# General Overview Of Process Improvement Methodologies and How they Fit in Traditional (WF) Project Management

By
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Training Objectives

- Increase understanding of the Process Improvement methodologies/approaches, Lean and Six Sigma.

- Increase understanding of the basic Lean tools.

- Increase understanding of DMAIC projects and how they fit in the Traditional (WF) project management.

- Understand how to use basic tools for project management in DMAIC projects.

- Understand how to apply easy PM techniques that will increase the success of your DMAIC projects.

- Understand that what was presented is the tip of the iceberg with respect to Professional Project Management Methodologies/Practices and Process Improvement Methodologies/Practices, etc.

TEAMWORK
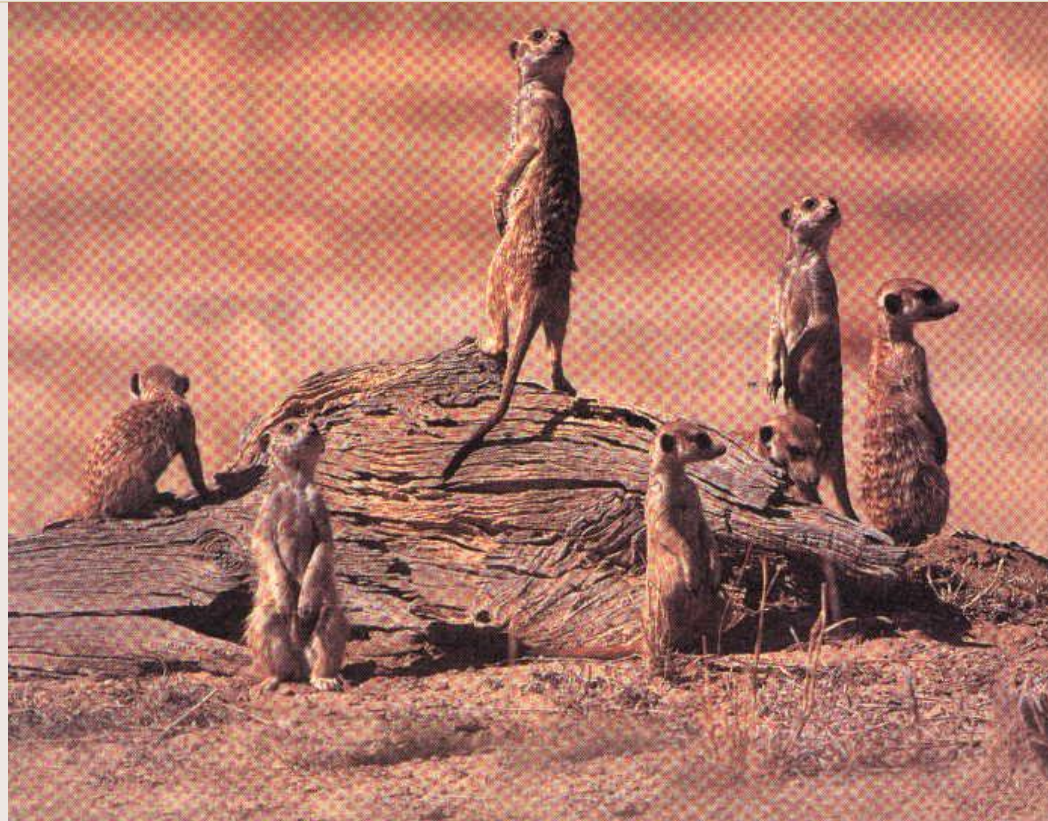
Murphy's Law

Anything that can go wrong,

WILL GO WRONG!

So, Have a Contingency Plan!

(Manage Risk)

Leadership

Leading ordinary people to accomplish extraordinary things!

PLANNING

Being prepared

is

50% of the Victory

What is a Project?

- A temporary (start, execute, end) endeavor undertaken to create a unique product or result.

What is Lean?

- A systematic approach to identifying and eliminating waste through continuous improvement by flowing the product or service at the pull of the customer in pursuit of perfection.

What is Six Sigma?

- Six Sigma is a rigorous and disciplined methodology that uses data and statistical analysis to measure and improve a company's operational performance by identifying and eliminating "defects" in manufacturing and service-related processes."

Six Sigma & Lean Tools

Six Sigma Tools, Techniques and Principles	Lean Tools, Techniques and Principles

Six Sigma Tools, Techniques and Principles

- DMAIC Methodology
- Project Management
- Variability Reduction
- Statistical Process Control
- Measurement System Analysis
- Design of Experiments
- Regression Analysis
- Analysis of Variance
- Hypothesis Tests
- Process Mapping
- More…

Lean Tools, Techniques and Principles

- Waste Identification & Elimination
- 5 S Practice
- SIPOC Process Mapping
- Visual Management
- Standardized Procedures
- Value Stream Mapping
- Kaizen
- Pull System (Kanban)
- Total Productive Maintenance (TPM)
- Just-in-Time
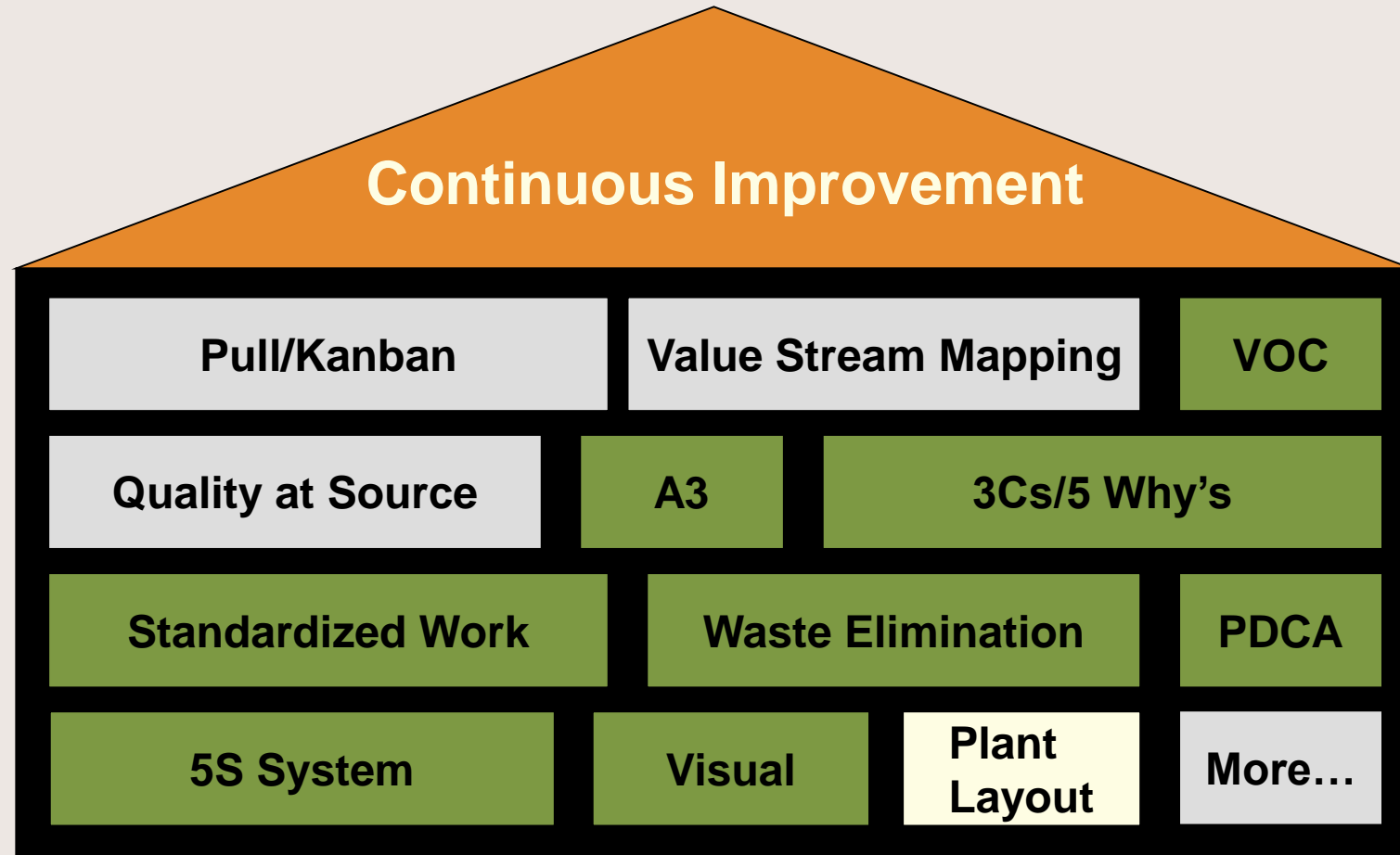- More…

What is Project Management?

- The Application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.

What is DMAIC?

- A structured problem-solving methodology
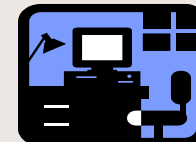
Lean Building Blocks

Lean Practical CPI Tools

•Waste Identification and Elimination (TIMWOOD)

•Brainstorming

•3C's (Cause, Concern, Countermeasure)

•PDCA (Plan, Do, Check, Act)

•5S's (Sorting, Set in order, Shine,
        Standardize, Sustain)

Types of Business Activities

Value Added Activity [VAA]: (Maximize)
An activity that increases the value of a service or product. A customer must be willing to pay for it to be considered "value added".
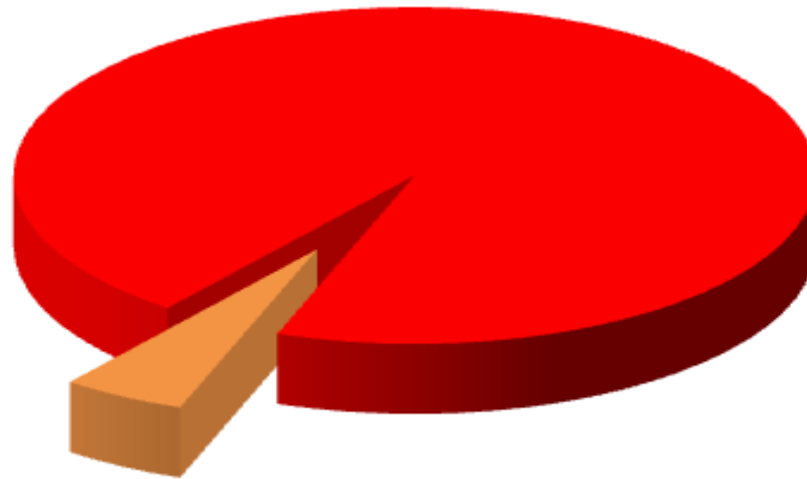
Non-Value Added [NVA]

Required: (Minimize/Optimize)
Any work carried out which is necessary, but does not increase the product value. A customers does not pay.

Not required - Waste: (Eliminate)
All other non-essential activity.

Types of Business Activities

95% Non-Value Added
5% Value-Added

Types of Waste

<u>T</u>ransport

<u>I</u>nventory

<u>M</u>otion

<u>W</u>aiting

<u>O</u>verproduction

<u>O</u>ver-processing

<u>D</u>efects

An easy way to remember the 7 main wastes is *<u>TIMWOOD</u>*

Types of Waste

Transport

Any material movement that does not directly support a synchronous manufacturing or service system

<u>CAUSES</u>
- Large batch size
- Uneven planning
- Lack of workplace organization (6S/5S)
- Poor communication

Inventory

Any supply in excess of process requirements necessary to produce goods or services, "Just in Time."

- Prior stock outages
- Incapable suppliers
- Long lead times
- Management decisions
- Local availability
- Inaccurate planning

Motion

Any movement of people or equipment which does not add value to the product or service.

- Layout of office, warehouse, or yard
- Lack of workplace organization (6S/5S)
- Inconsistent work methods
- Inconsistent batch sizes

Types of Waste

Waiting

Idle time that is produced when two dependent variables are not fully synchronized.

Overproduction

Having excess equipment versus future demand/customer needs

Over-processing

Effort which adds no **VALUE** to a product or service.

CAUSES
- Inconsistent work methods
- Poor process discipline
- Lack of appropriate machines
- Poor coordination
- Poor planning
- Poor visibility

- Blindly servicing product A when product B is in greater demand and in shorter supply
- Poor planning
- Lack of co-ordination/communication

- Decision making at inappropriate levels
- Ineffective standards or procedures
- Lack of customer input concerning requirements.

Types of Waste

Defects

Equipment or service which does not fulfill customers requirements.

CAUSES

- Inadequate training/experience
- Extreme pressure
- Lack of proper information/communication
- Incapable resources
- Deviation from standard operations

Brainstorming

- **What**
  - A structured method of generating ideas and engaging a team in the improvement process
- **Why**
  - Brainstorming produces many ideas/solutions in a short time
  - Facilitates the creative thinking process
  - Separates idea generation from challenging, debating, and analysis
- **How**
  - Review the problem definition
  - Clarify the goal/question and provide any relevant information
  - Have participants write down ideas as they think of them
  - Gather ideas, round-robin, one at a time, via post-it notes &/or flip charts - *No discussion of ideas until session is complete*
  - Write down every idea
  - Organize ideas into groups and prioritize the group with the higher relevance

3 C's – Concern, Cause, Countermeasure

To illustrate this difference, consider a visit to your doctor.:

- You feel like you have a cold, runny nose, headache, etc.

- You visit the doctor

- The doctor diagnoses a sinus infection, gives you medication to relieve it. The cold symptoms and headaches eventually fade and the condition subsides.

- A month later the condition recurs. You pay another visit to the doctor and are prescribed the same medication.

3 C's – Concern, Cause, Countermeasure

- This remedy clears up the symptoms of the problem but does nothing to eradicate the cause.

- Relate this situation to your work environment and you will realize the effort and resources being wasted are doing nothing more than relieving the symptoms for a period of time.

- In the majority of cases when first examining a problem, we see the effect of the problem (the cold/headeache) and not the cause (the allergies).

3 C's – Concern, Cause, Countermeasure

Iceberg → Symptoms

Problems

The Real Problem
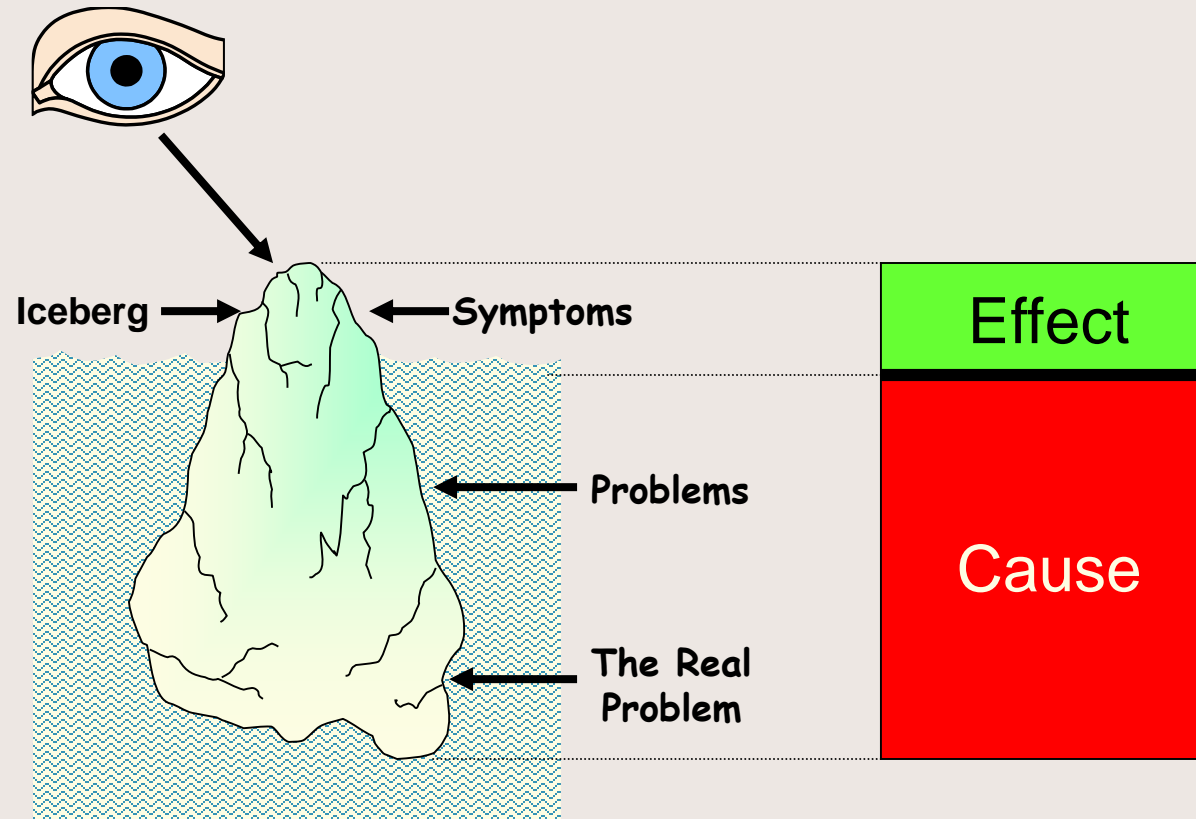
Effect

Cause

Problem Recognition Examines the EFFECT not the CAUSE

Brainstorming

5 WHYs

- **Why are you getting sick?**
  - I am getting a cold
  - I am getting a sinus infection
- **Why are you getting a cold and/or sinus infection?**
  - I was exposed to a cold virus
  - My sinuses over secreted phlegm
- **Why your sinuses over secreted phlegm?**
  - Allergy reaction
- **Why are you having allergy reactions?**
  - I am being exposed to allergens
- **Why are you being exposed to allergens?**
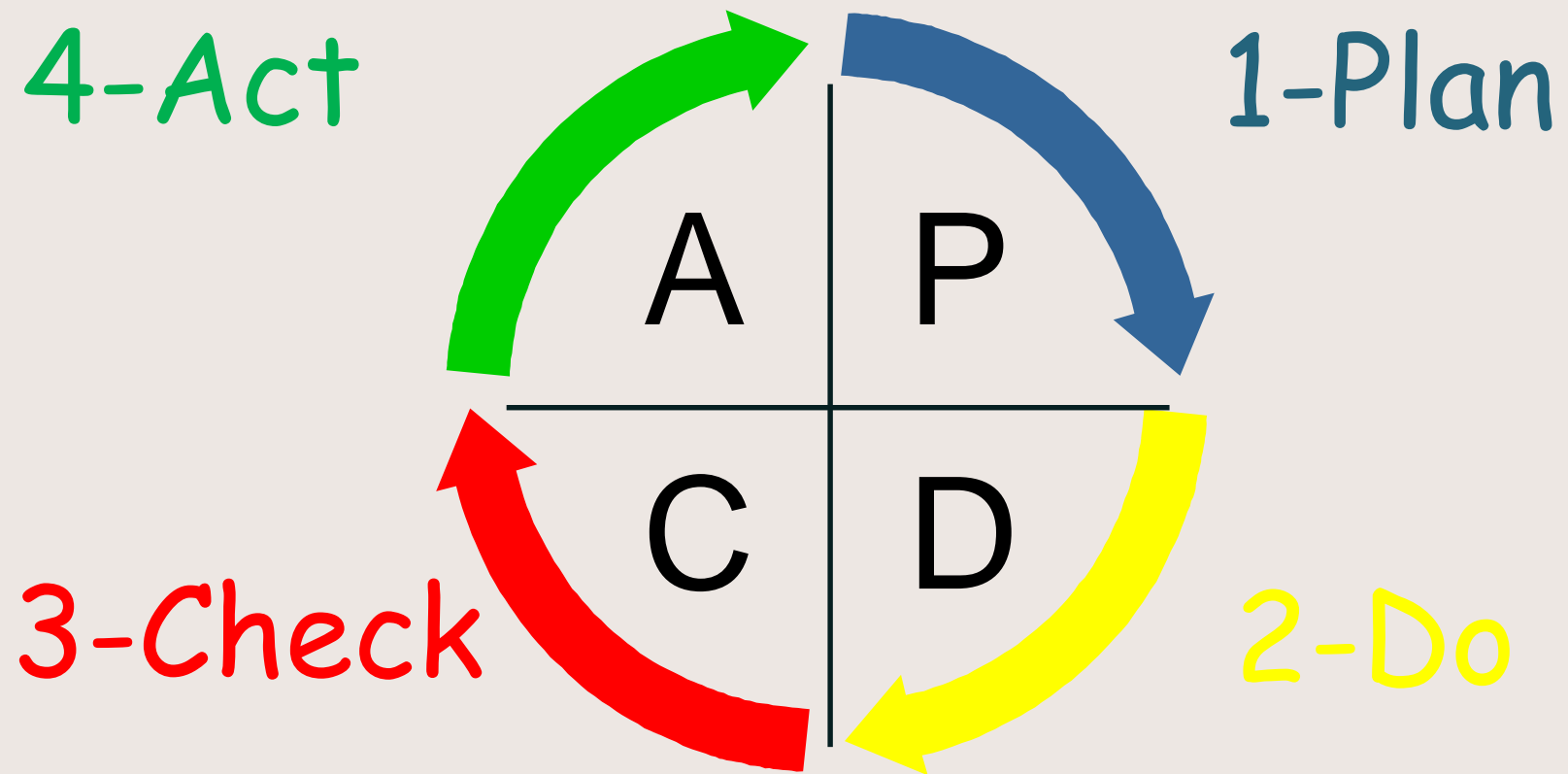 - I like the outdoors
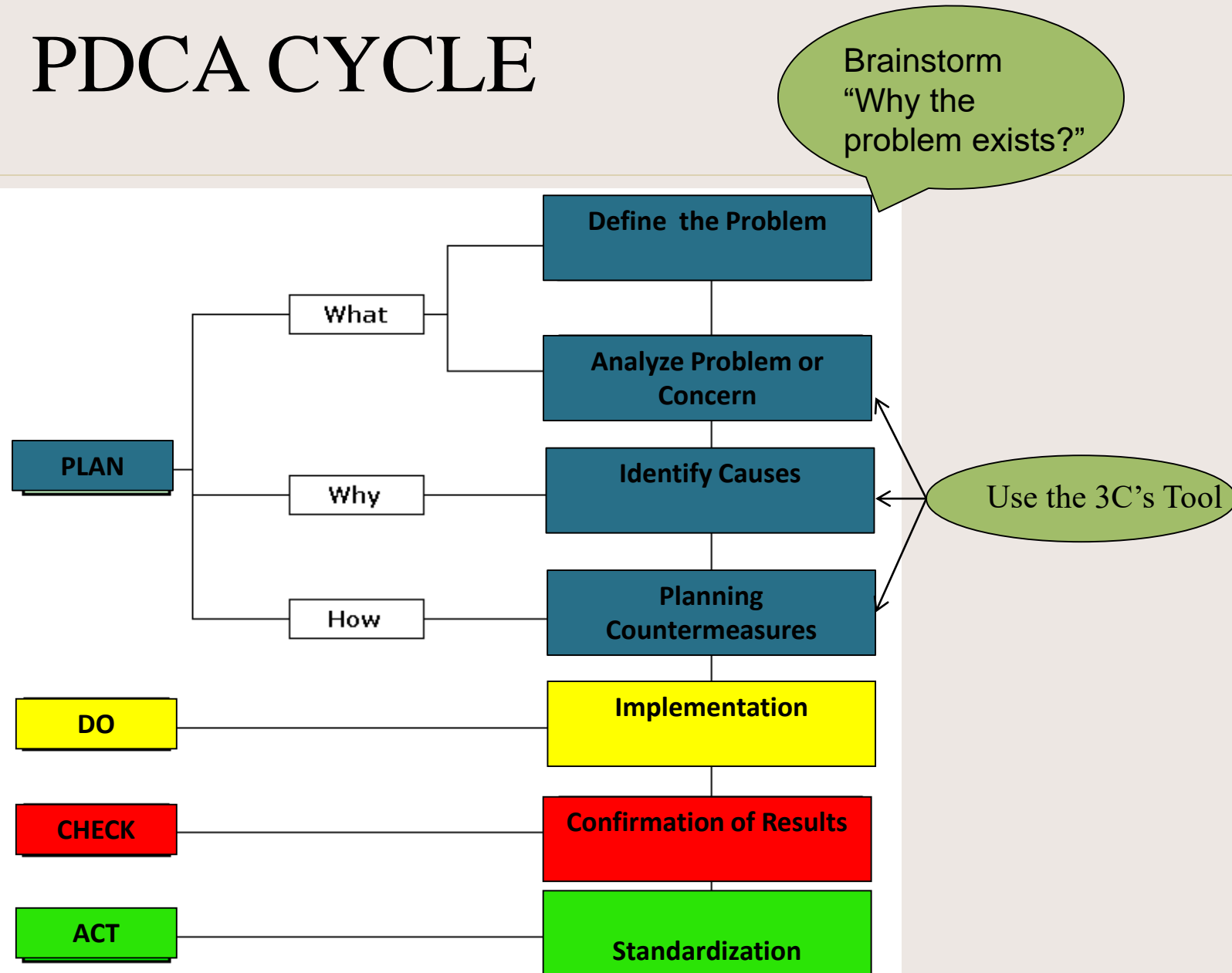
3 C's – Concern, Cause, Countermeasure

BRAINSTORM
- **Cold**
- **Sinus Infection**
- **Allergies**

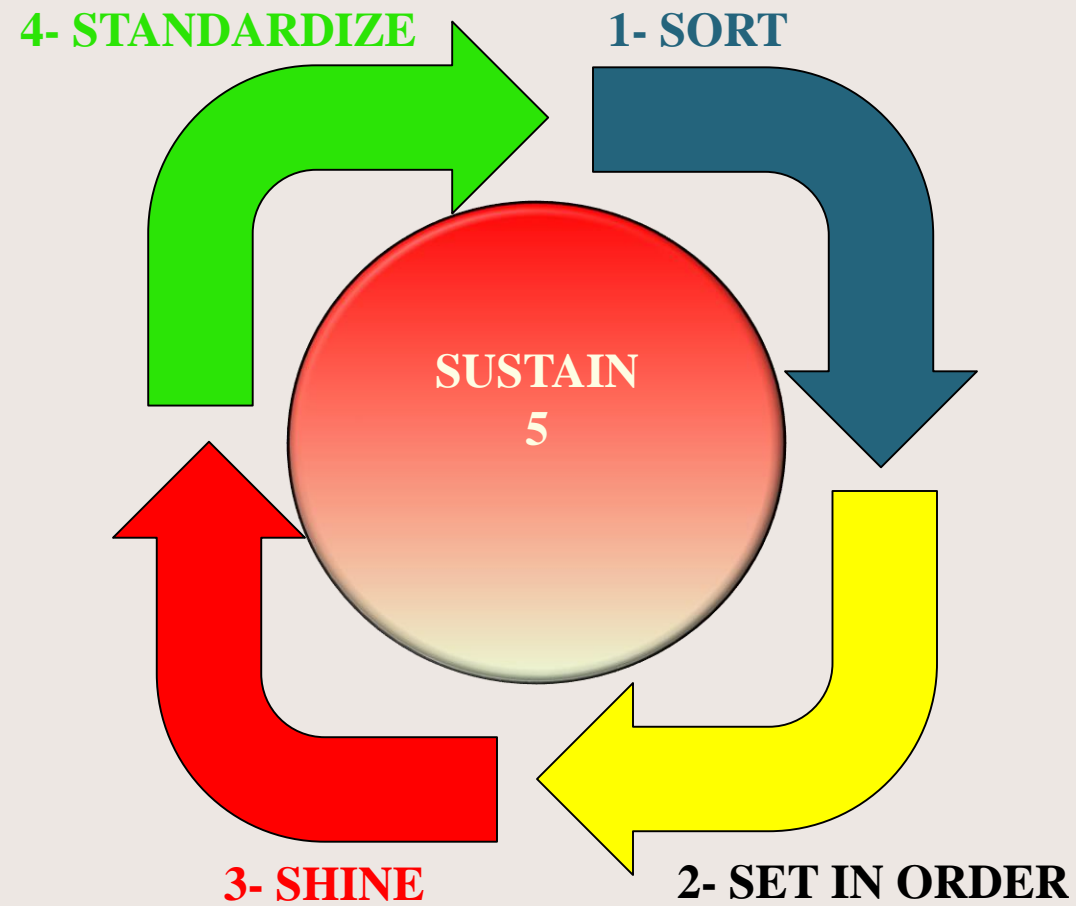| CONCERN	CAUSE	COUNTERMEASURE
Getting sick	Cold	Take cold medicine
	Sinus infection	Take antibiotics
	Allergies	- Take antihistamine - Immune-therapy shots - Prevent exposure to allergens

PDCA CYCLE

5 S's CYCLE

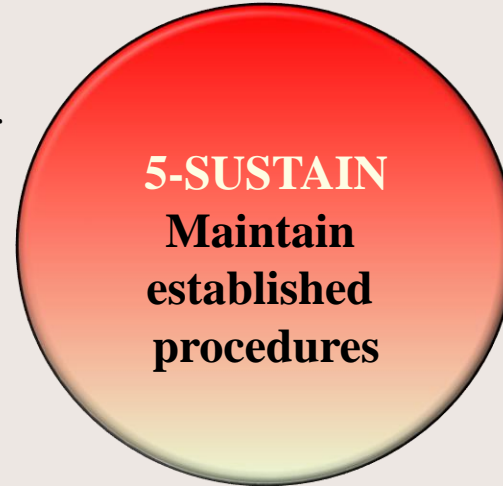# 5 S's CYCLE

4- STANDARDIZE

Adapt and create a habit (repetitive and consistent) of the method used for Sorting, Set in order and shine

1- SORT

Distinguish needed items from unneeded and eliminate the latter

5-SUSTAIN
Maintain established procedures

3- SHINE

Keep area clean and neat

2- SET IN ORDER

Keep items in the correct place for easy access

What is Project Management?

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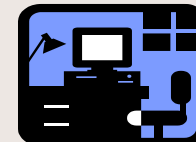
Five Managerial Activities

Initiating

Re-Planning

Executing

Monitor

Close

Five Phases

DEFINE

MEASURE

ANALYZE

IMPROVE

CONTROL

5 phases from defining a problem to implementing solutions with emphasis on sustaining them

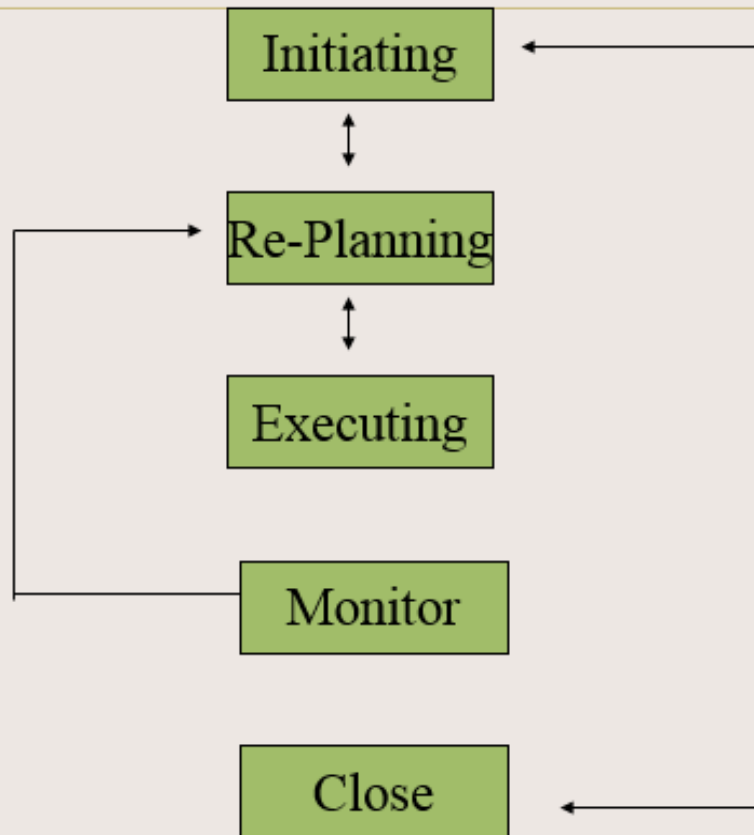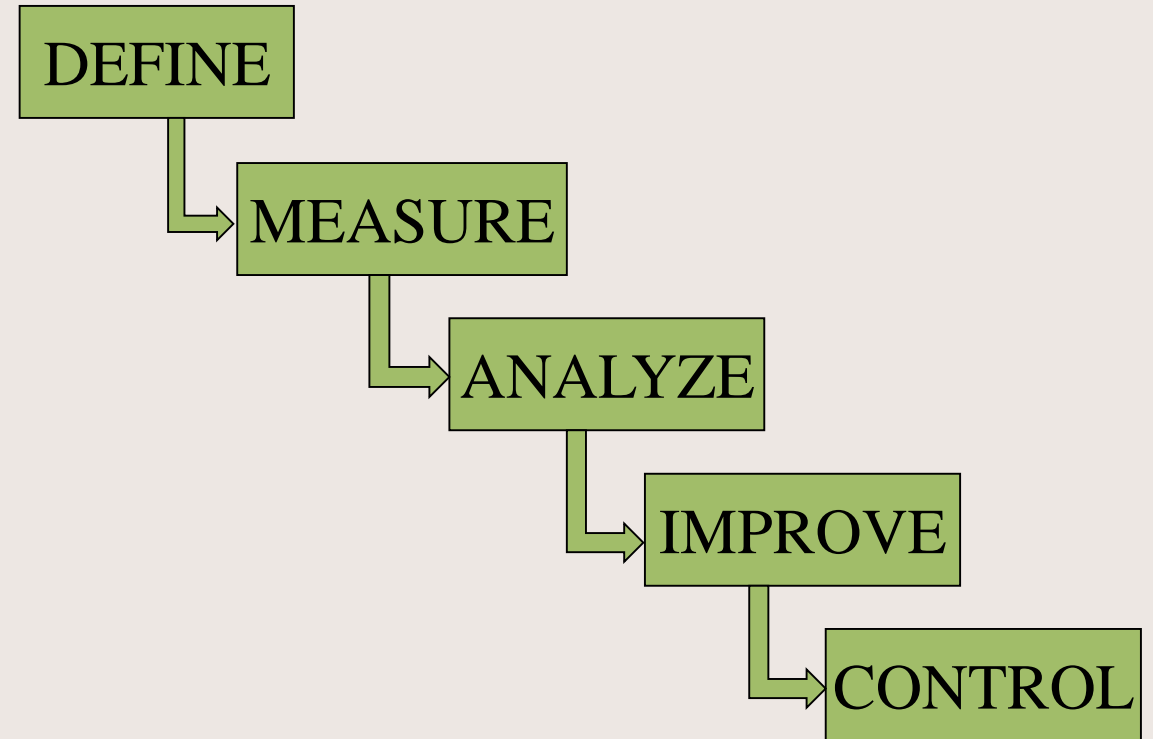**DEFINE** ➡ **MEASURE** ➡ **ANALYZE** ➡ **IMPROVE** ➡ **CONTROL**

- ## DMAIC is…
  - A structured problem-solving methodology
  - Used when a product/process is not meeting customer specs
  - Implemented by CPI personnel with the support of a sponsor
  - A way to help support the business strategy
  - 5 phases from defining a problem to implementing solutions with emphasis on sustaining them
    - Define the project goals and customer (internal & external) deliverables
    - Measure the process to determine current performance
    - Analyze and determine the root cause(s) of the problem
    - Improve the process by eliminating non-conformances
    - Control future process performance

DEFINE PHASE

- **Purpose**
  - Properly define the project's purpose and scope
  - Obtain background information about the process & its customers
  - Answer critical questions
    - What are we trying to accomplish (mission)?
    - Is the project scope broad enough to be important but narrow enough to be do-able?
    - Why are we working on this project?
    - Who is the customer?
    - What are the Critical-To-Quality Characteristics?
    - How does the current process flow?
    - What are the current inputs & outputs of the process?
    - What resources are required to complete the project?
    - When must the project be completed?

DEFINE PHASE

ACTIVITIES:
- Identify Problem
- Review Project Charter
- Gather VOC
- Select & gather project team
- Validate financial benefits
- Develop project plan & schedule
- Understand current process

TOOLS:
- Project Charter
- Project Plan
- SharePoint
- VOC (Kano)
- CTQ
- SIPOC
- Value Stream Map
- A3

DEFINE PHASE TOLLGATE

Tollgate review checklist for the DEFINE phase:

- ❑ Customer requirements and expectations are documented
- ❑ Project Sponsor is in place
- ❑ Project Team and resources are in place
- ❑ Project Charter is approved and signed off
- ❑ Project Plan is in place
- ❑ A3 has been initiated

All items must be completed and signed off before proceeding to the MEASURE phase!

MEASURE PHASE

- **Purpose**
  - Gather information and data about the current situation
  - Understand the current state of the process
  - Collect reliable data on process speed, quality and costs
  - Answer critical questions:

    - Has the success target been determined - in customer terms?
      - Have potentially significant process inputs been identified for further screening?
      - Has a data collection plan been developed for the process inputs & outputs?
      - What is the baseline performance of the process?
      - Are the relevant metrics visible and widely accessible?
    - Have potential quick wins been identified?

MEASURE PHASE

ACTIVITIES:

- **Identify Key Input, Process and Output Metrics**
- **Develop Data Collection Plan**
- **Collect Baseline data**
- **Determine Process Performance**
- **Validate Business Opportunity**

TOOLS:

- **Project Plan & A3**
- **Data collection plan**
- **Sampling**
- **Brainstorming**
- **Affinity diagram**
- **Check Sheet**
- **Swim-lane mapping**
- **Spaghetti diagram**
- **Variation analysis**

MEASURE PHASE TOLLGATE

Tollgate review Check Sheet for the MEASURE phase:

❑ Key measurements are identified

❑ Data collection has been planned and executed

❑ Process variation is displayed and communicated

❑ Baseline performance is established

❑ Project plan and A3 have been updated

All items must be completed and signed off before proceeding to the ANALYZE phase!

ANALYZE PHASE

- **Purpose**
  - Identify root causes affecting the key process inputs and outputs
  - Root Causes have been confirmed with data
  - Countermeasures have been identified
  - Answer critical questions:
    - What are the significant inputs affecting the output of concern (aka CTQCs)?
      - Are the input processes stable and capable?
      - What are the underlying sources of process variability?
      - Are the interactions between inputs identified, understood, and optimized?
    - Have the Countermeasures been prioritized?

ANALYZE PHASE

ACTIVITIES:

- Determine critical inputs
- Identify potential root causes
- Reduce list of potential root causes
- Confirm root cause effect on output
- Estimate impact of root causes on key outputs
- Identify & prioritize countermeasures

TOOLS:

- Project Plan & A3
- Fishbone
- 5 Why's
- 3 C's
- Cause & Effect
- SWOT
- Histogram
- Pareto
- Correlation
- FMEA
- Benchmarking
- Priority ranking

ANALYZE PHASE TOLLGATE

Tollgate review checklist for the ANALYZE phase:

- ❑ Identification of 'gaps' between the current and future states
- ❑ Communication of gaps in financial terms
- ❑ Verified and quantified root causes
- ❑ Prioritization of countermeasures
- ❑ Updated project plan and A3

All items must be completed and signed off before proceeding to the IMPROVE phase!

IMPROVE PHASE

- **Purpose**
  - Develop, Test and implement solutions to address the root causes identified in the ANALYZE phase
  - Use data to validate countermeasures
  - Learn from pilots of successful countermeasures
  - Execute full-scale implementation
  - Answer critical questions:
    - What improvement actions are necessary to achieve targeted performance levels?
    - Has a process been established to track implementation - with defined responsibility and target dates?
    - Are there any obstacles to improvement? Unintended consequences? Indirect effects?

IMPROVE PHASE

ACTIVITIES:

- Develop potential solutions
- Select & optimize best solutions
- Develop future process map(s)
- Establish operating tolerances for new processes
- Pilot the solution
- Develop full-scale implementation & training plans

TOOLS:

- Project Plan & A3
- Kaizen event
- PDCA as a tool
- Process mapping
- Implementation plan
- Training plan
- Kanban
- Process balancing

IMPROVE PHASE TOLLGATE

Tollgate review checklist for the IMPROVE phase:

- ❑ Possible countermeasures generated and tested
- ❑ Best countermeasure is identified and optimized
- ❑ Solution(s) approved for further rollout
- ❑ Implementation plan is defined and ready for execution
- ❑ Project plan and A3 are updated

All these items must be completed and signed off before proceeding to the CONTROL phase!

CONTROL PHASE

- **Purpose**
  - SUSTAIN the gains made by standardizing and improving work methods and processes
  - Hand-off improved process to process owner with procedures to SUSTAIN the gains
  - Answer the following Questions.
    - Have mechanisms been put in place to provide ongoing feedback and prevent backsliding?
    - Are significant characteristics (inputs and process variables) being monitored and improved over time using statistical methods?
    - Are improvements, lessons learned, and best practices being shared in a systematic fashion?

CONTROL PHASE

ACTIVITIES:

- Develop SOP's
- Implement mistake proofing
- Create Process Controls
- Monitor & Stabilize Process
- Identify lessons learned
- Create case study
- Transition project to Process Owner
- Calculate Financial Benefits

TOOLS:

- Project Plan & A3
- 5S
- Process control plan
- Visual controls
- Checklist
- Communication plan
- SOP publishing
- Poka Yoke
- Control charts

CONTROL PHASE TOLLGATE

Tollgate review checklist for the CONTROL phase:

- ❑ Process Standardisation
- ❑ Monitoring Plan
- ❑ Response Plans
- ❑ Documented Procedures
- ❑ Transfer of Ownership

- ❑ Case Study
- ❑ Lessons Learned
- ❑ Closed project plan
- ❑ Benefits Sign Off

All items must be completed and signed off before closure of the project!

PROJECT MANAGEMENT

Traditional PM & DMAIC

Clear Outcome
of the project,
More Certainty of
Completion time,
The solution has
been agreed while
in DMAIC the
solution has to be
determined during the
execution of the project.

Project Charter
Project Plan
Timeline
Comm Plan
Issue/Risk Register
Project Closing

Fishbone, Benchmarking,
Aff-Diag, Ck-Sheet, SLM,
A3, Kaizen Event,
PDCA, Process
Mapping, Kanban, VOC
Process Balancing, CTQ
5S, 5 Why's, Process
Control Plan,
Poka Yoke, SIPOC
Visual Controls, VSM,
Ck. Lists, Control Charts
3C's, C&E, Hist, Pareto,
FMEA, Priority Ranking

Traditional PM & DMAIC

Project Management & DMAIC:

❑ Project Management is a **Superset** of all projects and event activities

❑ DMAIC is a methodology/series of activities to solve problem in a structured way, therefore it is a specialized type of project where the general project activities can be applied.

❑ To complete a DMAIC project is required to not only know how to apply PM techniques and practices but also Lean Six Sigma Methods and Tools

❑ The DMAIC process works on Processes and does not end after handover to the process owner, a Control Plan to ensure sustainability is part of the last phase of DMAIC which is hand over to the process owner.

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References/Bibliography

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- *The Project Management Institute Website*
- *Exploring Requirements: Quality before Design by Gerald Weinberg*
- *Successful Project Management –Step-by-Step Approach with Practical Examples By Milton D. Rosenau, Jr.*
- *DSDM ATERN Handbook (Agile Project Management)*
- *Lean Six Sigma Methodology*
- *The Lean Six Sigma Pocket Toolbox*
- *Lean Six Sigma Demystified*
- *Many others….*

Credentials

- *J. Miguel Hidalgo:*
  - *Master in Business Administration, Concentration in Electronic Commerce Management (OLLU)*
  - *B.S. in Computer Science (USL)*
  - *B.S. Professional Aeronautics (ERAU)*
  - *Certified DSDM Agile Project Management Foundations by APM Group (UK)*
  - *Certified Project Management Professional (PMP) by PMI*
  - *Certified Lean Sigma Black Belt (Ohio State University)*
  - *Certified ITIL V3.0 by APM Group*
  - *U.S. Army Veteran*

Q & A