Welcome to Lean and Six Sigma Training

Lean Six Sigma Yellow Belt

Anexas Europe

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Lean and Six Sigma Overview - Objectives

At the end of the module participants will:

- Understand why an organization launches Six Sigma
- Understand the flow of the DMAIC methodology for process improvement
- Have kown some of the relevant tools in DMAIC methodology
- Know when and in what context to use the DMAIC methodology and 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

- Owns vision, direction, integration, results
- Leads change

Leadership/ Sr. Executive

- Support Six Sigma
- Ensure success of GB/BB projects

Yellow Belts

- Supports Black Belts by participating on project teams

Green Belts

- Develops deployment and Strategy
- Supports cultural change

Champion / Sponsor

All Employees (White Belts)

- Understand vision
- Apply concepts to their job and work area

- Apply Breakthrough Strategy to specific projects, lead and direct teams to execute projects

Black Belts

- Owns the process in which GB/BB works
- Challenges GB findings

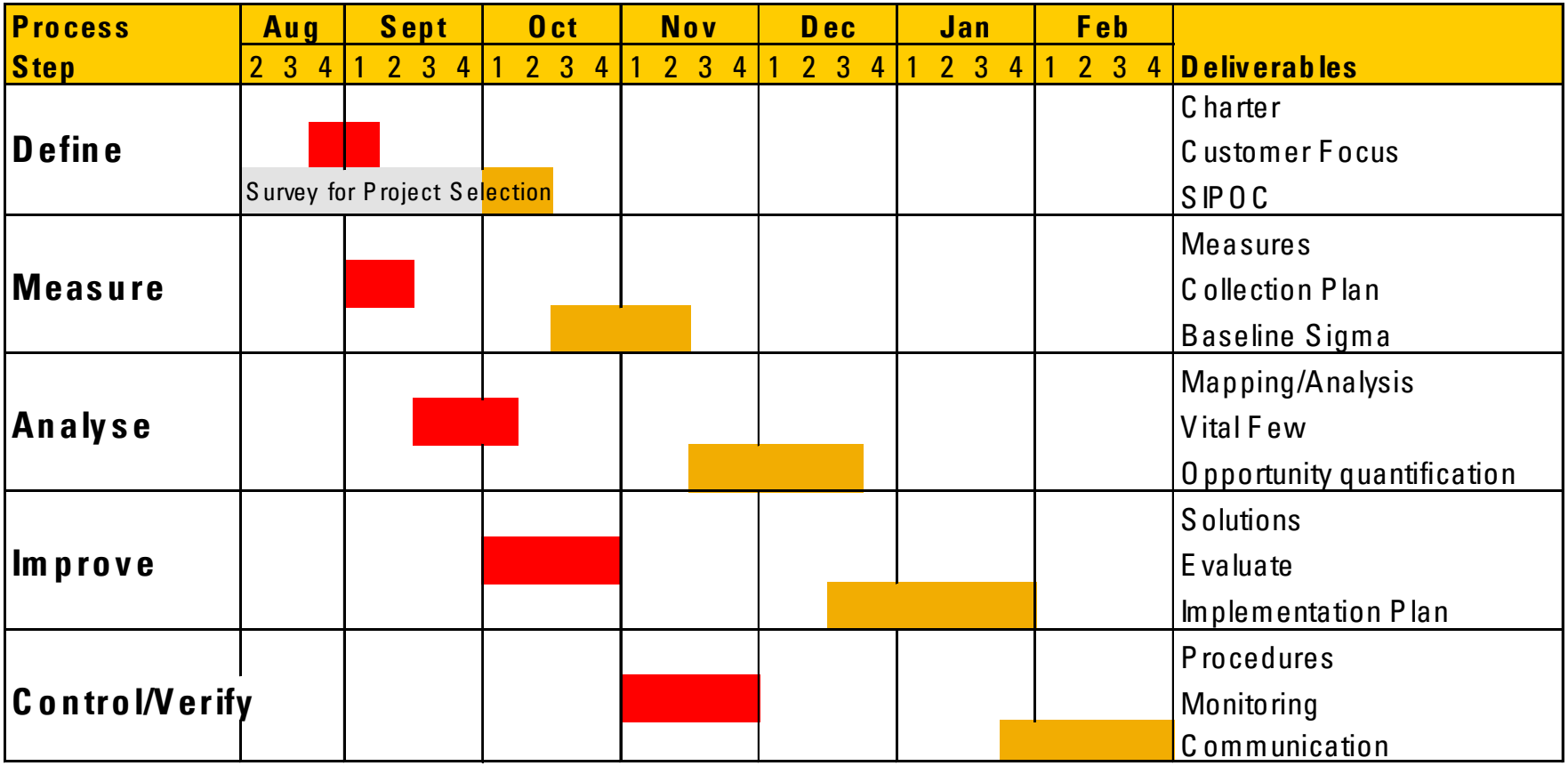
Process Owner

Master Black Belt

- Trains and coaches Black Belts , Green Belts and leaders

A Typical One Wave Implementation Plan at an organization

High Level Improvement Timeline

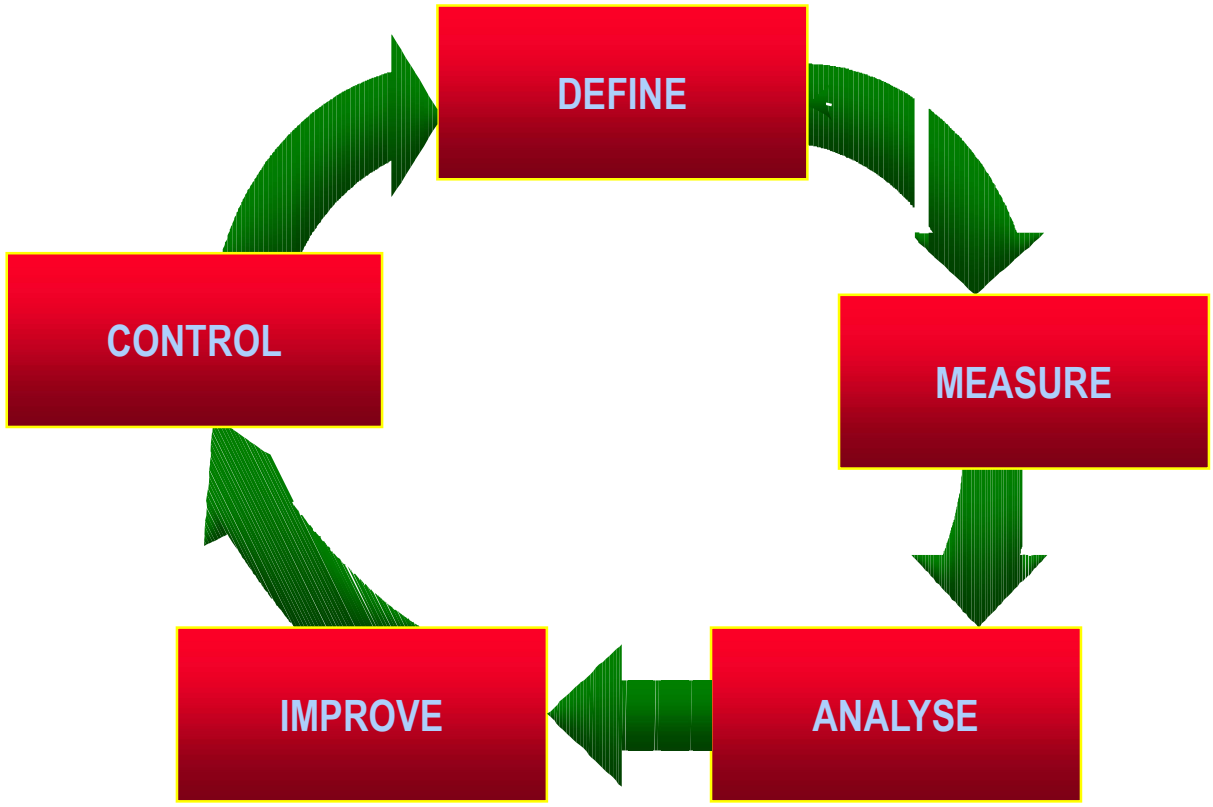


Six Sigma Trainings at an organization

- White Belt Training (Half Day Awareness Program)
- Yellow Belt Training - Awareness Programme with/without Business Game (1 Day)
- Champions Training (1 Day)
- Green Belt Training (4 Days)
- Black Belt Training (4 Days after GB)
- During Induction, the employees are exposed to Six Sigma philosophy (Half an hour module)
- Master Black Belt (5 days after BB)

Green Belts and Black Belts are required to pass an exam and demonstrate success in their projects (approved by financial analyst for financial savings) to attain certification

DMAIC : An Improvement Methodology

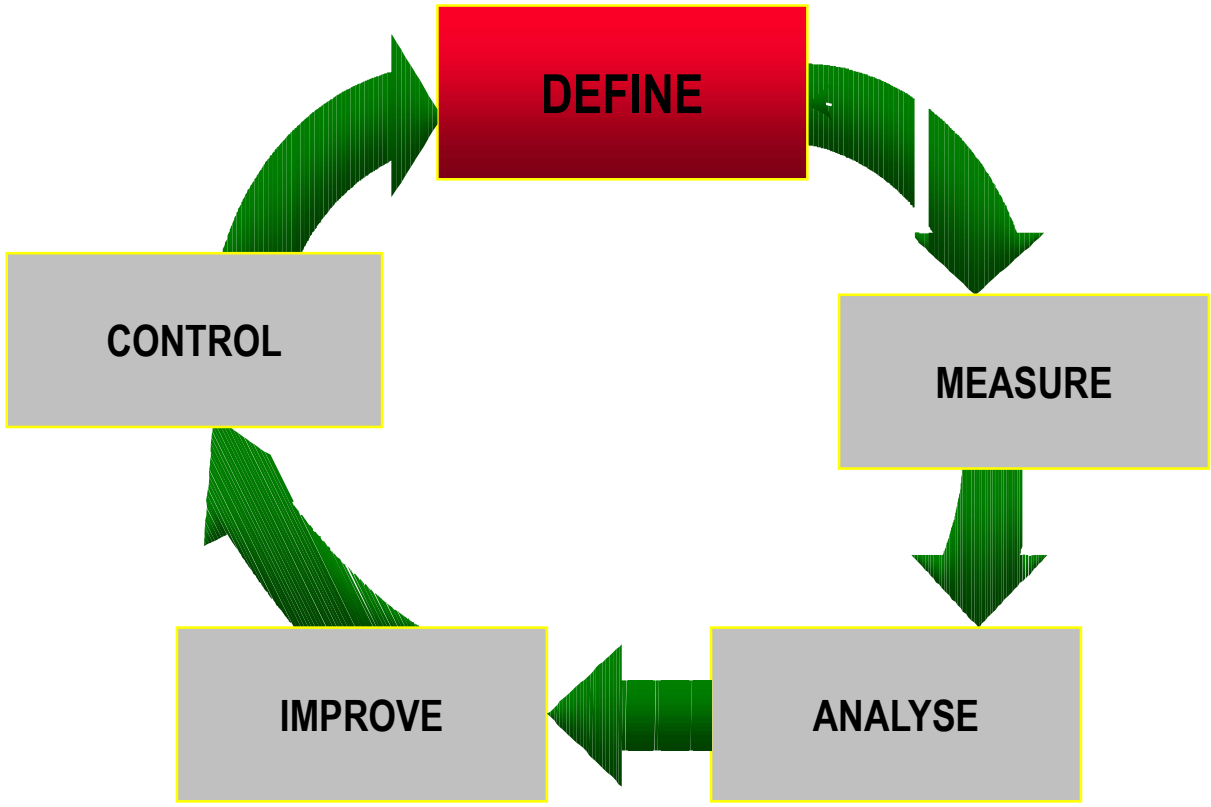


DMAIC : An Improvement Methodology

- **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

DMAIC Overview

DMAIC : An Improvement Methodology



DEFINE Roadmap

High Level Process Map (SIPOC)

- Process Definitions
- Connecting the Customer to Your Process

Customer CTQs

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

Project Charter

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

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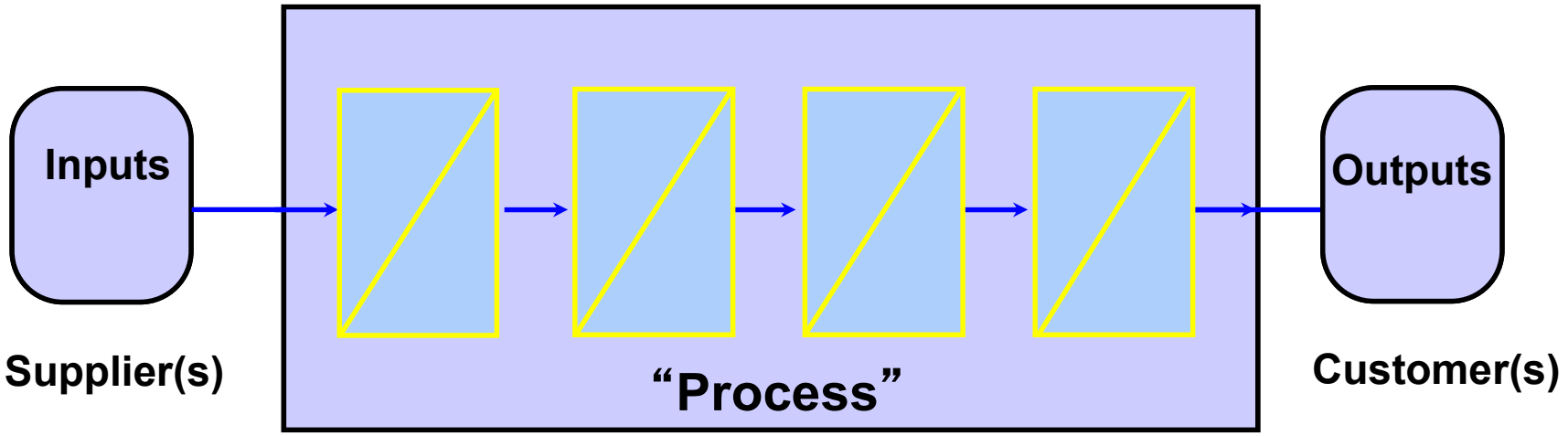
What is a process ?

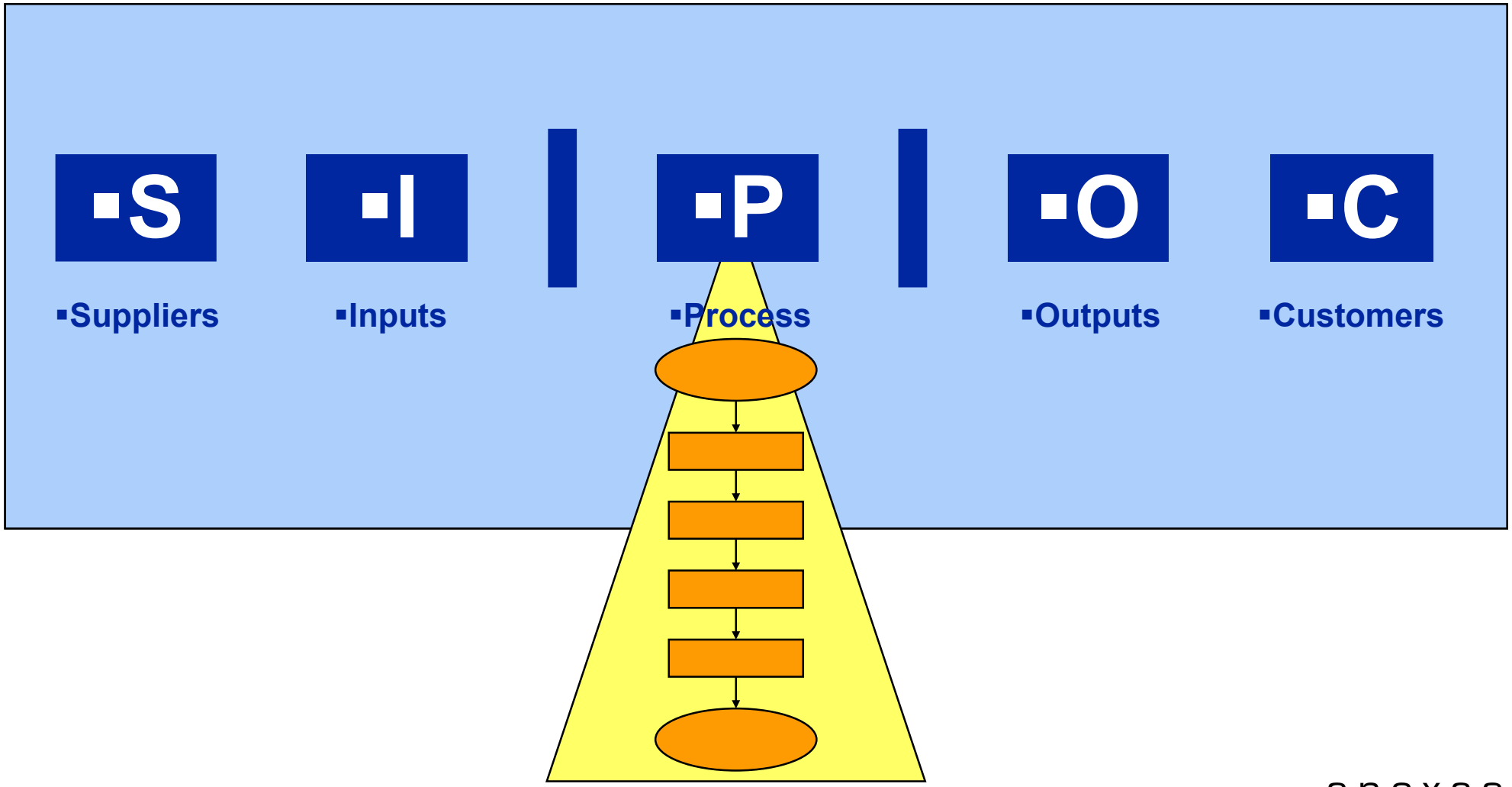
A set of activities that takes one or more inputs and transforms them into outputs that are of value to the customer



▪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

DMAIC Project Charter

Project No.:_____

Project Name:

Process :

Resource Plan

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

Team Members

Text

Problem Statement

Text

Scope

Text

Goal Statement

Text

Customer CTQ's

Text

Estimate Financial Opportunities / Intangible Benefits

Text

High Level Project Milestone

Text

Validation

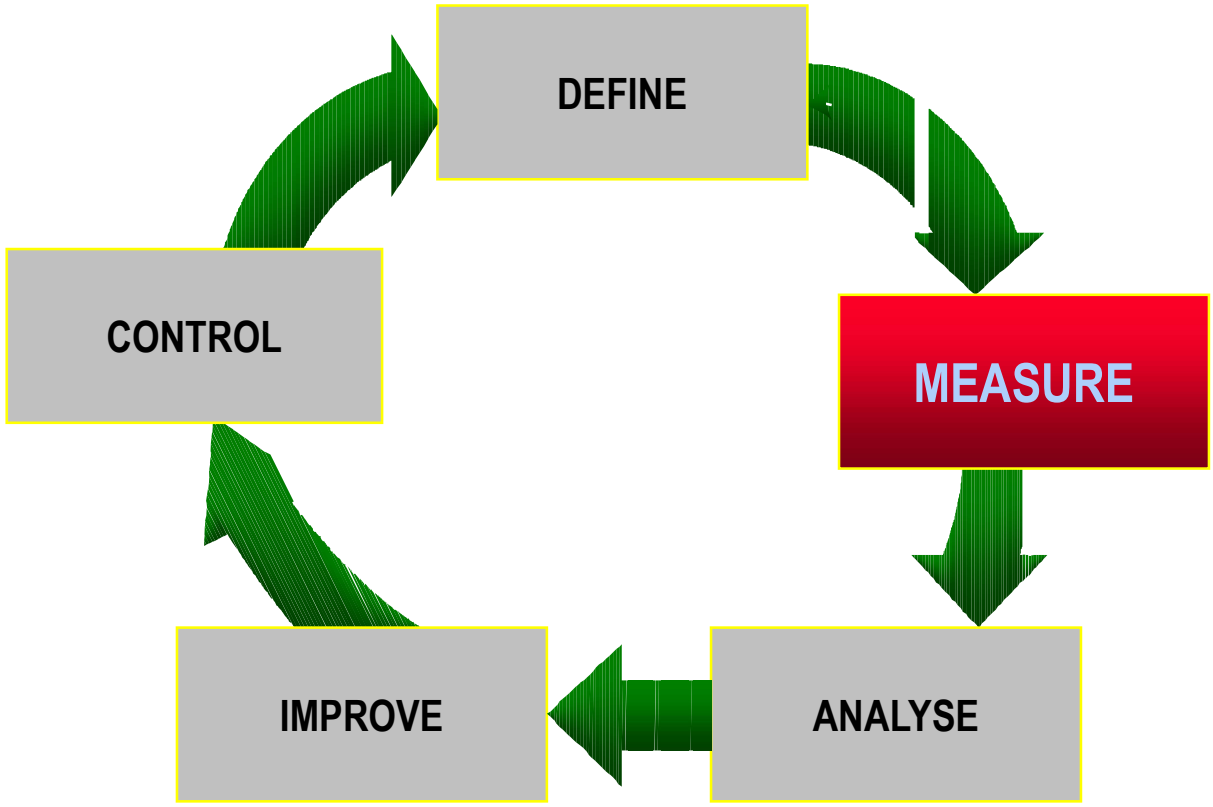
Green / Black Belt | Master Black Belt | Process Owner

CEO | Financial Analyst | Champion / Sponsor

Define Phase Tools

- SIPOC
- VOC – CTQ –
- PROJECT CHARTER

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

Measure

There are 2 types of Data

- Continuous (Variable)
  - It is continuous and quantitative in nature
  - It can contain decimal point
  - It has a unit
  - Examples : Project completion time : 23.6 days
  - Thumb Rule : Good sample size is 30-50 for studying variable data
- Attribute (Discrete)
  - It is qualitative in nature
  - It has an attribute and various categories of an attribute, which can be described by discrete numbers:
  - Example: Project status (Attribute) – Delayed, Not delayed (Categories)

    Gender (Attribute) – Male, Female (Categories)

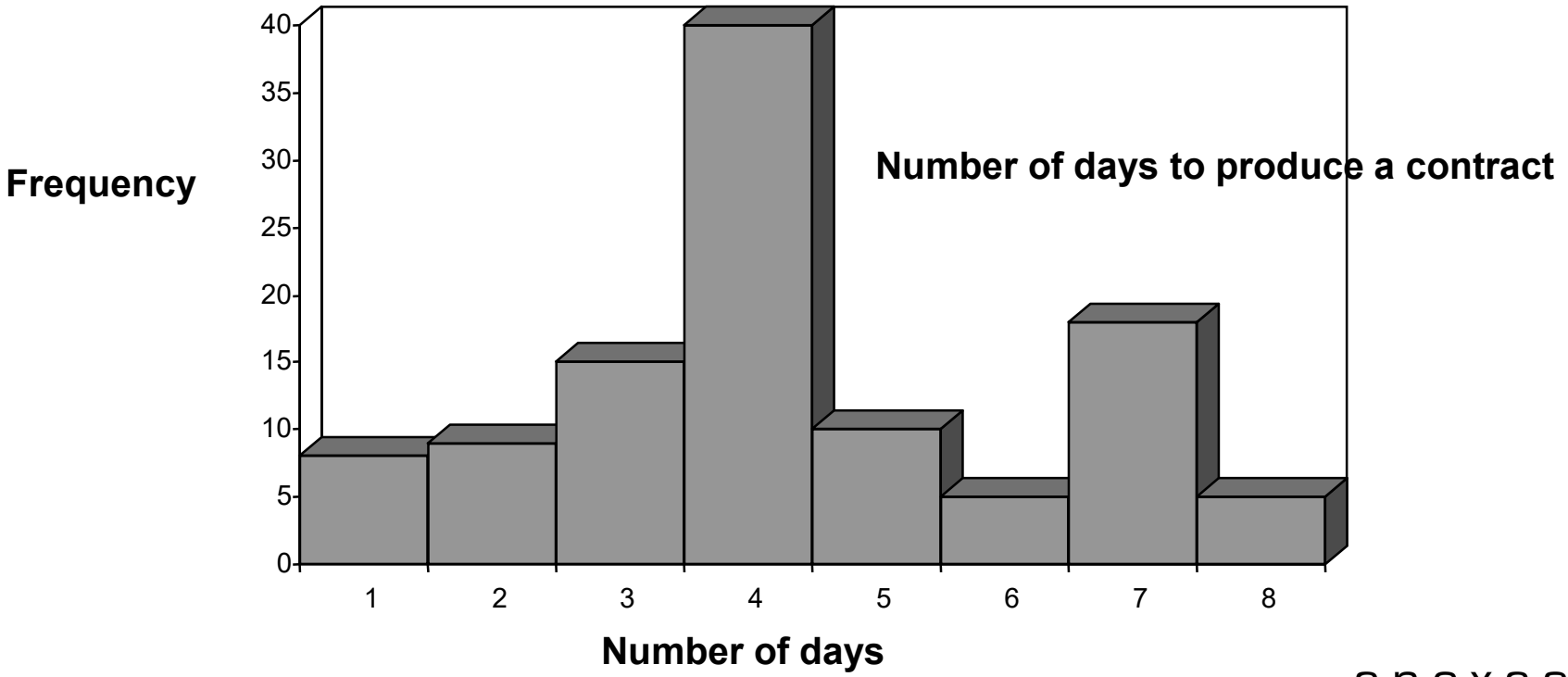
    Each of the categories above can be described in terms of counts, for example 30 males and 20 females. You cannot have 30.1 males!
  - Thumb Rule : 200-1100 is a good sample size for attribute data

Variation over a period of time : histogram

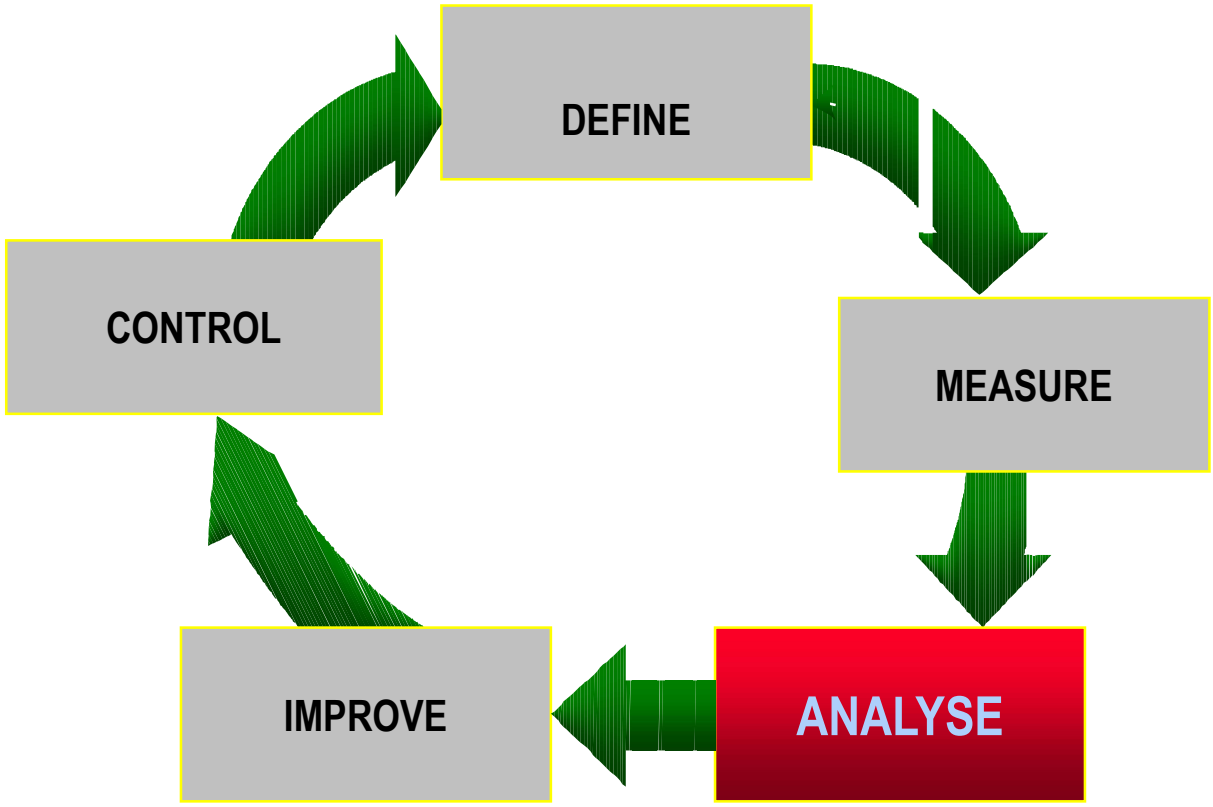
Definition

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

Example



DMAIC : An Improvement Methodology



Analyse

Objective :

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

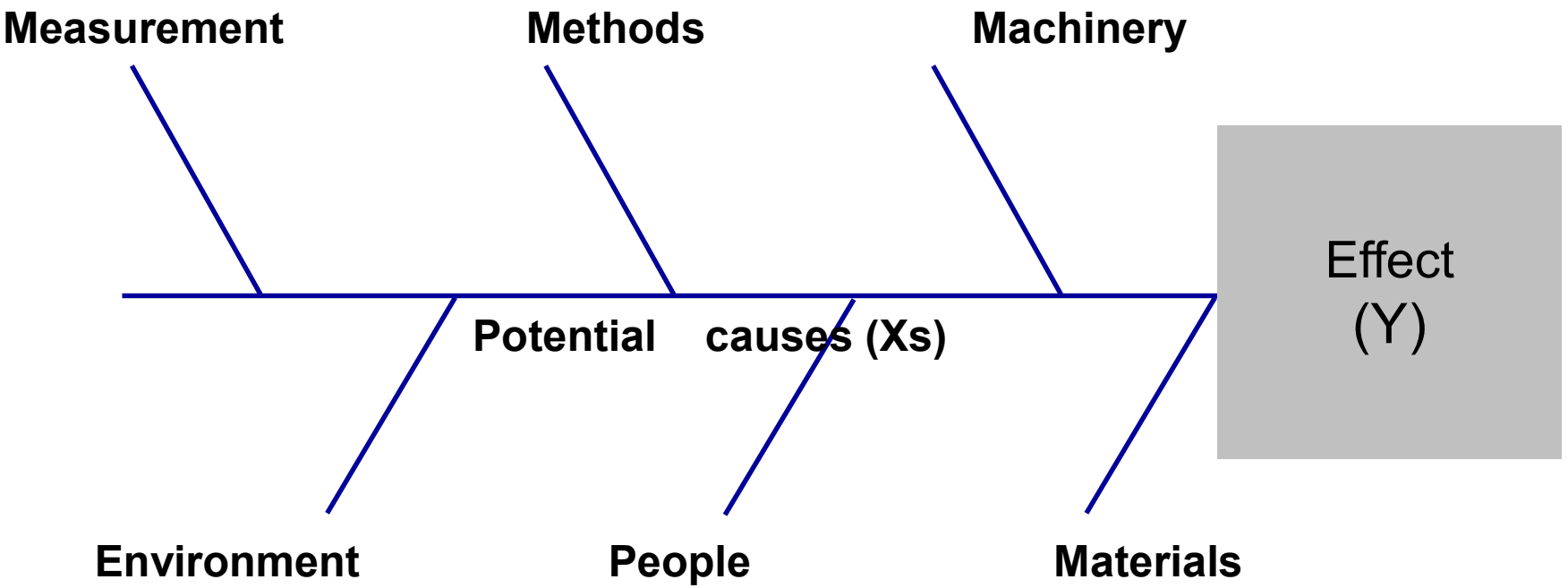
Steps :

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

Analyse

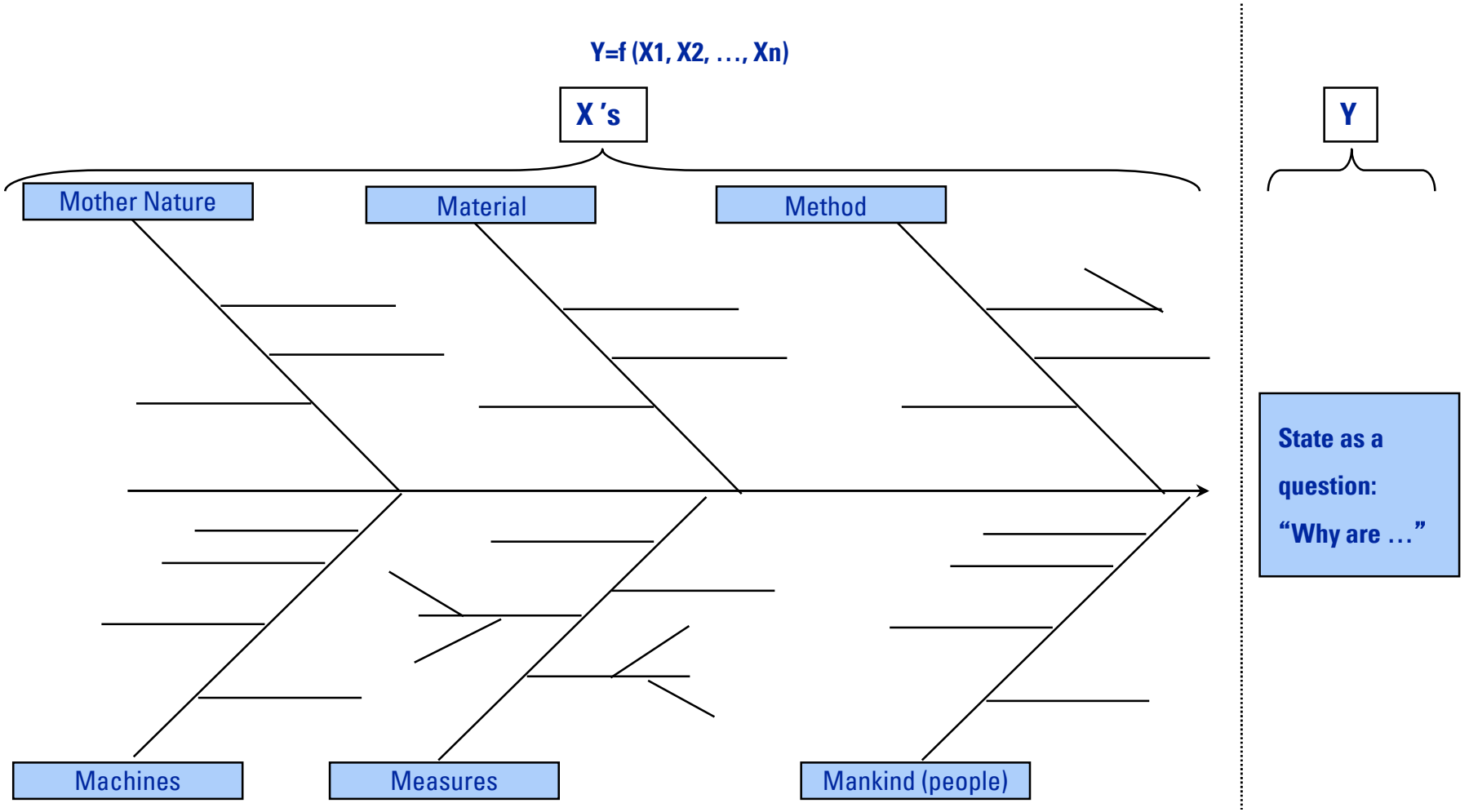
Consolidating the analyses prior to root causes validation

Cause & effect diagram



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

Fish Bone Diagram/Cause & Effect/Ishikawa Diagram



- Use the traditional categories: Machines, Methods, Mother Nature
- Measurement, Materials, People
- - OR, make up your own, based on your process problems

Notes:

- - What are the causes of defects, variation, customer dissatisfaction, inefficiencies- Prioritise /

Vote on the few main causes. Next, you will collect data to validate relationship /causal relationship.

- - Remember, Y is the key output measure and X' s are process or input variables

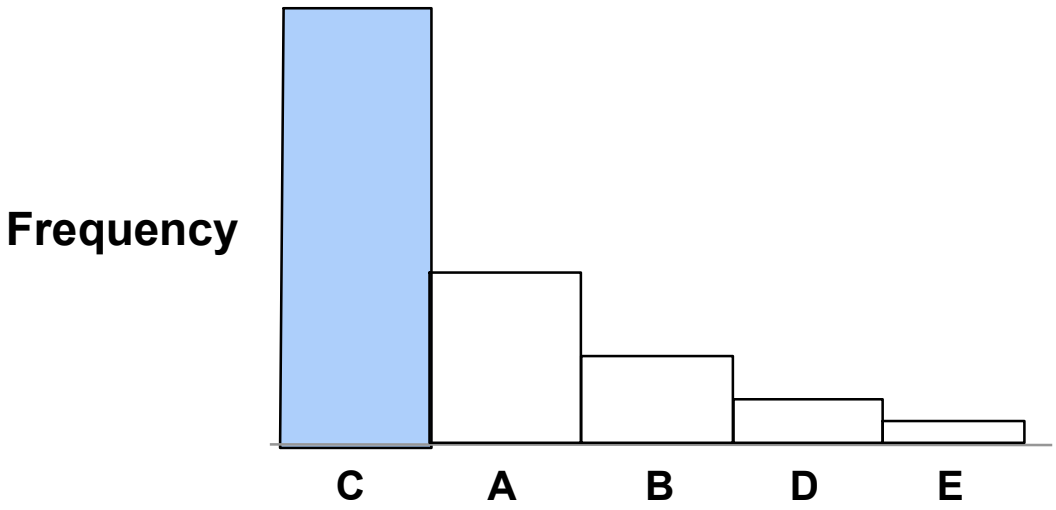
Analyse

Analyse data : Pareto chart

Pareto chart

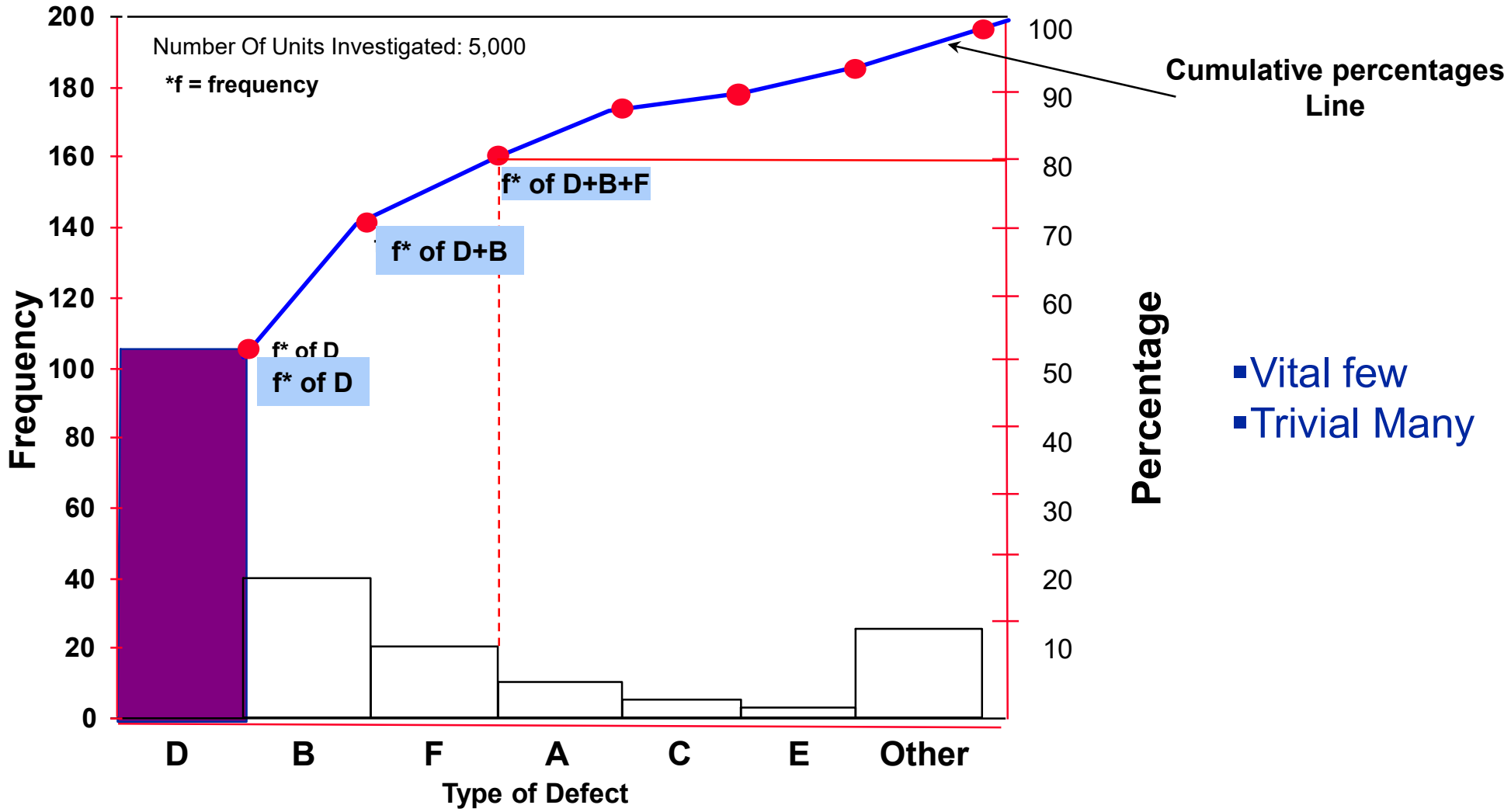
Definition

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



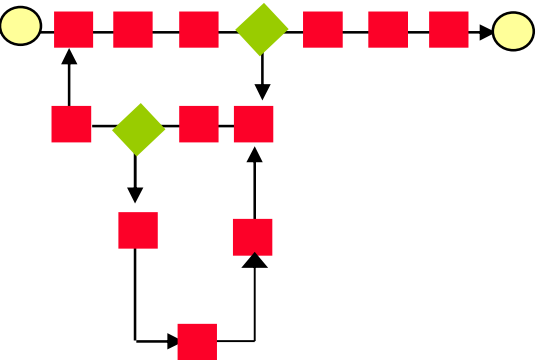
- Vital few
- Trivial Many

Analyse

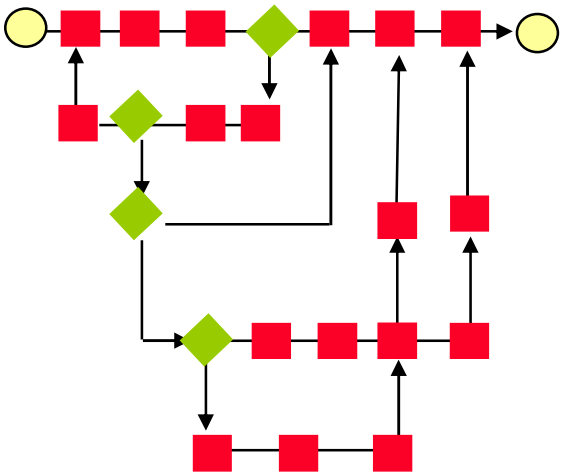
Analyse process mapping

Versions of a process

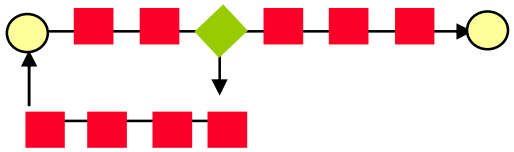
What you *think* it is...



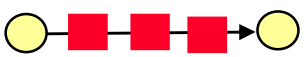
What it *really* is…



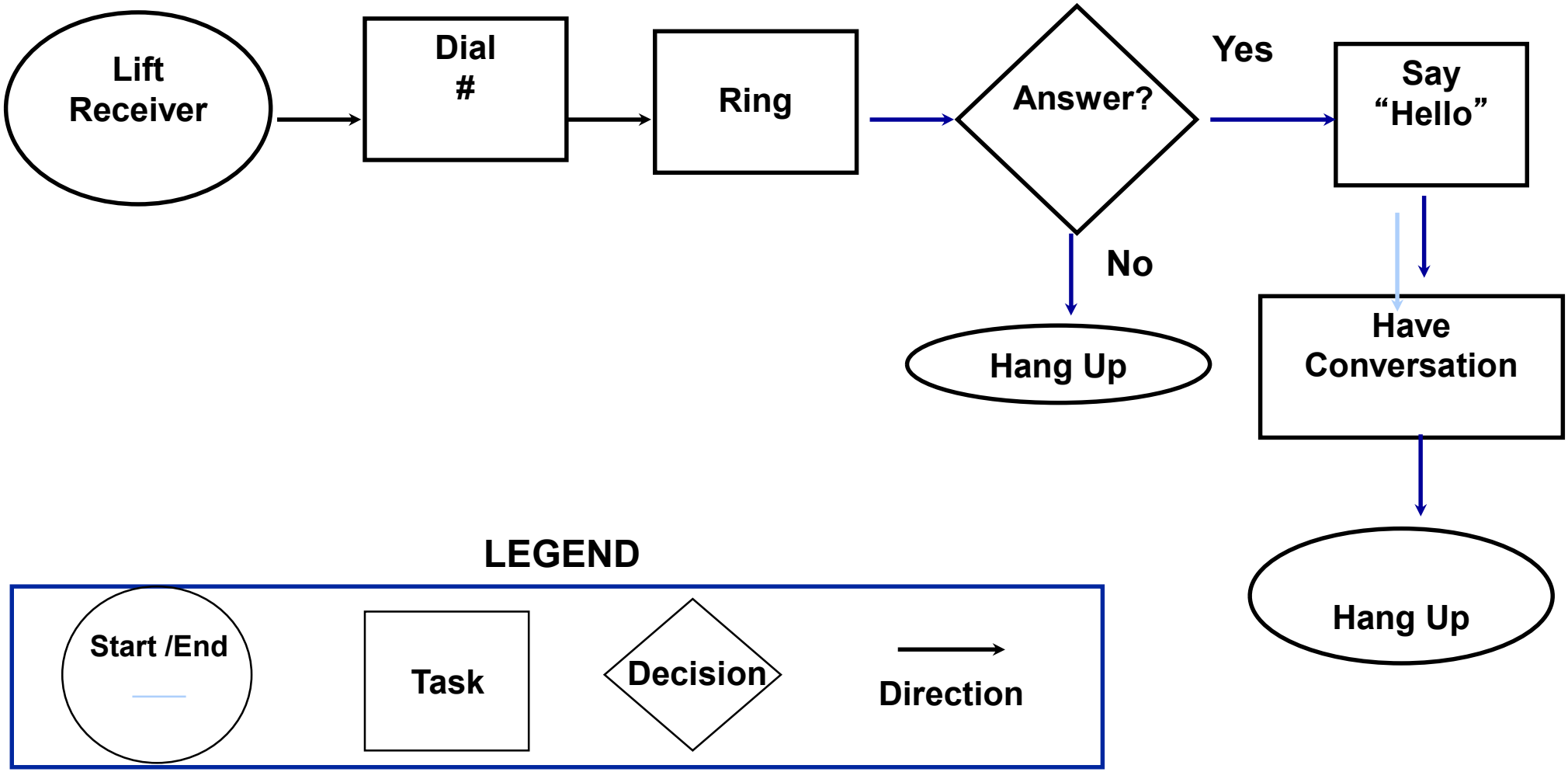
What it *should* be…



What it *could* be



Process flowchart conventions



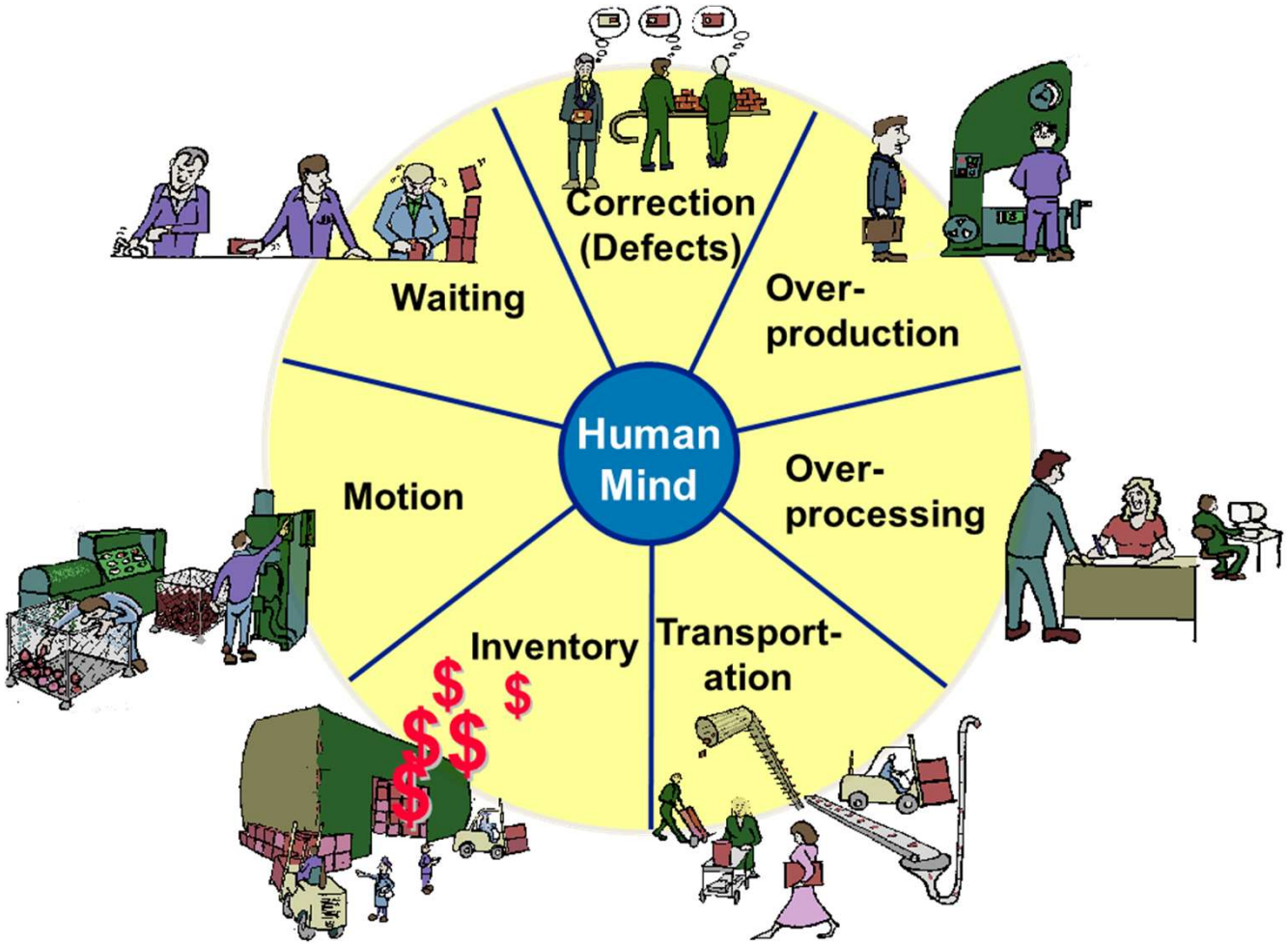
Process mapping analysis

- 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

Major Categories of Waste: TIMWOOD



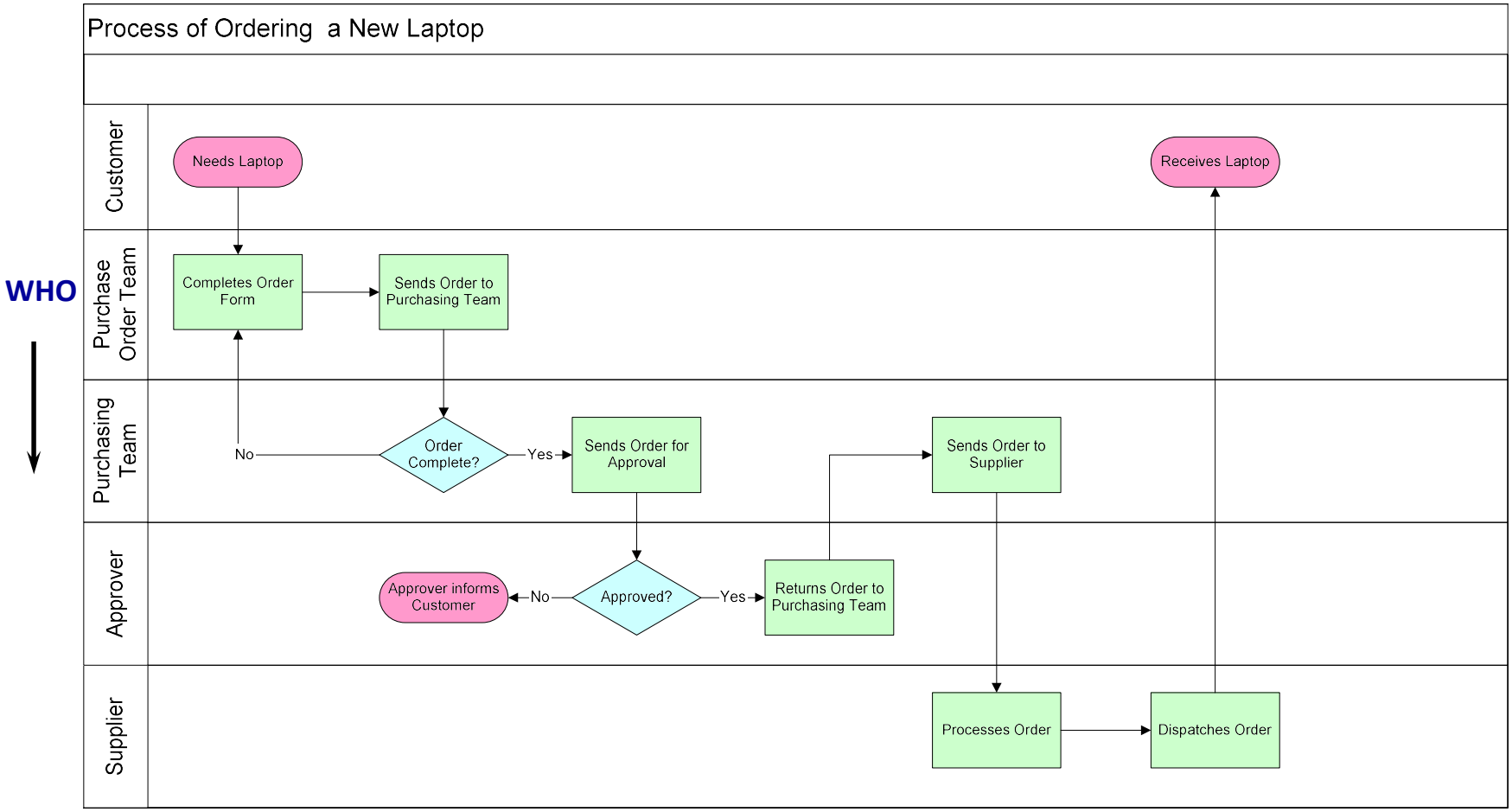
ESCAP Analysis

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

Analyse
Process Mapping



Analyse – Tools

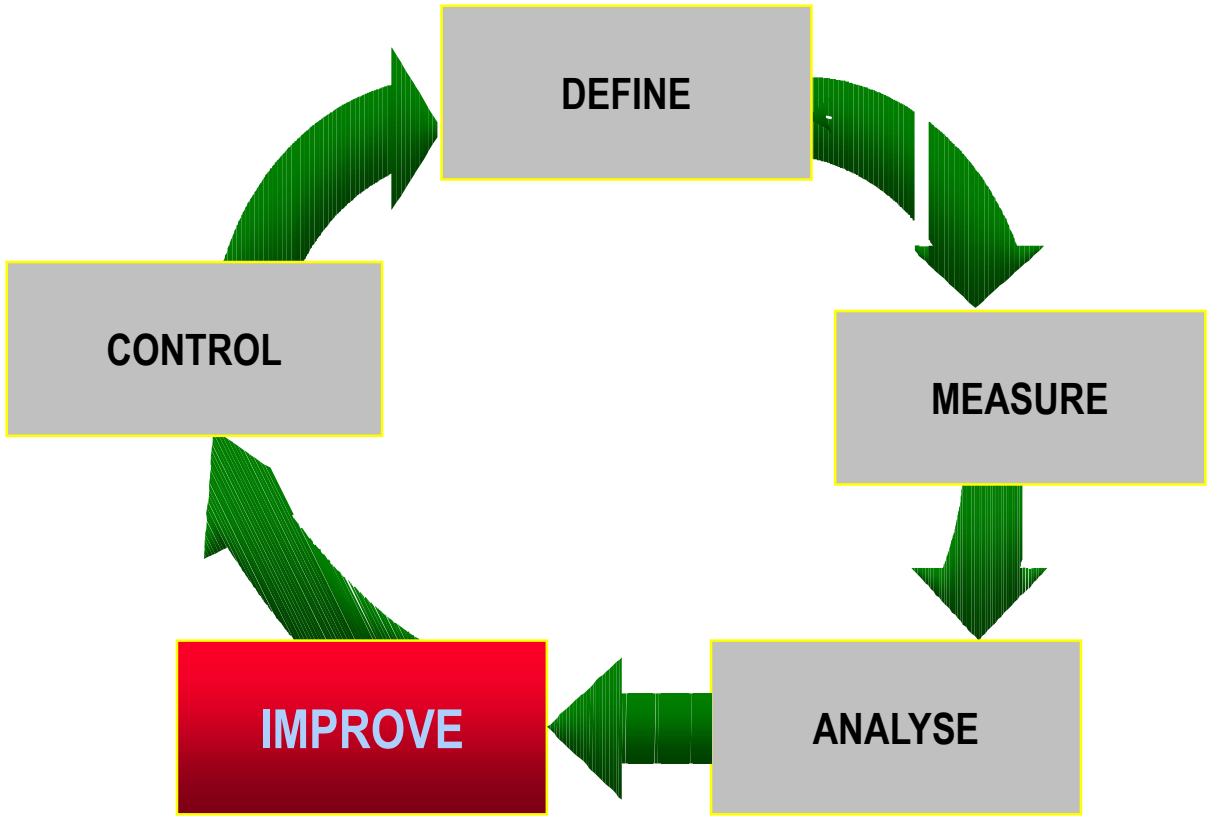
Data Door :

- **Cause and Effect Diagram and CI Matrix**
- **Pareto analysis**

Process Door

- **Process Mapping and VA and NVA Analysis**
- **Lean Tools**

DMAIC : An Improvement Methodology



Improve

Objective :

- Determine new improved process design

Steps :

- Generate solutions
- Select and test solutions

What Are The Five S's?

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

Improve

Introduction to FMEA

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 levels
- Best practices
  - Use company data
- Brainstorming
  - Brainstorming with post it notes, channelled brainstorming, anti-solution, …. etc

Brainstorming

Rules of Brainstorming

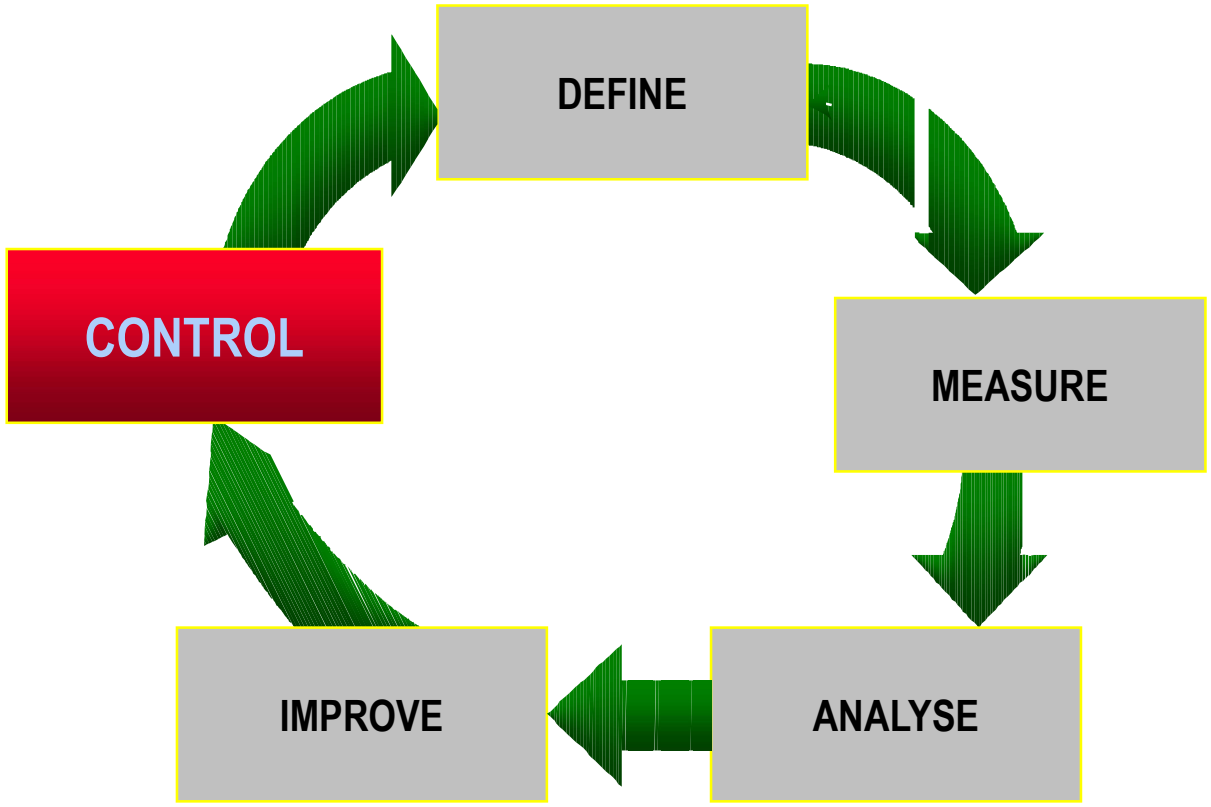
- Equal opportunity to everyone to participate
- Capture all the ideas (Document)
- Leave your designation and ego along with your shoes outside meeting room
- Non threatening environment to be created
- Ensure that there are no disturbances
- Focus on the topic (Create parking lot)
- Fantasize freely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

Brainstorming

Types of Brainstorming

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

DMAIC : An Improvement Methodology



Control

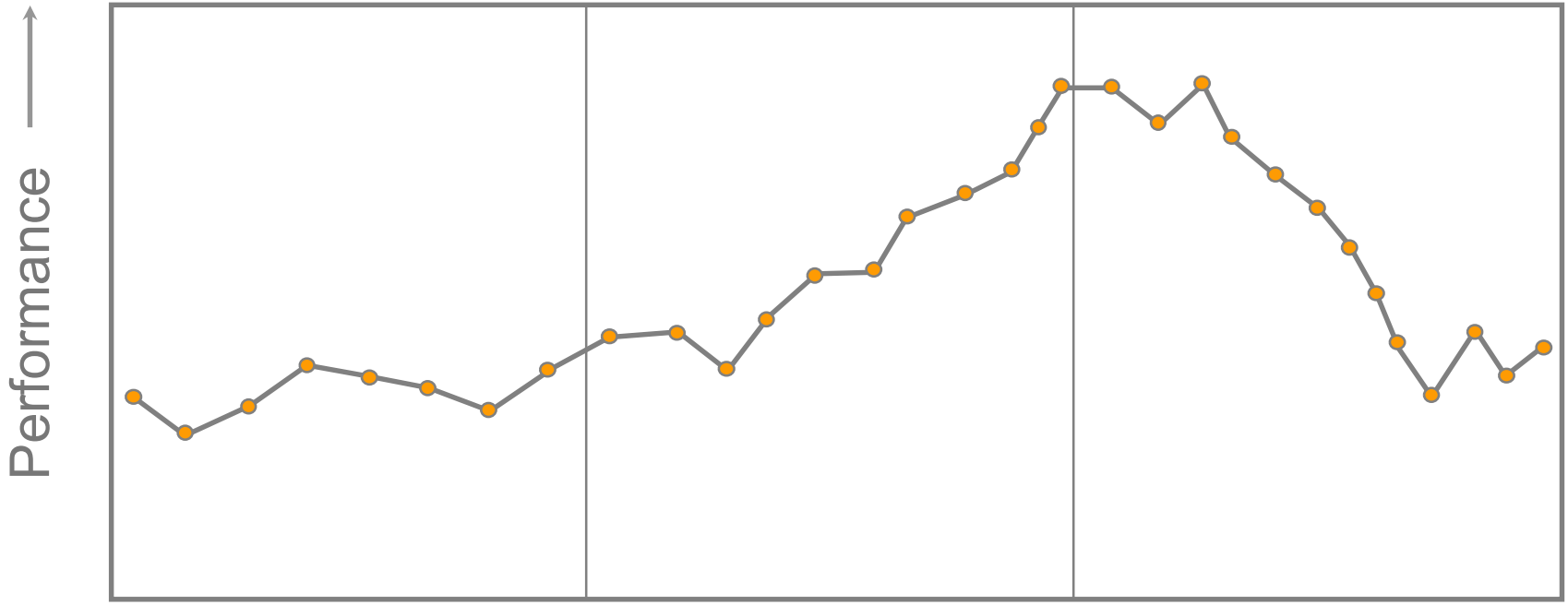
Objective :

- Ensure improvement over time

Steps :

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

Control = ensure gains over time



Question Time