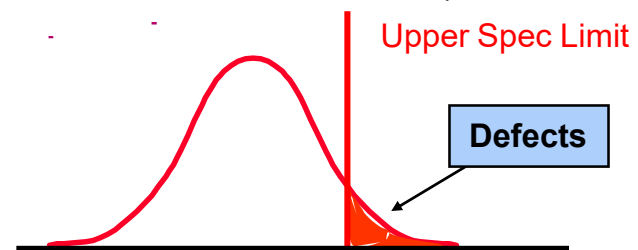
Graphical Display



- Display data in graphic form to determine the type of distribution, the metrics to understand variation and set goals for the improvement strategy.
 - Normal Distribution described by Mean and Standard deviation
 - Skewed Distribution described by Q1 (or Q3) and Inter Quartile Range
 - Long tailed distribution described by Median and Span 5-95

Calculate Process Sigma

Defects "Outside" Spec Limit

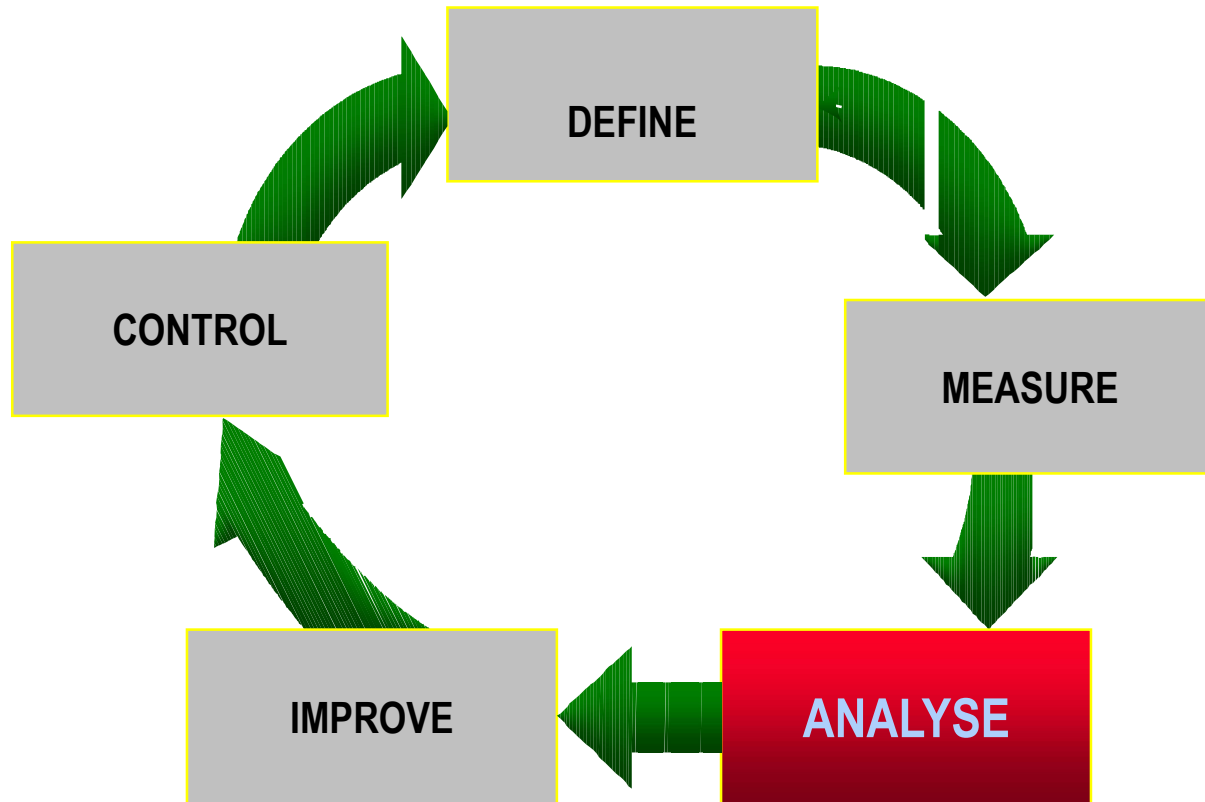


- Compute baseline sigma



Module 4: Analyse Phase

DMAIC : An Improvement Methodology



Analyse Phase

Objective :

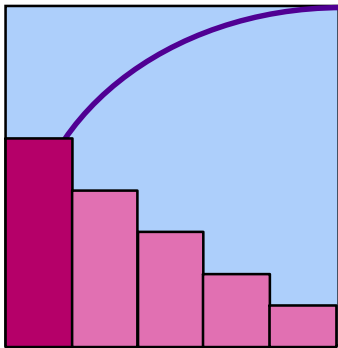
- Identify problem's root causes through process and data analysis

Steps :

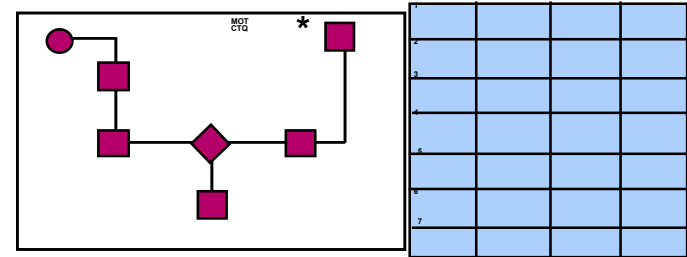
- Cause and Effect Diagram
- Control Impact matrix
- Pareto chart
- Value analysis using process map

Analyse roadmap

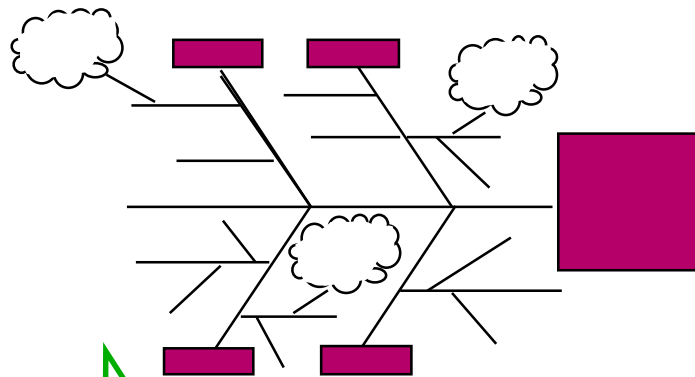
Data Analysis



“As Is” Process Map & Analysis



Root Cause Identification

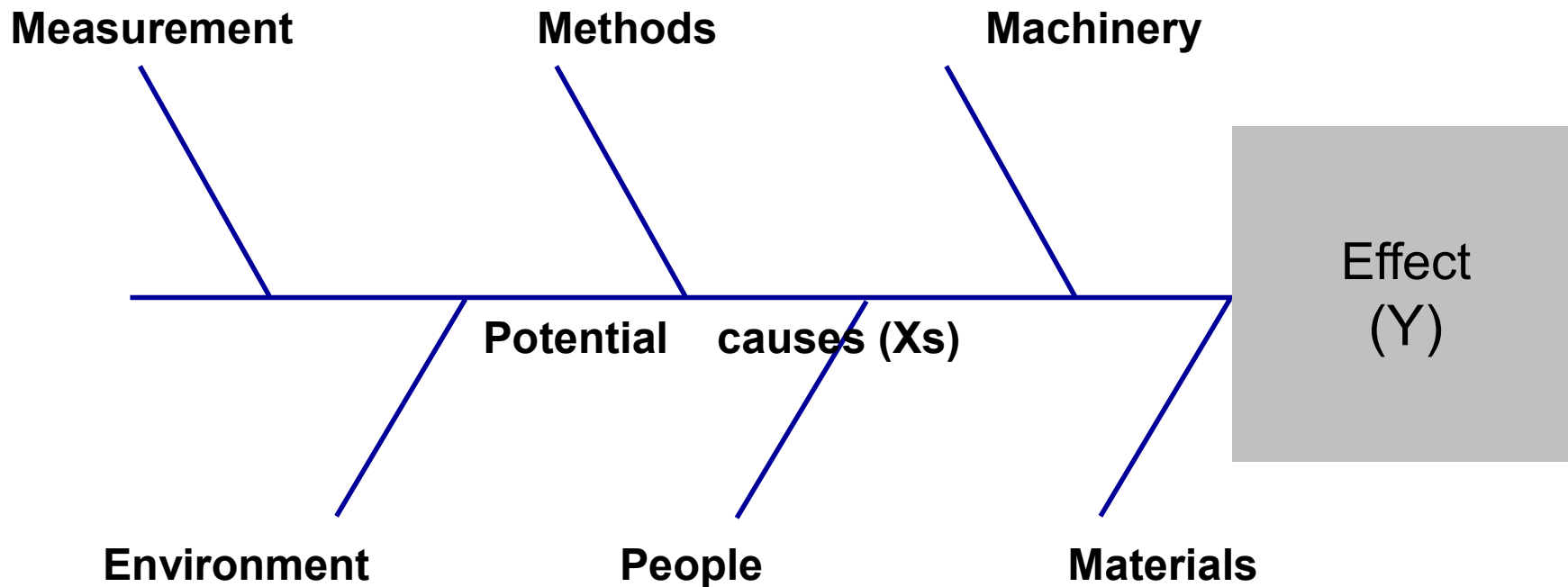


Root Cause validation with data

Analyse Phase

Consolidating the analyses prior to root causes validation

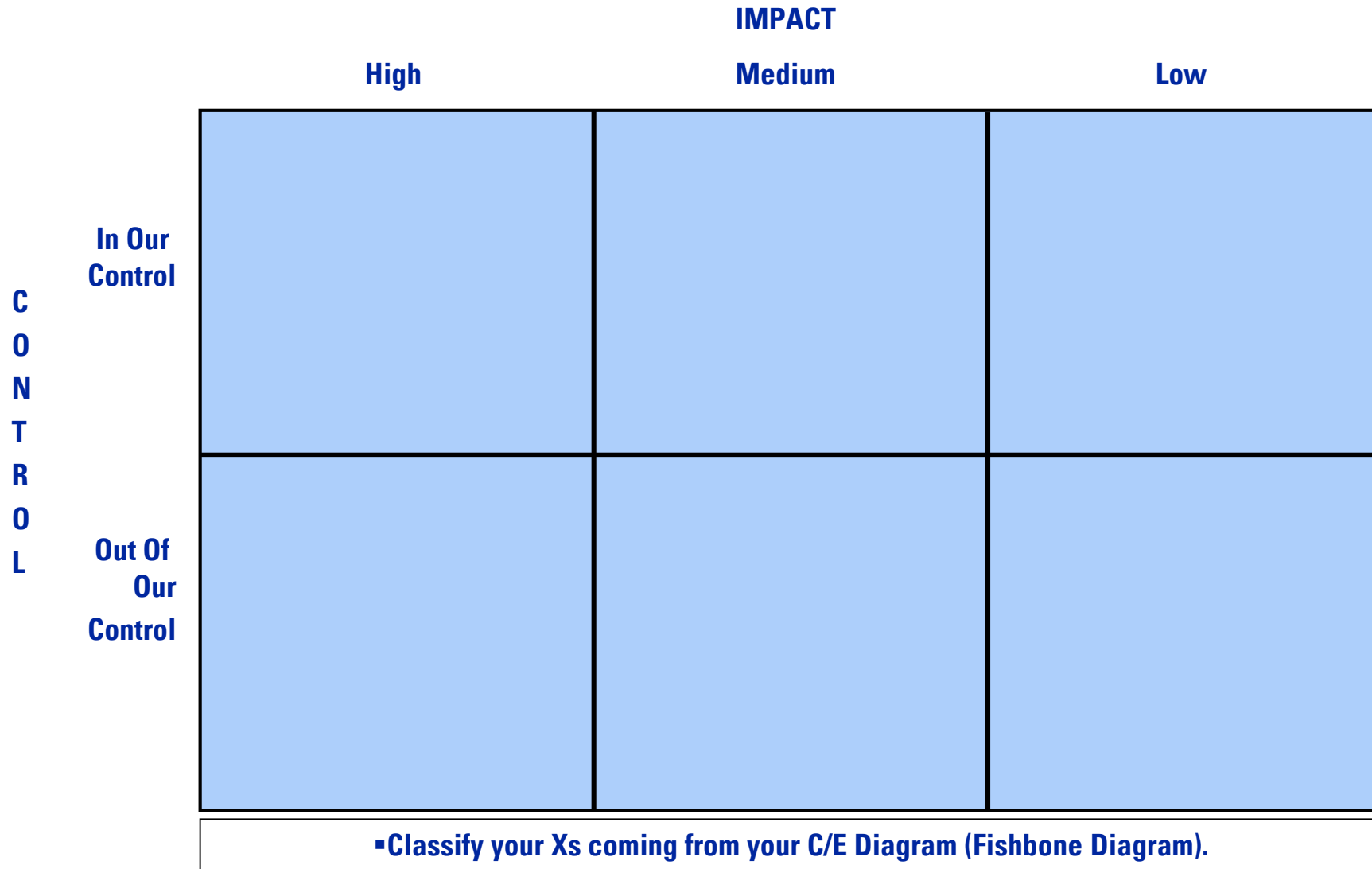
Cause & effect diagram



- Summarise potential causes
- Allows identification of root causes
- Potential root causes need to be validated by data

Prioritisation of Xs: Control / Impact Matrix

$$Y=f(X_1, X_2, \dots, X_n)$$



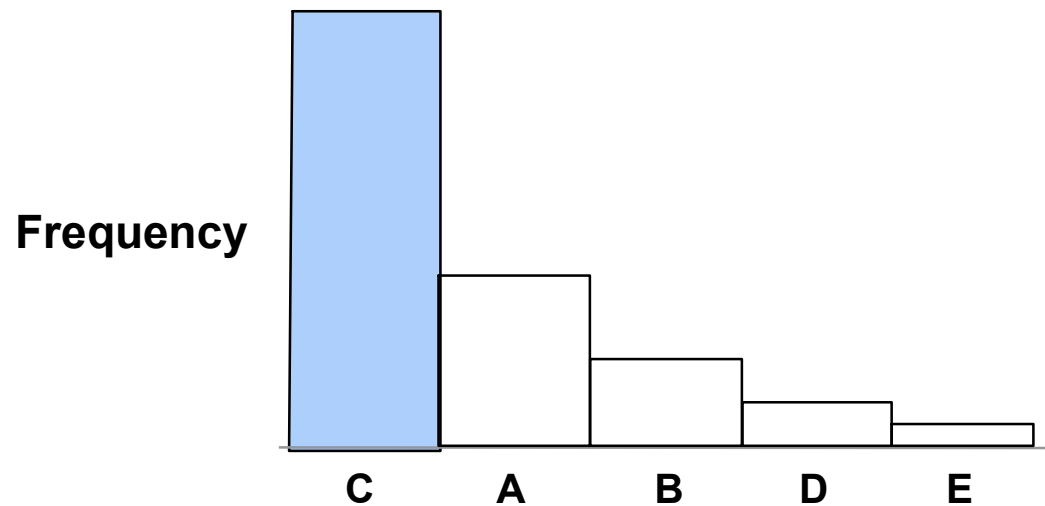
Analyse

Analyse data : Pareto chart

Pareto chart

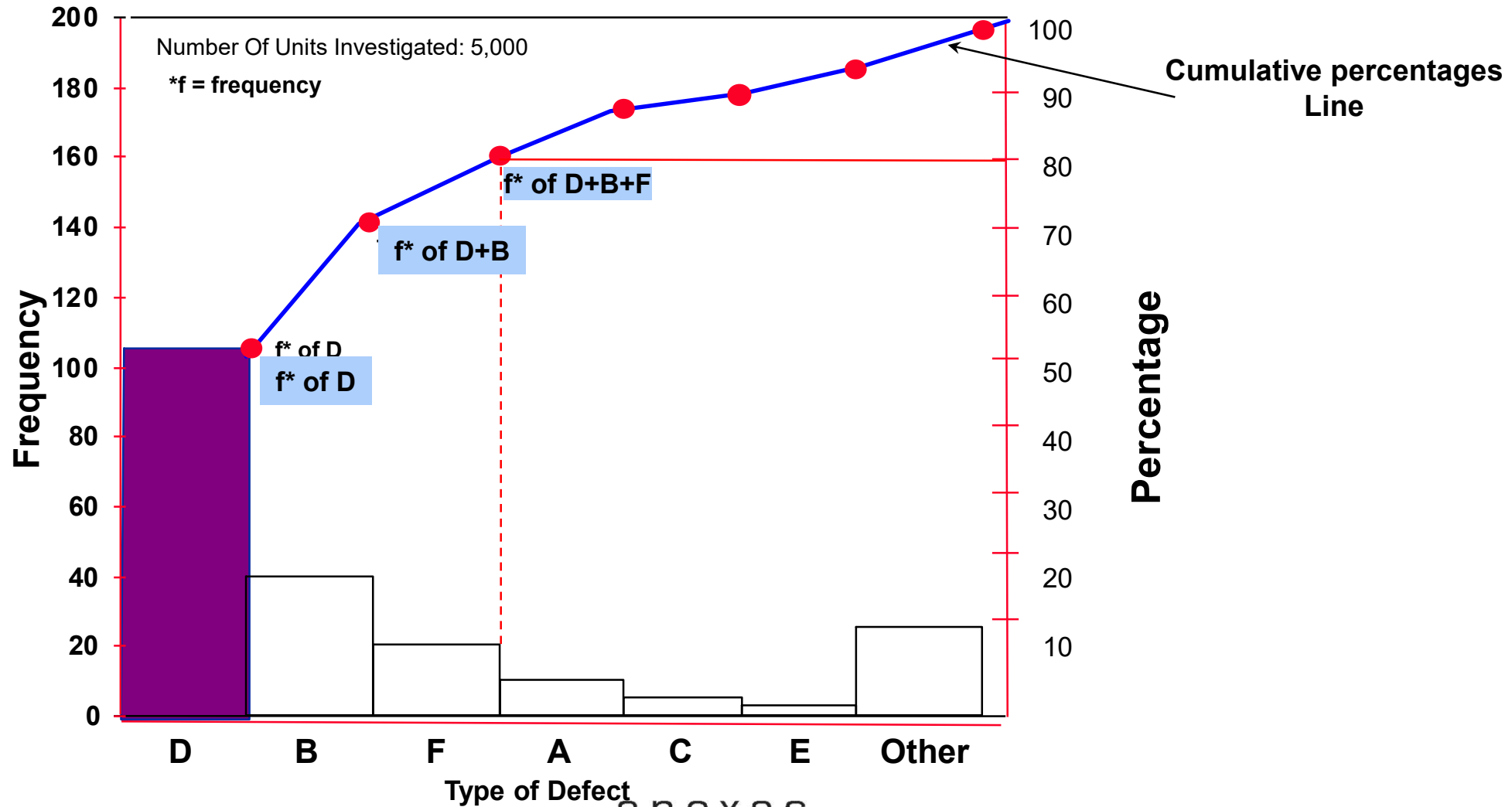
Definition

A tool to graphically represent the discrete data in categories and identify the few causes basic to most of the defects (the 80 / 20 principle)



Example

Pareto chart example



Analyse

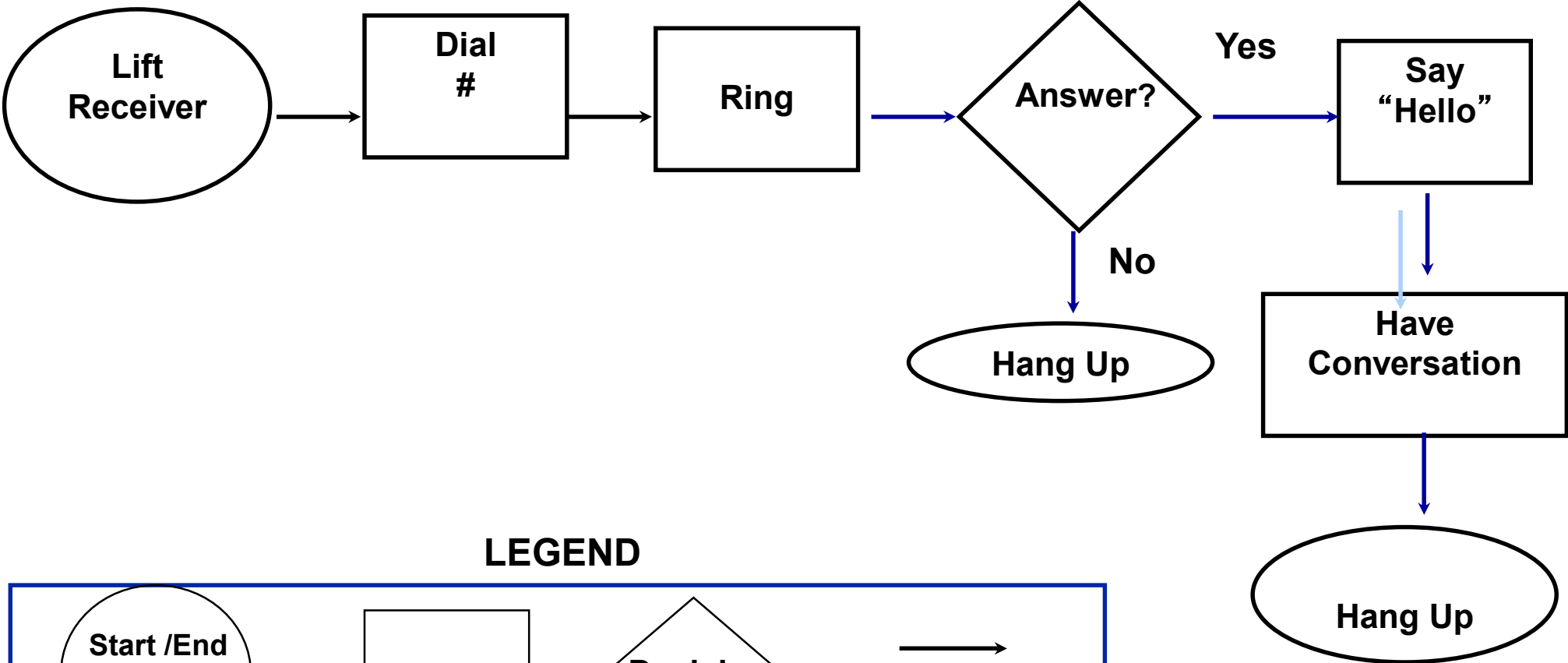
Usage of Graphs in Minitab: Following Rules apply

- *Analysing Single Column:*
 - Continuous / Variable Data: **Graphical summary (Histogram), 1t**
 - Attribute Data: **Pareto Chart, 1p**
- *Analysing Two Columns:*
 - Continuous + Attribute: **Box Plot, ANOVA**
 - Continuous + Continuous: **Scatter Plot, Regression**
 - Attribute + Attribute: **Pareto Chart, Chi Square**

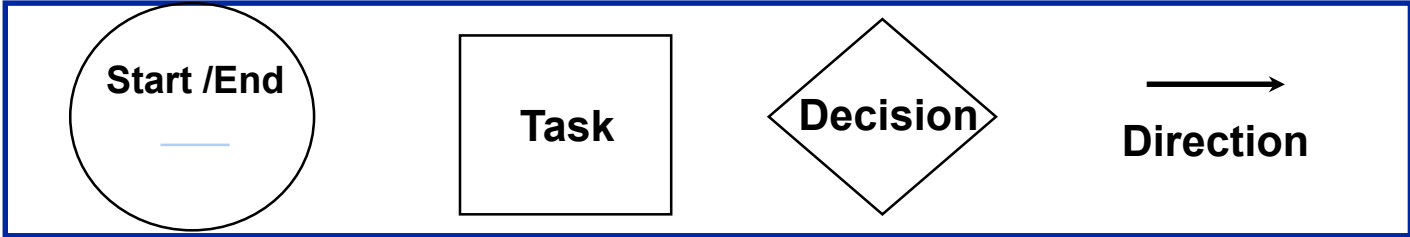
Analyse

Analyse process mapping

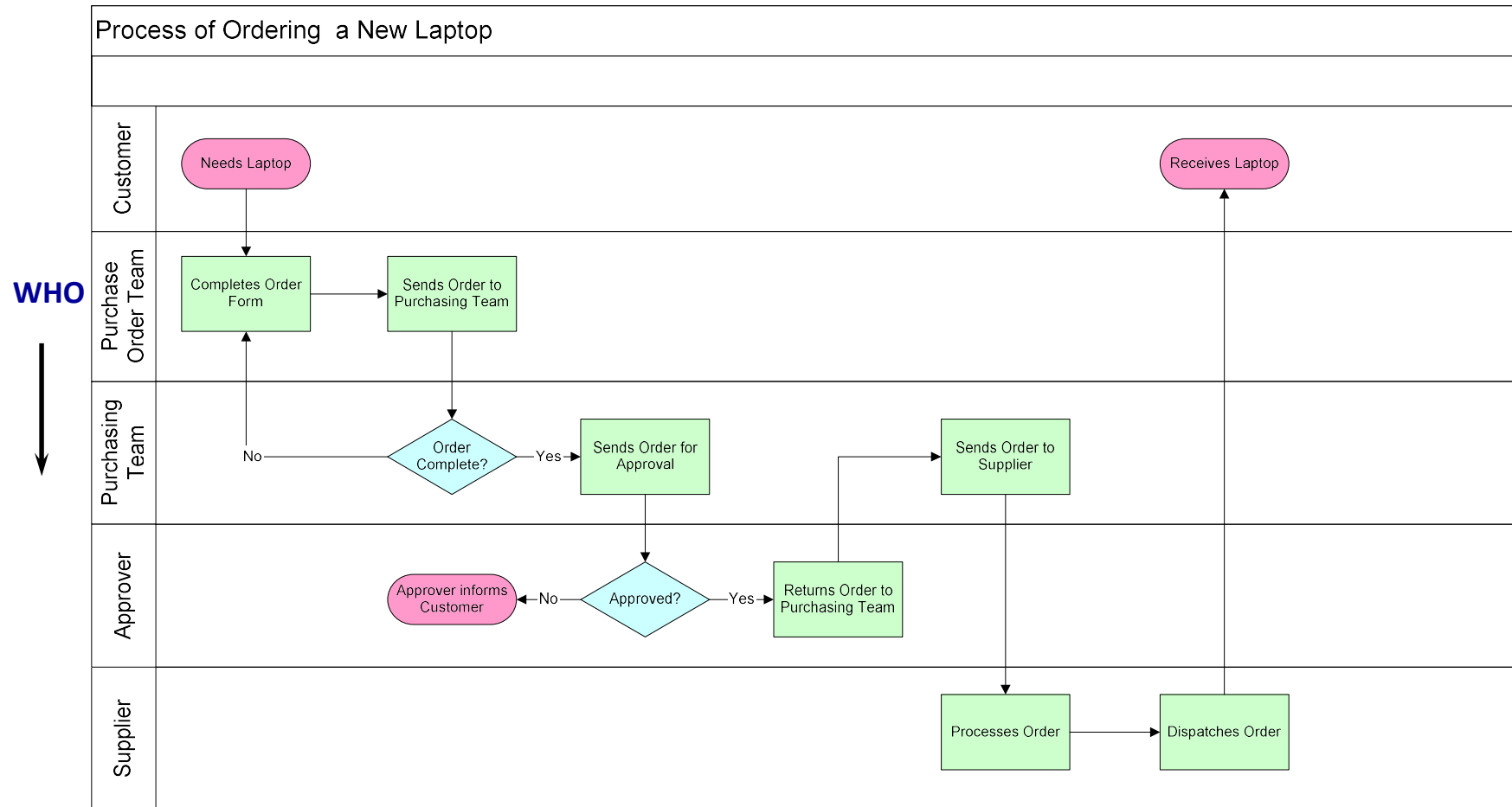
Process flowchart conventions



LEGEND



Analyse Process Mapping



WHO



PROCESS FLOW



Define Measure Analyse Improve Control

anexas
consultancy SE

Process mapping analysis

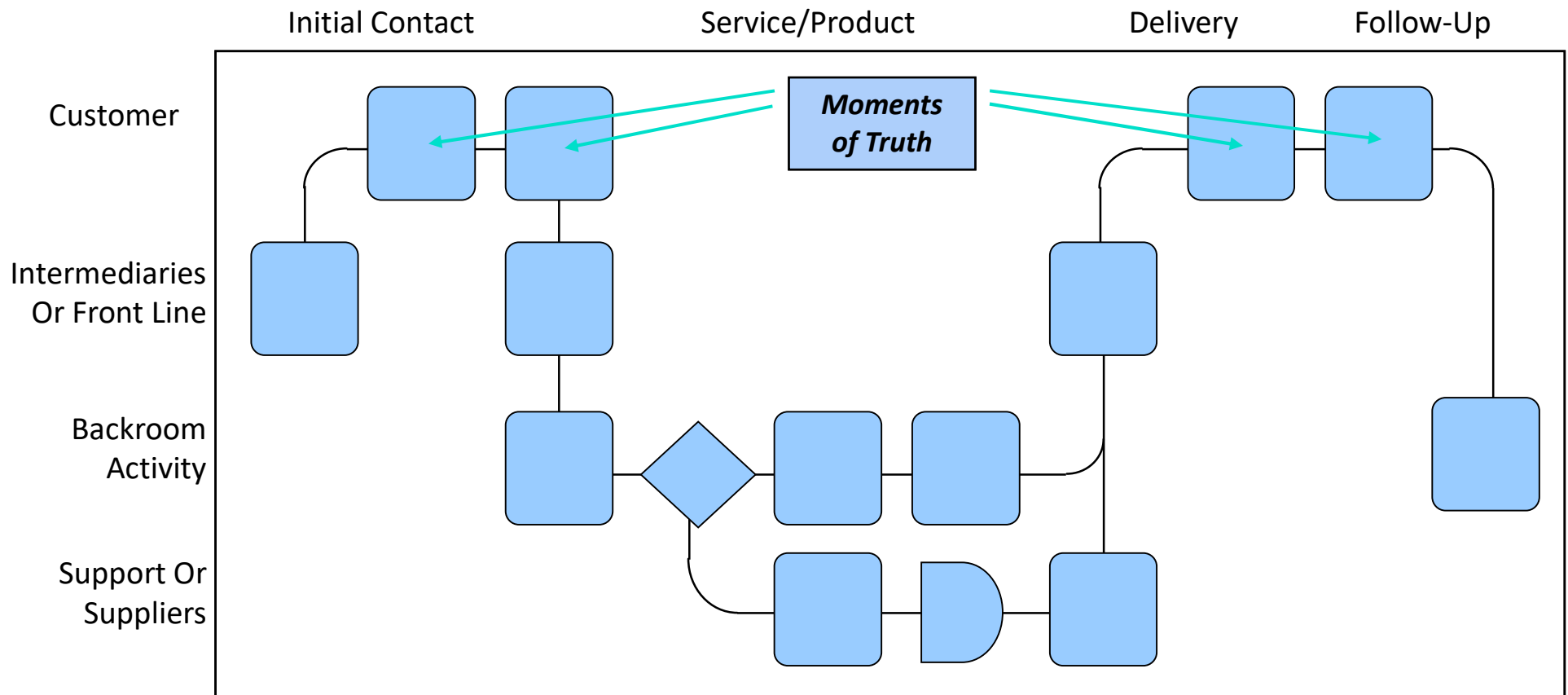
Types of analysis

- Moments of truth
 - At what moment does the customer get an impression about the process?
- Nature of work
 - Which tasks really add value?
- Work flow
 - How much active time and waiting time in the process?

Analyse

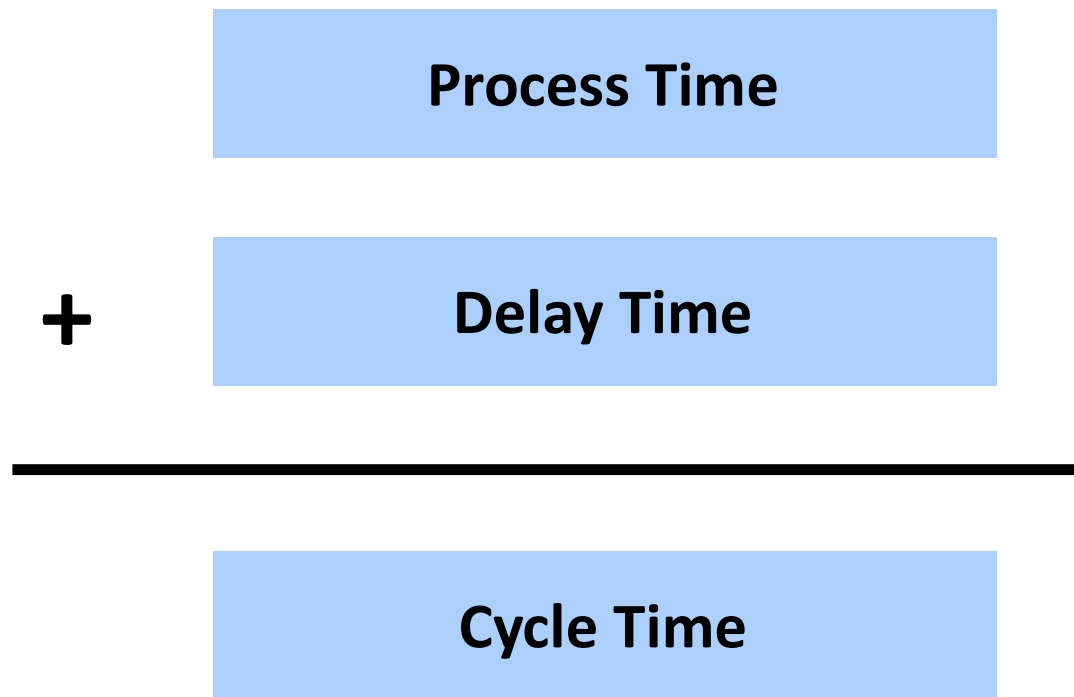
Process Mapping: Moment of Truth

A Typical Deployment Flow Chart



Analyse

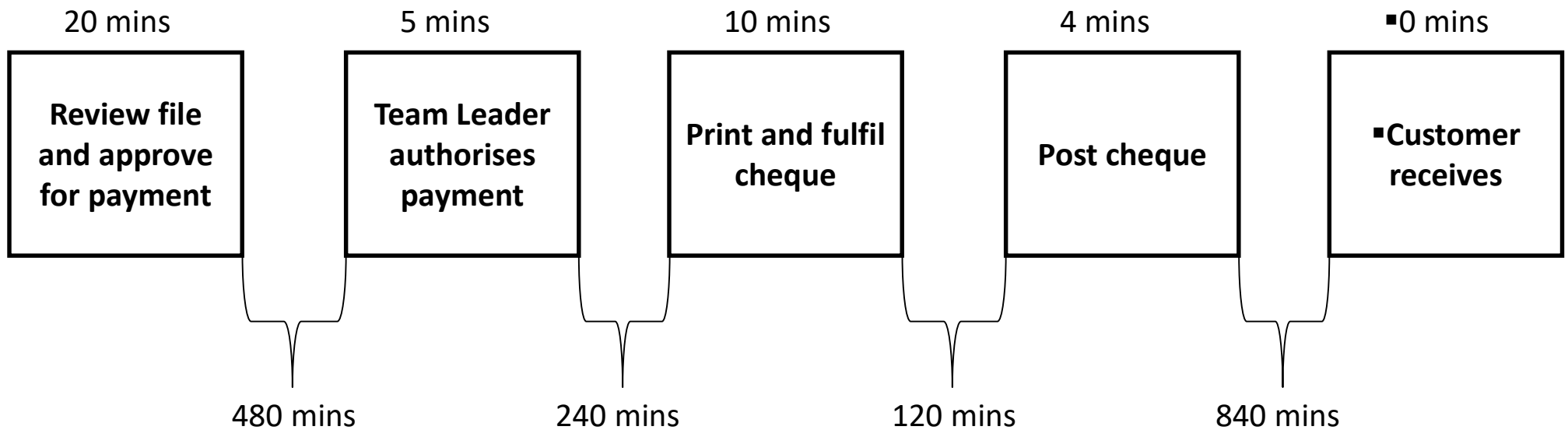
Process Mapping: Flow of Work



Analyse Process Mapping

Cycle Time = 1719 minutes

■ **Processing Time: Total 39 minutes**



+ Delay Time: 1680 minutes

Analyse

Process Mapping: Nature of Work (Value Added/ Non Value Added Activity)

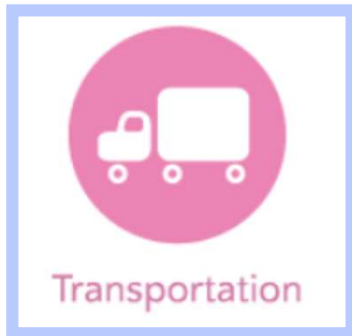
3 criteria to qualify a task “with added value” from the customers' point of view

- The step transforms the input (product or service) and brings it closer to completion
- The step is performed right the first time
- The customer is willing to pay for this step

7 (8) Wastes (Muda)

- Intellect
- Scrap / Rework / Defect/ Errors
- Waiting
- Inventory
- Motion / Movement
- Transportation
- Over processing
- Overproduction

8 Wastes- Examples



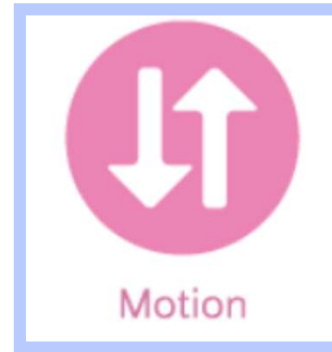
Unnecessary movement of products and materials

Example: Movement of first set of approvals documents from one location to another within or outside office premises



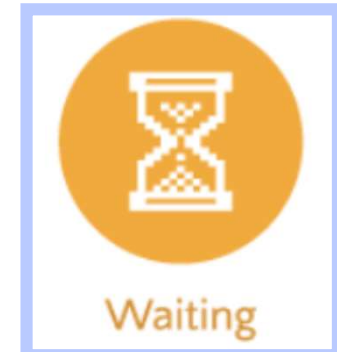
Excess materials that the customers or employees do not need right now

Example: Approval Files and documents awaiting to be processed



Unnecessary movement by people

Example: BMs hand carrying first set of documents for approval to Hub



Wasted time waiting for next steps in process

Example: BM Waiting for Fast Track application to retrieve information



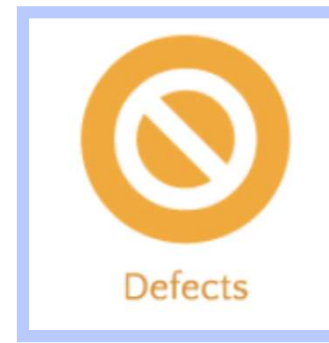
Production that is more than needed or before it is needed

Example: Collection of more approval paperwork for an F&I loan



More work or higher quality than is required by the customer

Example: Follow-ups and costs associated by coordination between Hub and Banks



Efforts caused by rework, scrap and incorrect information

Example: Rejected and returned documents due to lack of complete set of documents from Hub to BM



Underutilising people's talents, skills and knowledge

Example: Employing people in the wrong position

ESCAP Analysis

All the process steps are evaluated based ESCAP criteria.

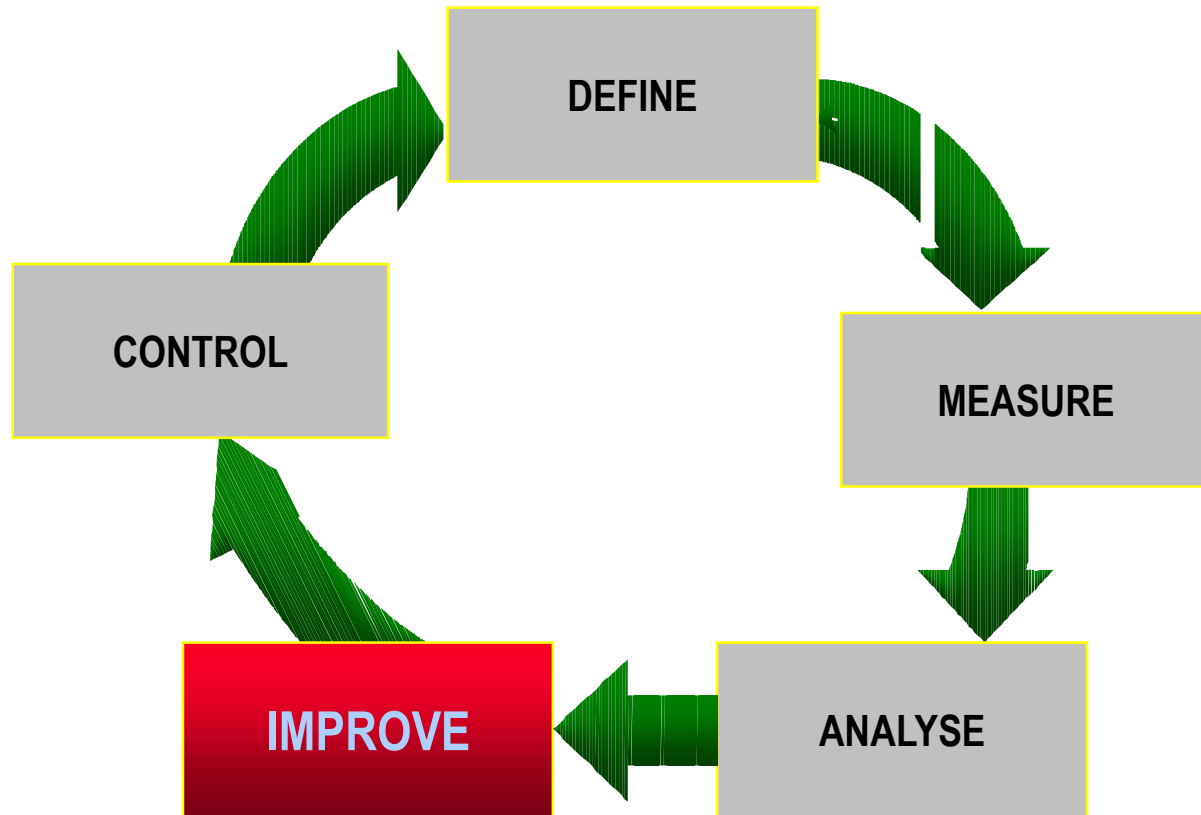
It is checked if following can be done to any of the steps :

- Eliminate
- Simplify
- Combine
- Automate
- Parallel



Module 5: Improve Phase

DMAIC : An Improvement Methodology



Improve

Objective :

Determine new improved process design

Steps :

Generate solutions

Select and test solutions

Five S

What Are The Five S's?

- Sorting
 - Selecting or separating
- Simplifying
 - Straighten and store
- Sweeping
 - Scrub and shine
- Standardizing
- Self discipline
 - Systematize

Mistake Proofing (Poka-Yoke)

What Is Mistake Proofing (Poka-Yoke)?

- Japanese phrase:
- Yokeru (to avoid), Poka (errors)
- A strategy for preventing errors in processes
- Makes it impossible for defects to pass unnoticed
- Corrects problems as soon as they are detected
- Technique detects defects
- Prevents defects from moving into next area
- Developed by Dr. Shigeo Shingo to achieve zero defects

Idea Generation: Creativity approaches

- Process benchmarking
 - Compare the performance of an existing process against other companies' "best in class" practices (same market or not)
 - Determine how those companies are organised to deliver these performance level
- Best practices
 - Use company data
- Brainstorming
 - Brainstorming with post it notes, channelled brainstorming, anti-solution etc

Brainstorming

Pre-requisites of Brainstorming

- Purpose of Brainstorming
- Participants (From the process / not from the process)
- Facilitator
- Stationery
- Selection of tool of brainstorming
- Meeting room
- Facilities
- Communication to participants about time, venue, topic in advance

Brainstorming

Rules of Brainstorming

- **Equal opportunity to everyone to participate**
- **Capture all the ideas (Document)**
- **Leave your designation and ego along with your shoes outside meeting room**
- **Non threatening environment to be created**
- **Ensure that there are no disturbances**
- **Focus on the topic (Create parking lot)**
- **Fantasize freely (Do not put breaks on your thoughts)**
- **Watch your time!**
- **Defer evaluation (Do not discuss ideas)**
- **Generate Quantity, do not worry about Quality**

Brainstorming

Types of Brainstorming

- Round Robin
- Anti Solution
- 6-3-5

Brainstorming Methods

1. Round Robin

- Everyone gets a chance to put forth his/her idea. If they do not have to contribute an idea, they just say pass.
- This goes on till all the participants have exhausted their ideas.

2. Anti Solution

- Team brainstorms on how to increase the problem rather than solving it.
- The brainstormed ideas are reversed to get the solution.

3. 6-3-5

- The 6-3-5 method is another brainstorming technique
 - that generates and develops ideas
 - by asking up to six participants to write, within five minutes, three ideas on separate cards or pieces of paper.
 - These cards or paper are then passed along to other participants for further refinement or additional ideas.
- Each round lasts for 5 minutes and the 6 participants are asked to generate up to 3 ideas per round.

Solution Selection Matrix

Select among Possible Solutions Using Objective Criteria

Criteria		Weight	Solution A		Solution B		Solution C	
			Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
1				0		0		0
2				0		0		0
3				0		0		0
4				0		0		0
5				0		0		0
6				0		0		0
TOTAL				0		0		0

Where **weight** and **scores** on following scale : High = 9, Medium = 3 and Low = 1.

Conclusions:

Criteria are the requirements that you want your solution to meet. Some criteria are “must” criteria. Any solution that does not meet even one of the “must” criteria must be eliminated

Solution Selection Matrix

Criteria		Weight	Solution A		Solution B		Solution C	
			Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
1	cheap solution	3	3	9	9	27	9	27
2	quick to implement	3	9	27	1	3	3	9
3	high impact on CTQs	9	9	81	9	81	9	81
4	compliant	9	1	9	9	81	9	81
5	change management	3	1	3	3	9	9	27
6	resource required	1	9	9	3	3	3	3
TOTAL				138		204		228

Where **weight** and **scores** on following scale : High = 9, Medium = 3 and Low = 1.

Example :

Solution A = outsource all data processing

Solution B = development of our own software

Solution C = buy a software and adapt to our needs

It seems here that solution C is the most satisfying. B also can be considered as an option.

Criteria are the requirements that you want your solution to meet. Some criteria are “must” criteria. Any solution that does not meet even one of the “must” criteria must be eliminated

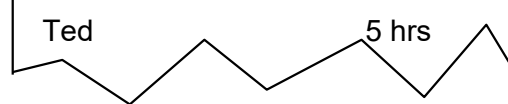
Elements of a Plan

Tasks and Timeline

Step	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
	█						
		█					
			◆				
				█			
					█		
						█	
							█

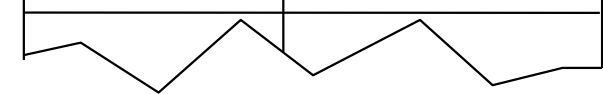
Budget and Resources

<i>Expenses</i>	
XXXXX	00.00
XXXXX	00.00
XXXXX	00.00
<i>Staff time</i>	
Ted	5 hrs



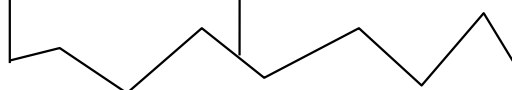
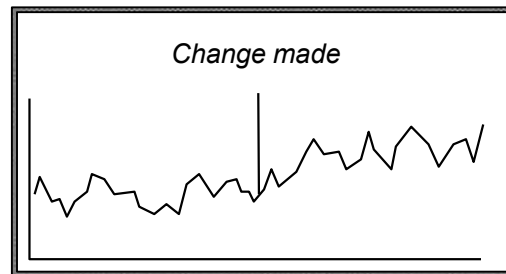
Stakeholders

<i>PERSON or GROUP</i>	<i>Communication and Participation</i>
Finance	
Sales	
IS	



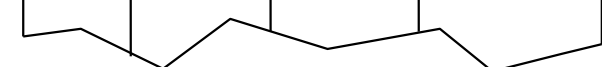
How to Check

<i>PLAN</i>	<i>ACTUALS</i>

Potential Problems

<i>Step</i>	<i>Pot. Failure</i>	<i>Pot. Cause</i>	<i>Counter-measures</i>



Planning Tools

What do you want to do?

See tasks and their relative sequence – duration and timing

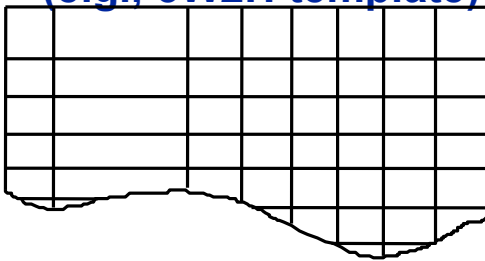
Break down the components of a task

Describe steps of a process and responsibilities

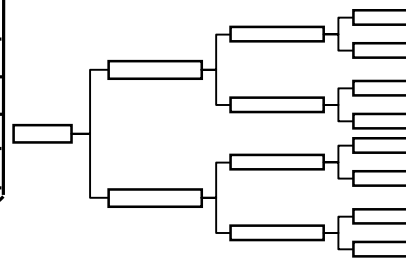
See tasks and their relative sequence, duration, and timing

Planning grid

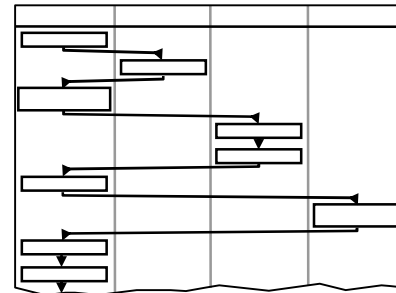
(e.g., 5W2H template)



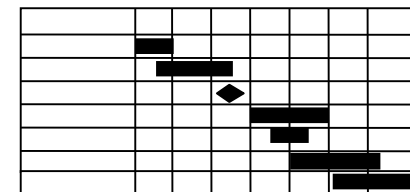
Tree diagrams



Process maps



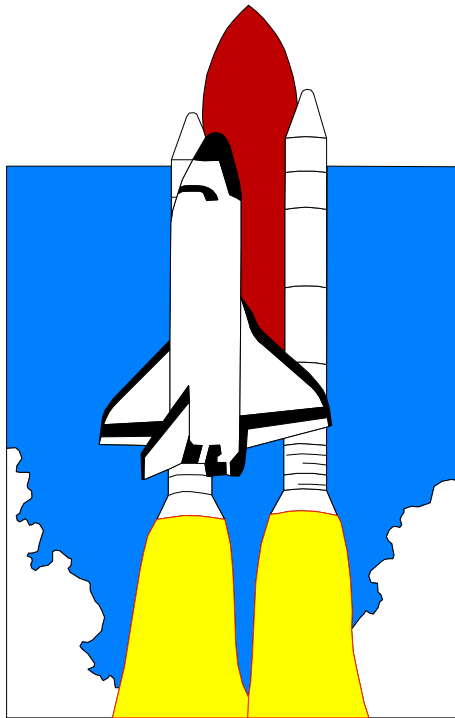
Gantt charts



Improve

Introduction to FMEA

Failure Modes and Effects Analysis



Definition - FMEA

- A structured approach to:
 - identifying the ways in which a product or process can fail
 - estimating the risk associated with specific causes
 - prioritizing the actions that should be taken to reduce the risk
 - evaluating the design validation plan (Product) or the current control plan (Process)
- Primary Directive: Identify ways the product or process can fail and eliminate or reduce the risk of failure

Overview

Process Step/Input	Potential Failure Mode	Potential Failure Effects	S E V	Potential Causes	O C C	Current Controls	D E T	R P N	Actions Recommended

How Bad?

How Often?

How well?

What is the Input

What can go wrong with the Input?

What is the Effect on the Outputs?

What are the Causes?

How can these be found or prevented?

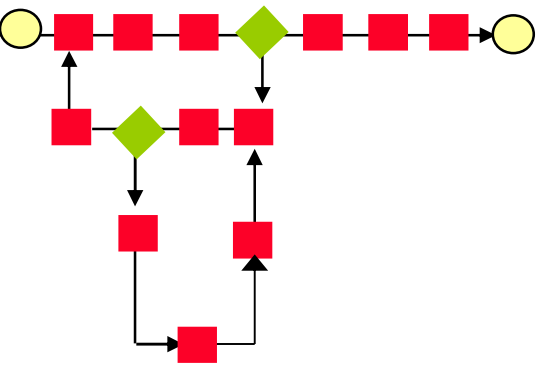
What can be done?

Definition of Terms

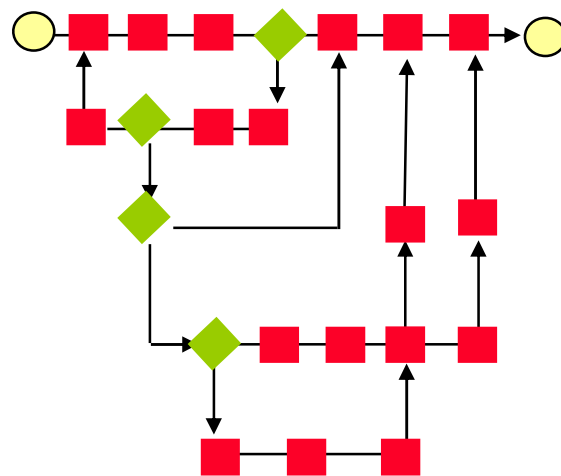
- Failure Mode
- Effect
- Cause
- Current Controls
- Risk Ratings 1-10 : Severity (S), Occurrence (O), Detection (D)
- Risk Priority Number (RPN) = $S \times O \times D$

Continuous Improvement

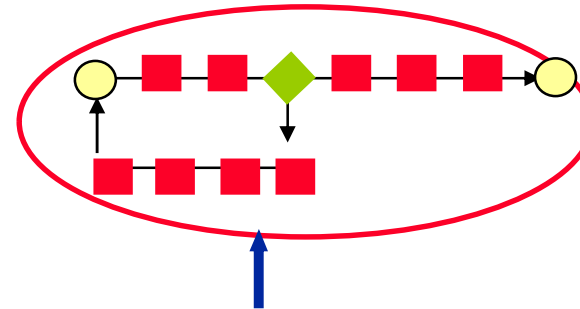
What you *think*
It is....



What it *really* is...

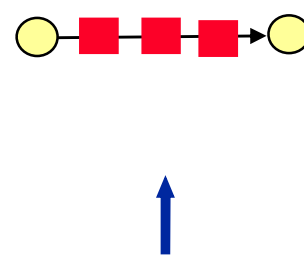


What it *should* be...



IMPROVE :
What we want to put
in place in generation
1 that will give us the
money to finance
generation 2.

What it
could be



IMPROVE :
Generation 2 target.

Benefits of doing a pilot

- Improve the solution that meets customer requirements
- Refine implementation plan
- Lower risk of failure by identifying and fixing possible problems ahead of time
- Confirming expected results and relations between predictive parameters and results (Xs on Y)
- Increase opportunities to receive feedback and buy-in
- Implement the solution earlier and faster for a particular customer segment

IMPROVE

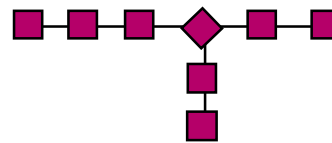
Purpose : To determine new improved process design through idea generation, selection, process design, solution testing , and improvements implementation.

Solutions Refinement



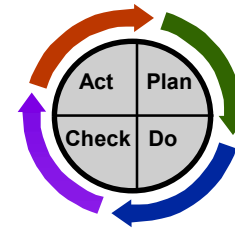
Evaluate potential problems in new process design and improve robustness of this design

New Process



Develop a “should be” process map showing the impact of the solution

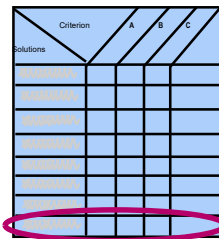
Pilot



Pilot the solution on a small scale to increase buy-in and improve overall implementation

Solution generation and selection

Brainstorming, anti solution, brainwriting, ...



Generate solutions to address the root causes and develop criteria to screen and select solutions (including cost / benefit)

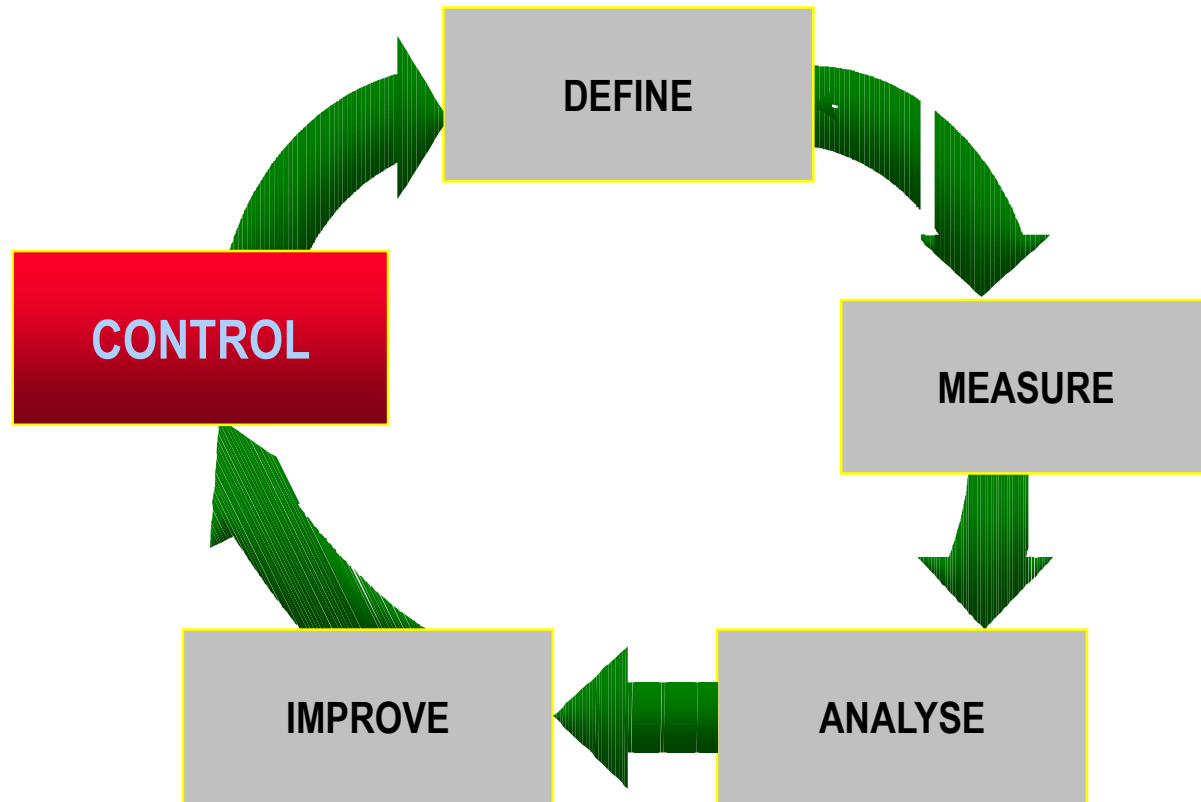


Perform cost / benefit analysis of proposed solution



Module 6: Control Phase

DMAIC : An Improvement Methodology



Control

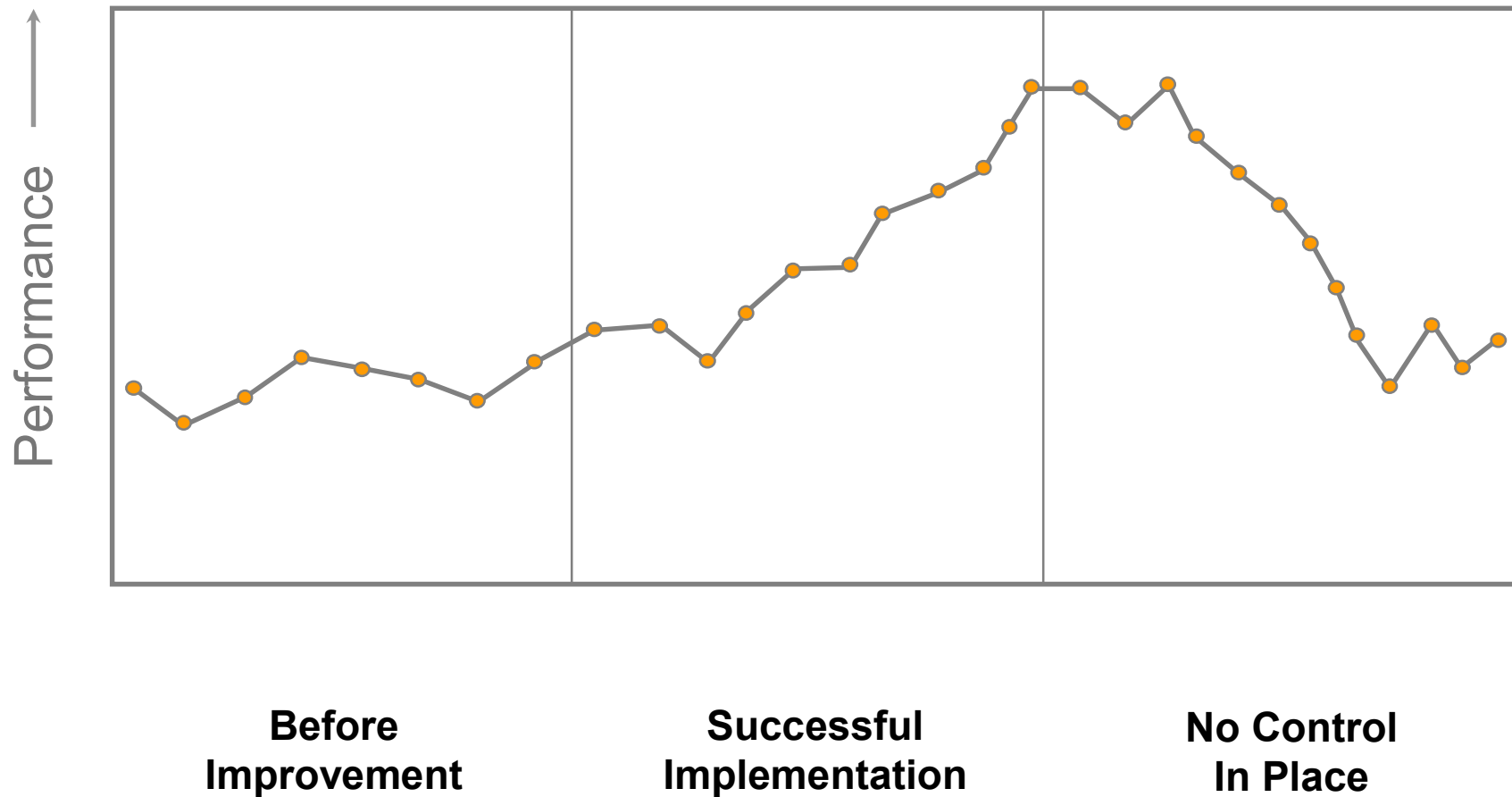
Objective :

- Ensure improvement over time

Steps :

- Create control tools (documentation and dashboard)
- Organise process reviews by Process Owner

Control = ensure gains over time



Time 
anexas
consultancy SE

CONTROL = ensure gains over time

The CONTROL phase naturally leads to Process Management as the purpose of that phase is to deliver the tool set for ongoing management of the process performance by Process Owner.

CONTROL = implement process management

- Process Management Chart
 - process owner's name
 - process documentation (process mapping, persons involved)
 - customer performance criteria
 - key measures to track, follow and analyse (output, process, input, financials)
- Dashboards
 - graphical display of measurements collected
- Process performance reviews
 - frequency according to process cycle time
- Response plan
 - quick fixing of special causes
 - opportunities for ongoing improvement, i.e. new DMAIC projects

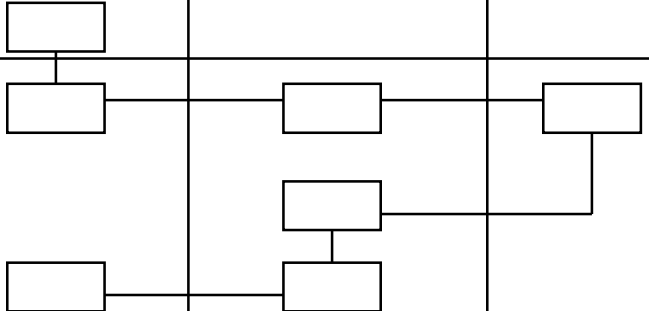
Process Management Chart

Example

Process Owner Name: _____

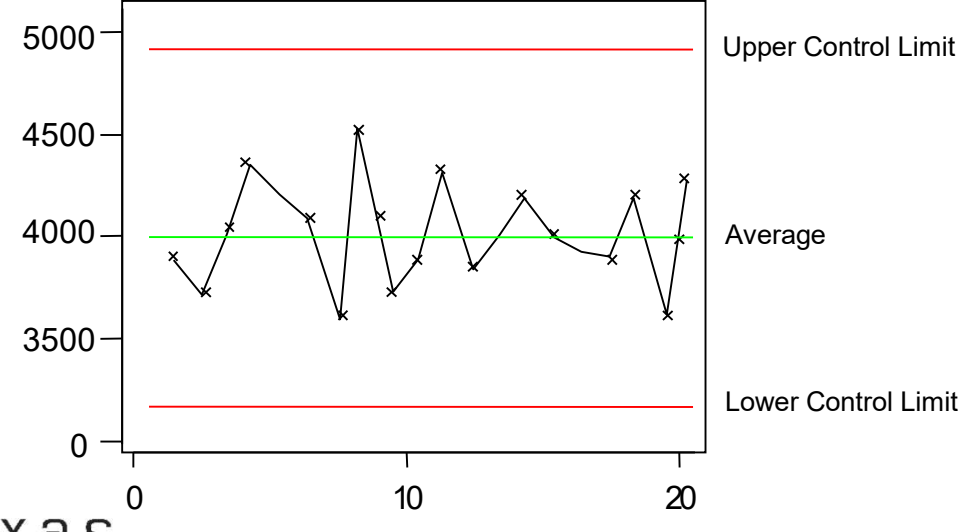
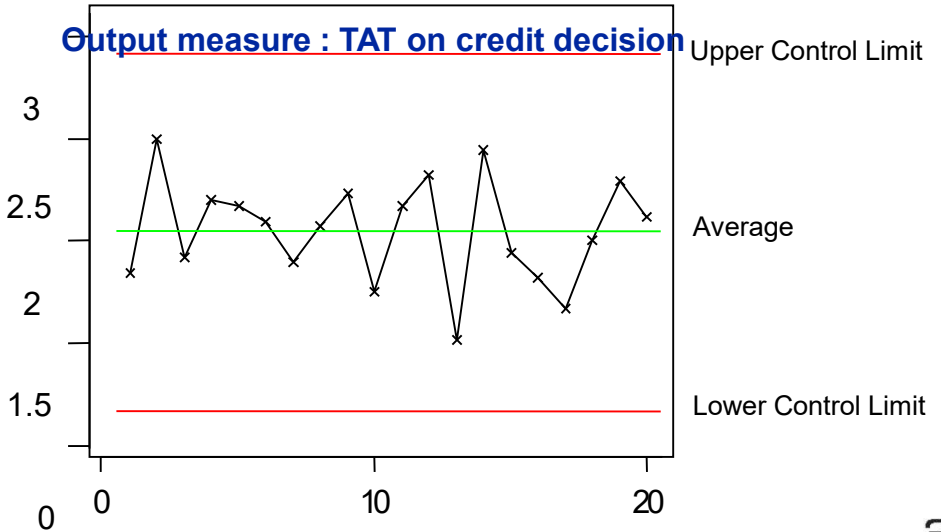
Date: _____

Process Name: New Account Opening

Process Name: New Account Opening			Check The Process			Act/Fix Problem	
	Process Map	Area 3	Output, Process or Input Measure	Target	Data collection method	Immediate Control/Fix	Process/System Improvement
			<ul style="list-style-type: none"> •TAT on credit decision 	<ul style="list-style-type: none"> • < 2.5 min. 		<ul style="list-style-type: none"> •Analyse if common cause or special cause variation. Make sure process is in control (within control limits) and capable (within customer specification limits) 	<ul style="list-style-type: none"> •When process not in control, analyse variation and fix issues. •When process in control but no more capable, launch a new improvement project.
			<ul style="list-style-type: none"> •% of approvals •# of applications per day •# Store team meetings / month •# of training sessions / store staff 	<ul style="list-style-type: none"> • > 85% • > 3500 • > 3 • > 3 			

Input measure : # of applications per day

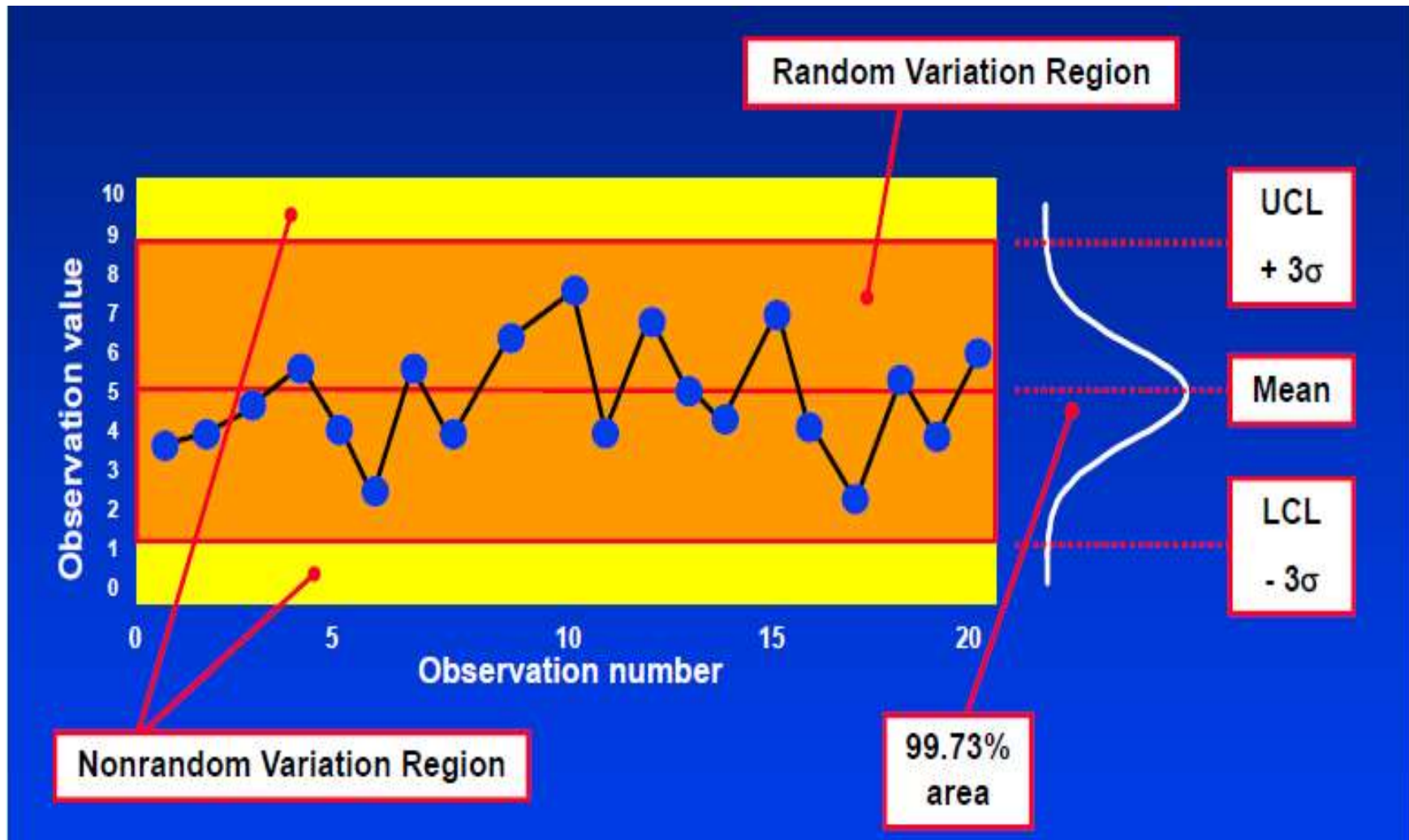
Output measure : TAT on credit decision



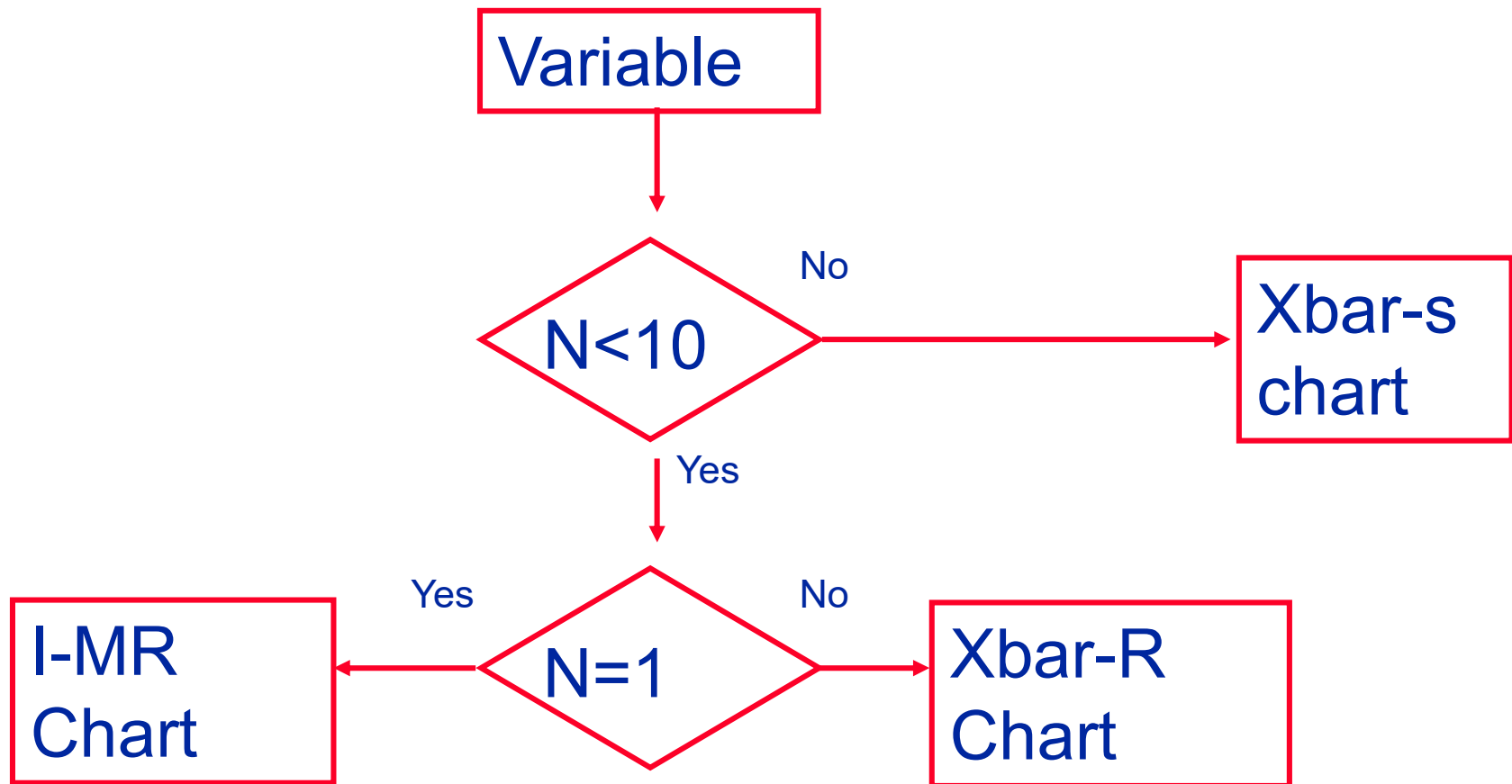
Statistical Process Control for Variables Data (SPC)

Introduction to SPC

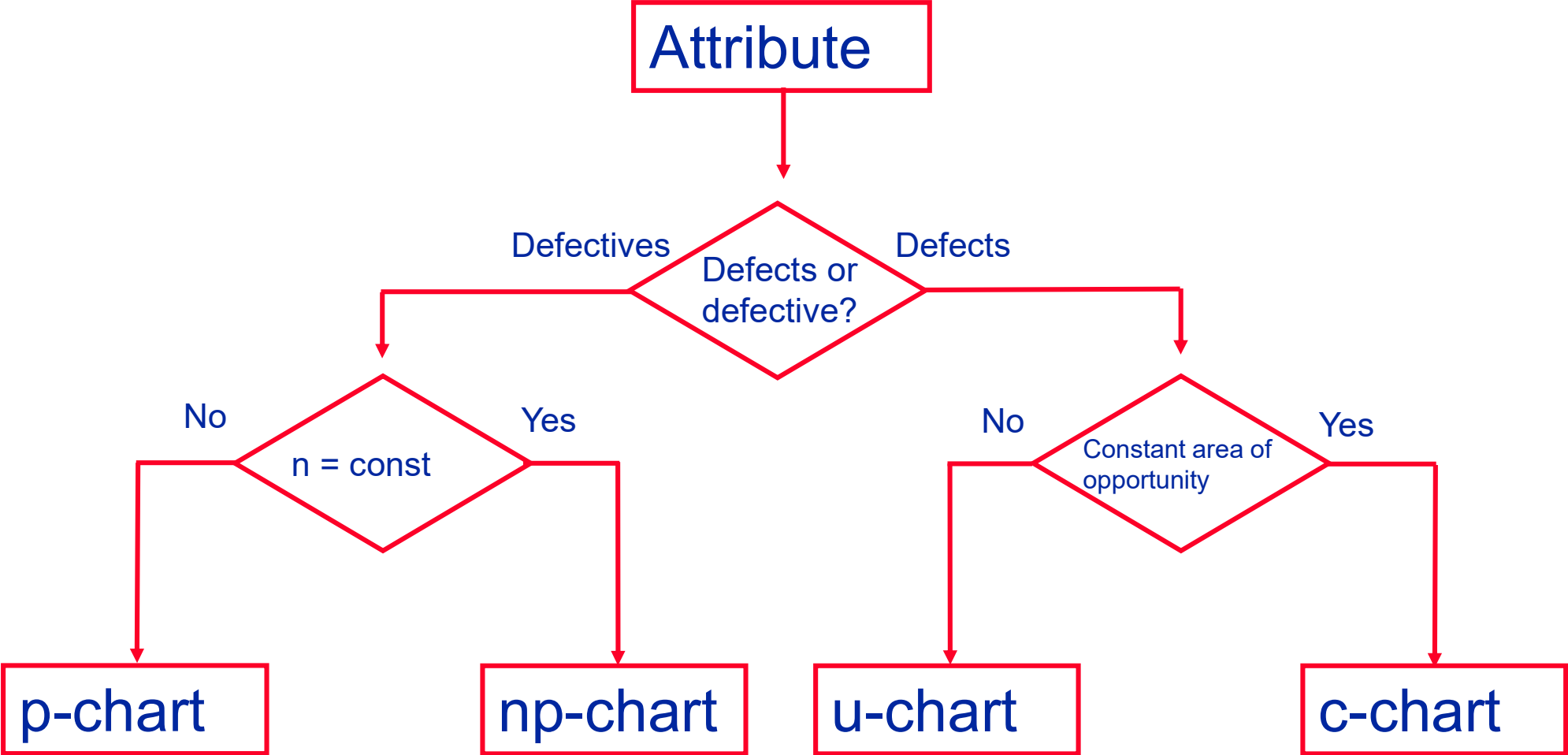
Statistics of a Control Chart



Control Chart Roadmap



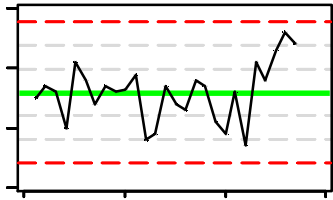
Control Chart Roadmap



CONTROL

Purpose: To ensure improvement effectiveness over time by institutionalisation of the improvement and implementation of ongoing monitoring and reviews.

Monitoring Plan



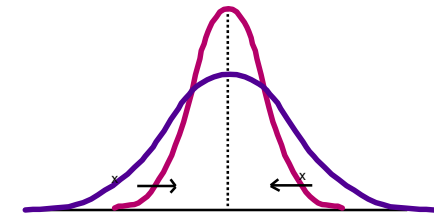
Develop a monitoring plan to insure gains are held over the long term

Implementation Plan

$Q \times A = E$

Who	What	Where	When
#####	#####	#####	#####
#####	#####	#####	#####
#####	#####	#####	#####

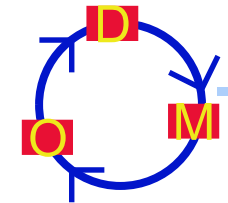
Develop a full implementation plan including project and change management elements



Process Capability

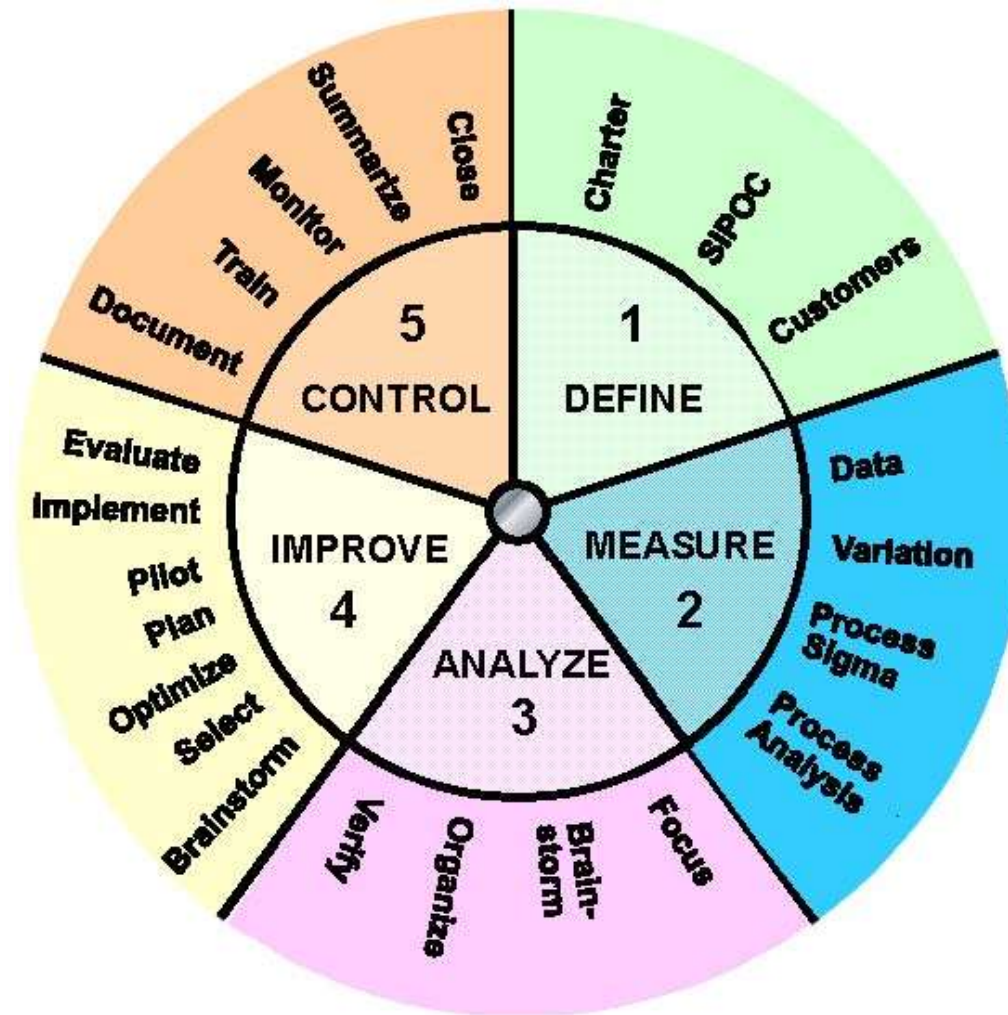
Monitor the process according to plan. Chart data as evidence that process is in control and meeting customer specifications

Continuous Improvement



- Process ownership to Process Owner (Process Management chart to facilitate transfer)
- Process Owner to held regular process reviews based on dashboards.
- Process Owner to take action when process does not deliver what is expected
- Process has entered Process Management = Define, Measure , Operate.

DMAIC REVIEW



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- Please subscribe Anexas Europe YouTube channel to get access to all the training material on video.
<https://m.youtube.com/channel/UCAk6IJsnpCsz7-rZTVx90uw>
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- Connect with the founder of Anexas Europe – Amitabh Saxena on his LinkedIn account to see his latest videos on quality topics <https://www.linkedin.com/in/amitabhsaxena/>

Thank You!

- Please write to Anexas Team at enquiry@anexas.net for any queries
- Anexas website: www.anexas.net

Thank You!

- Congratulations on completing a milestone in your life!
- Best wishes for your Lean and Six Sigma journey!

- Amitabh Saxena

CEO

Anexas Europe