



# LEAN SIX SIGMA WHITE BELT

**MakeWay is an accredited partner of the International Lean Six Sigma Institute (ILSSI)**



# About MakeWay Global

MakeWay Global is an international human capital development and management consultancy firm that is **focused on the management of change** for organisations.

Some of our accredited certification courses include:

Business Analysis Diploma	Project/Programme Project Management	Others
Foundation Certificate in Business Change	PRINCE2®	Lean Six Sigma – (White, Yellow, Green, Black Belts)
Business Analysis Practice	AgilePM®	Cyber Security Courses (inc. <b>GDPR, NDPR</b> )
Requirements Engineering	Scrum	Leadership and Management
Commercial Awareness	MSP®	Business Skills (inc Effective Communication)
Modelling Business Processes	MoP®	Business Applications

- **World Class Training**
- **Our Global Associates:** are passionate, real world experienced and knowledgeable trainers
- **Study at Your Pace**
- **Post Study Consultation**
- **Customised Training Solutions (inc specialist areas)**
- **Exceptional Standards (with Value for Money)**

# SESSION LOGISTICS

Trainer Intro

Health and Safety  
(Fire...)

Conveniences

Smoking areas

Days / Timings,  
including breaks

Delegate ID check

Mobile devices  
(telephones,  
tablets etc)

Delegate  
Introductions

# White Belt Agenda

**1/2-  
Day**

- ☐ Introduction to L6S
- ☐ Improvement Project  
Selection and Establishment
- ☐ Some Improvement  
Methodologies
- ☐ DMAIC for Green Belt

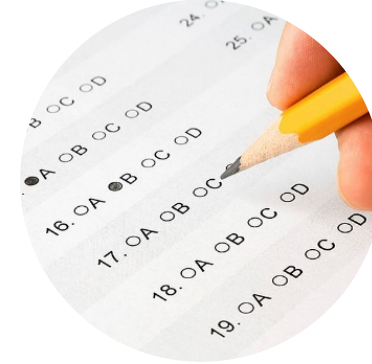
# Objectives of the White Belt course



To give an understanding of what **Lean Six Sigma (L6S)** is and what it means to business leaders and sponsors



Identify and address improvement opportunities in your organisation



Understand the role of the Belts in continuous improvements



# Introductions

**Name**

**Your current  
role**

**L6S awareness  
and/or  
experience**

**Expectations for  
the course**



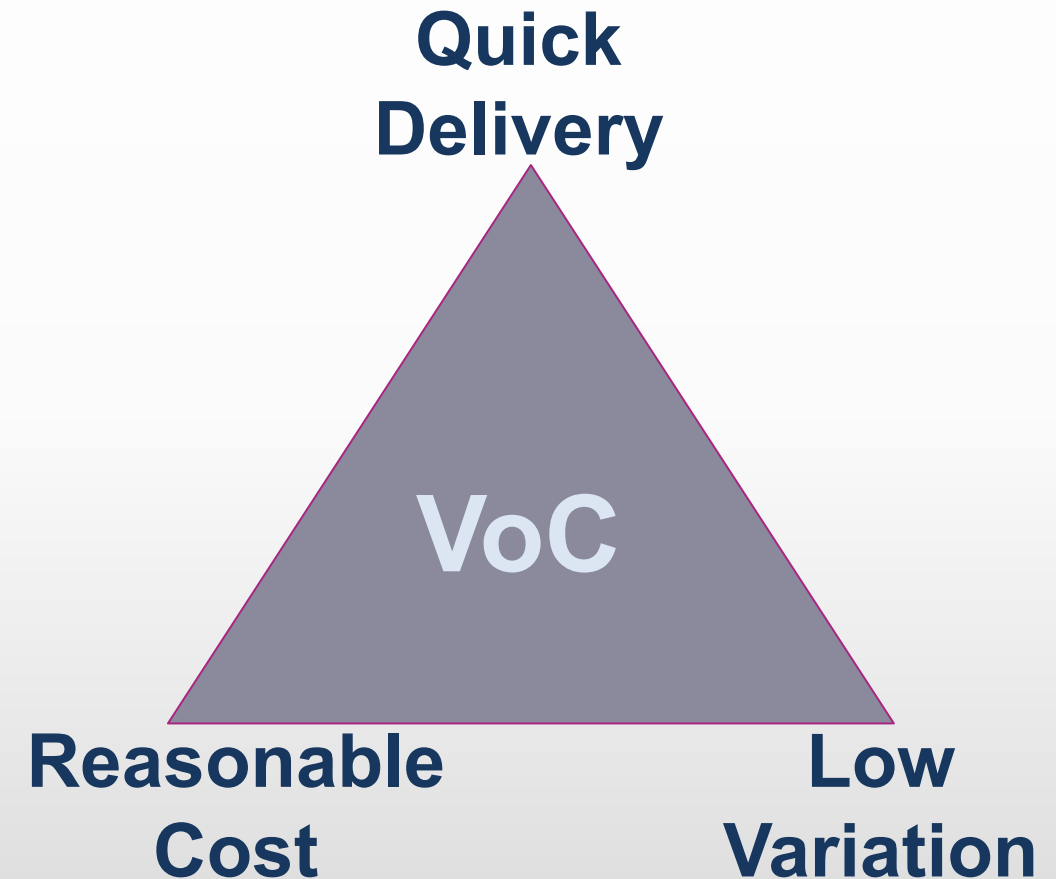
# Making Customers Happy

Customers want three things from a product or service:

- Minimum variation
- Quick delivery (short lead time)
- Reasonable Cost

These three requirements are linked together and need to be balanced out

The Voice of the Customer (VoC) tells us what this balance should be



# Value of Touch Points (1)

A registered patient goes to a doctor for an annual check-up, completes the required paperwork and checks out. A few months later, the **patient receives a bill indicating that the health insurance company denied part of the service.** The doctor's office can't explain why – *they use a third party billing service and don't know anything about the bill.* The billing service won't help – they just do the paperwork.

After numerous calls to the doctor's office and insurance company, the patient gives up and pays the bill. When later asked about a doctor in the area or an insurance company to use, the patient recommends they look elsewhere.

By measuring each touch point independently you can determine its contribution to the overall effectiveness as well as more effectively measure the total customer experience.



# Value of Touch Points (2)

A customer experience does not begin and end at a transaction, website visit, or conversation with an agent. The customer experience process encompasses the moment the customer becomes aware of your company and comprises multiple independent **interactions**, **transactions**, and **contacts** along the way.

All these repeated interactions are actually **touch points**.

**A touch point** is any customer interaction or encounter that can influence the customer's perception of your product, service, or brand.

The goal of every company interested in leveraging customer experience as a competitive advantage is to create a positive and consistent experience at **ALL** of the touch points.

# Continuous Improvement



Every company is looking for ways to save money, time, increase efficiencies and continuously improve. Having a Continuous Improvement (CI) mindset in everyday life is critical to using CI tools more seamlessly in workplace situations.

Continuous Improvement is an ongoing effort to improve products, services or processes. These efforts can seek incremental improvement over time or “breakthrough” improvement all at once.

Continuous Improvement can also be defined as a method for identifying opportunities for streamlining work and reducing waste.



# What is Lean Six Sigma?

A fusion of  
two related  
disciplines

***Lean***

***Six Sigma***

Both consist  
of:

Philosophies

Methodologies

Tools and  
techniques

Lean and Six  
Sigma are highly  
complementary

So it makes  
great sense to  
combine them

Most practitioners  
merge the  
philosophies and  
combine a subset  
of the tools into the  
Six Sigma  
methodology  
***(DMAIC)***



# Origins of Lean

- What we now call Lean is derived from the Toyota Production System (**TPS**) which was initiated in the late 1940s (Started 1948)
- Toyota could not use the mass production systems practised by the major car manufacturers as they did not have the resources – so they came up with the philosophy of “doing more with less”
- The term **Lean** was first coined by John Krafcik in his 1988 article “Triumph of the Lean Production System,” based on his master's thesis at the MIT Sloan School of Management
- People tend to use the term **Lean Thinking** to describe the culture of Lean

# The Focus of Lean

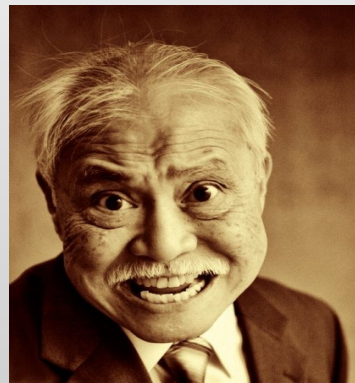
Eighty-five percent of reasons for failure to meet customer expectations are related to deficiencies in systems and process rather than employees. The role of management is to change the process rather than badgering individuals to do better.

- **William Edwards Deming**

*American engineer, statistician and professor*



All we are trying to do is reduce the time from order to cash



- **Taiichi Ohno**

*Toyota Production System*

# The Toyota Production System (TPS)

**MUDA (無駄)**  
**[Waste]**

Achieve efficiency

**MURA (斑)**  
**[Unevenness/  
Irregularity]**

Achieve flow

**MURI (無理)**  
**[Complexity]**

Achieve standardised  
work for your tasks

The TPS was created by **Taiichi Ohno** based on the ideas  
taught by **W Edwards Deming**

Since the late 1980s, the term **LEAN**, which describes the TPS,  
has been introduced to the western world

# The Focus of Lean



Lean is **NOT about cutting costs** it is about removing waste without sacrificing quality.  
It is the ability to **do more with less** resources.

**WASTE** is whatever slows the delivery process down

# 7 Wastes of Lean [Muda] 8 Wastes in Lean Services

**T**ransportation

**I**nventory (Over)

**M**otion

**W**aiting

**O**ver-production

**O**ver-Processing

**D**efects (and Rework)

**S**kills (unutilised)

**TIMWOOD(S)**



1) **D**efects

2) **O**ver-production

3) **W**aiting

4) **N**on-Utilised talent (Skills)

5) **T**ransport

6) **I**nventory

7) **M**otion

8) **E**xtra Processing

**DOWNTIME**



# Lean Wastes (Muda) in Services (5)

## Defects

- Errors and Rework
- Missing information
- Work not meeting standards
- Ignoring customer requirements

## Over-production

- Making more than is needed
- Too many reports, reviews or approvals
- Excessive documentation
- Documents carrying the same information
- Batching paperwork

## Waiting

- Waiting for information or paperwork
- Waiting for approval
- Equipment downtime
- Waiting time between batch processing
- Delays

**DOWNTIME**

# Lean Wastes (Muda) in Services (6)

## Non-utilised Skills

- Not utilising the skills and the knowledge of those who work for the organisation
- Not listening to a good idea
- Unclear communication – such as leaving people to guess what is required

## Transportation

- Paper-based rather than electronic
- Unnecessary electronic transfer – why are some people cc'd for every email discussion that they do not need to know about
- Data travels to multiple locations
- Inefficient inter-office mail system

**DOWNTIME**

# Lean Wastes (Muda) in Services (7)

## Inventory

- Excessive backlog or work in progress
- Creation of queues
- More than the absolute minimum being stored (paper and electronic)
- Partially completed work

## Motion

- Walking to deliver paperwork
- Chasing needed information or paperwork
- Lack of \*ergonomic workspace or design
- Task switching

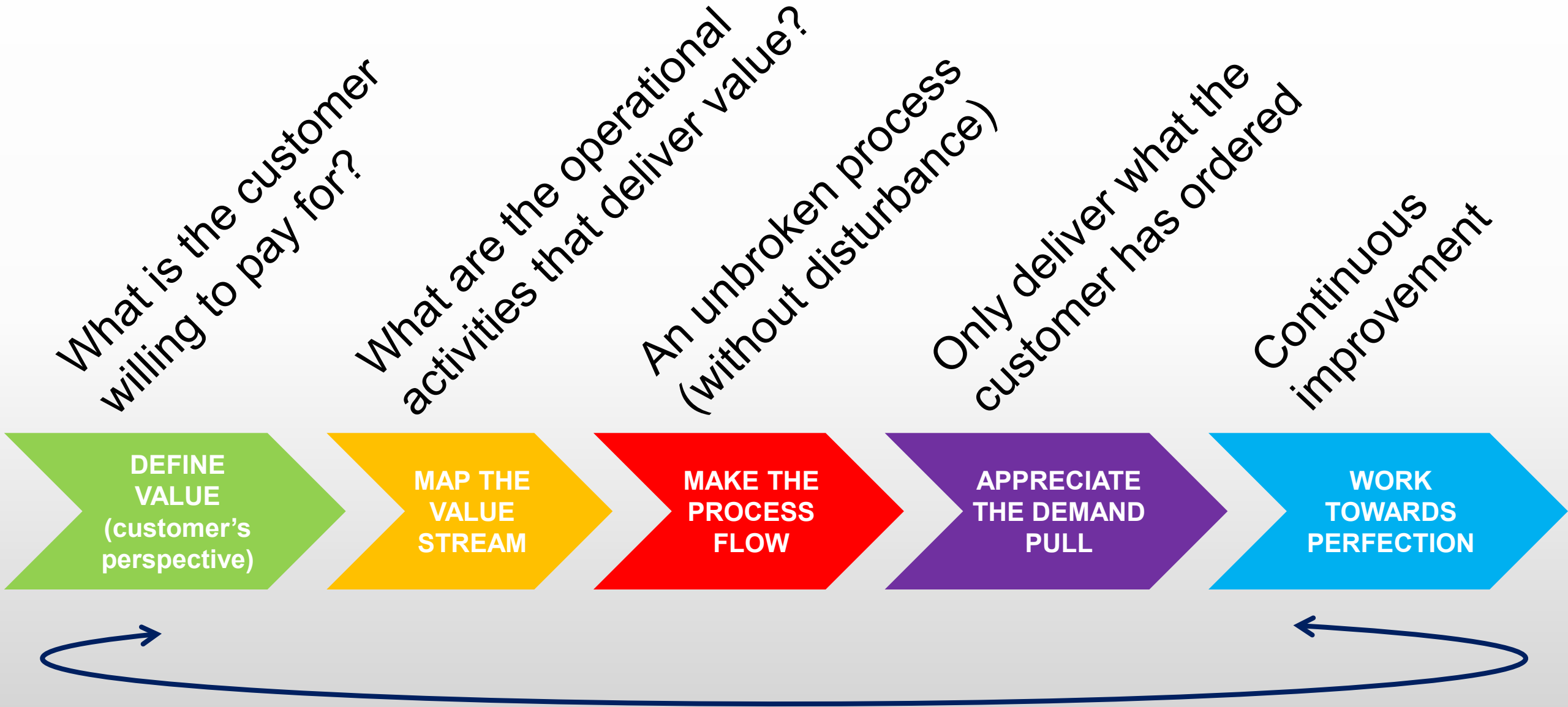
## Extra processing

- Unnecessary steps
- Multiple handoffs
- Multiple documents
- Lack of standard procedure
- Excessive checking
- Relearning
- Extra features and complexity

**DOWNTIME**

\*Process of designing or arranging workplaces, products and systems so that they fit the people who use them

# The Five Principles of Lean



# Single Piece Flow

In *Single Piece Flow*, products or transactions are handled in batches of **ONE**



Each item is examined for defects before handing over (to next part of process)



Faulty units are **avoided** being passed downstream (i.e. towards the customer)  
→ Production halts until the problem is rectified)



In practice, it often means working to the smallest batch size possible



**TRADITIONAL BATCH SYSTEM**



**ONE-PIECE FLOW SYSTEM**

# Pull

In *Pull* systems material flow is triggered by downstream demand

## Example:

- A user replaces the printer toner from the department's stationery cupboard (and leaves a Kanban for the store)
- The store replenishes the stationery cupboard (and leaves a Kanban for procurement)
- The procurement team places an order with the supplier to replenish the warehouse
- The supplier replaces the toner in the warehouse

So the flow is triggered by the customer placing an order – you can see how *Single Piece Flow* links in. This keeps stock holding to a minimum, thus reducing waste. Only that which is used is replaced!

***Pull is the opposite of 'Push'***  
***– where regular deliveries are driven by a schedule***

# What are Kanbans?

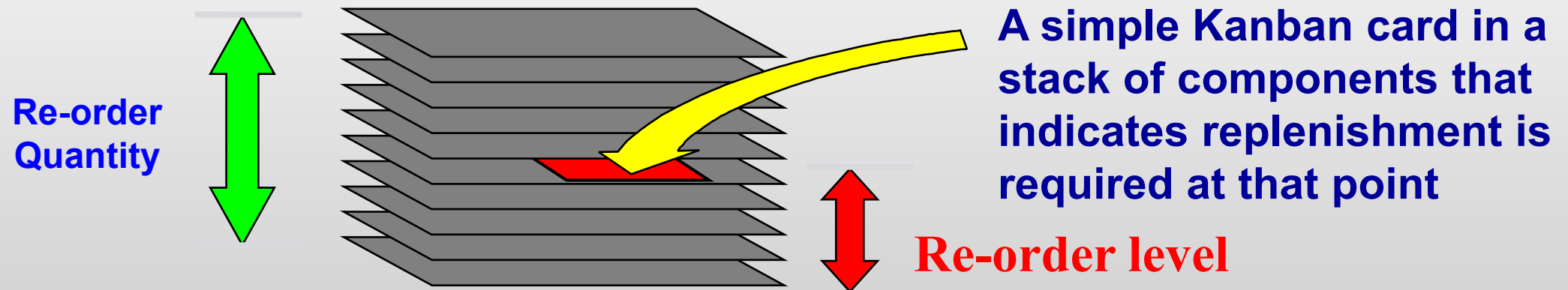
**A Kanban can be a whole host of things:**

- a card
- a bin, container or pallet
- an empty square
- a ping pong ball or tennis ball
- a token etc.



**Visual Signals**

The Kanban has a particular purpose – it acts as an indicator for stock control and replenishment based on pre-set, fixed re-order levels and re-order quantities for materials. It is a short term execution tool



# History of Six Sigma

**1984** Bob Galvin of Motorola edited the first objectives for Six Sigma  
10x levels of improvement in service and quality by 1989  
100x improvement by 1991  
Six Sigma capability by 1992

**1984** Texas Instruments and ABB Work closely with Motorola to further develop Six Sigma

**1994** Application experts leave Motorola

**1995** AlliedSignal begins Six Sigma initiative as directed by Larry Bossidy

Captured the interest of Wall Street

**1995** General Electric, led by Jack Welch, began the most widespread undertaking of Six Sigma ever attempted

**1997** till present: Six Sigma spans industries worldwide



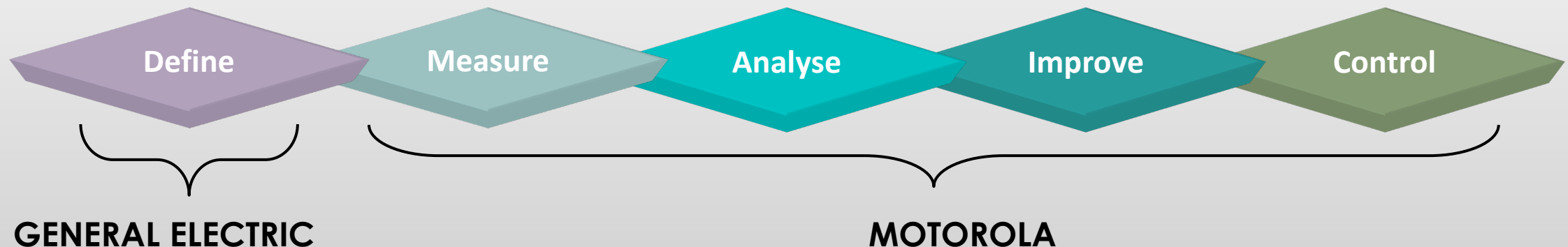
# History of Six Sigma

Six Sigma created a realistic and quantifiable goal in terms of its target of **3.4 defects per million operations/steps** – this indicates that 99.99966% of its products or services are without flaws

It was also accompanied by problem-solving strategy made up of four steps:


**Measure, Analyse, Improve and Control**

When GE launched Six Sigma, they improved the methodology to include the **Define** phase




# The Six Sigma Metric ( $6\sigma$ )

99% Quality  
means...



- 20,000 lost mail articles per hour
- 5,000 incorrect surgical operations per week
- 200,000 wrong drug prescriptions each year
- 2 short/long landings at most major airports per day

$6\sigma$  Quality  
(3.4 defects/million)  
means...



- 7 lost mail articles per hour
- 1.7 incorrect surgical operations per week
- 68 wrong drug prescriptions each year
- 1 short/long landings at most major airports every five years

# The Six Sigma Approach:

*What is the reason behind calculating the sigma value?*

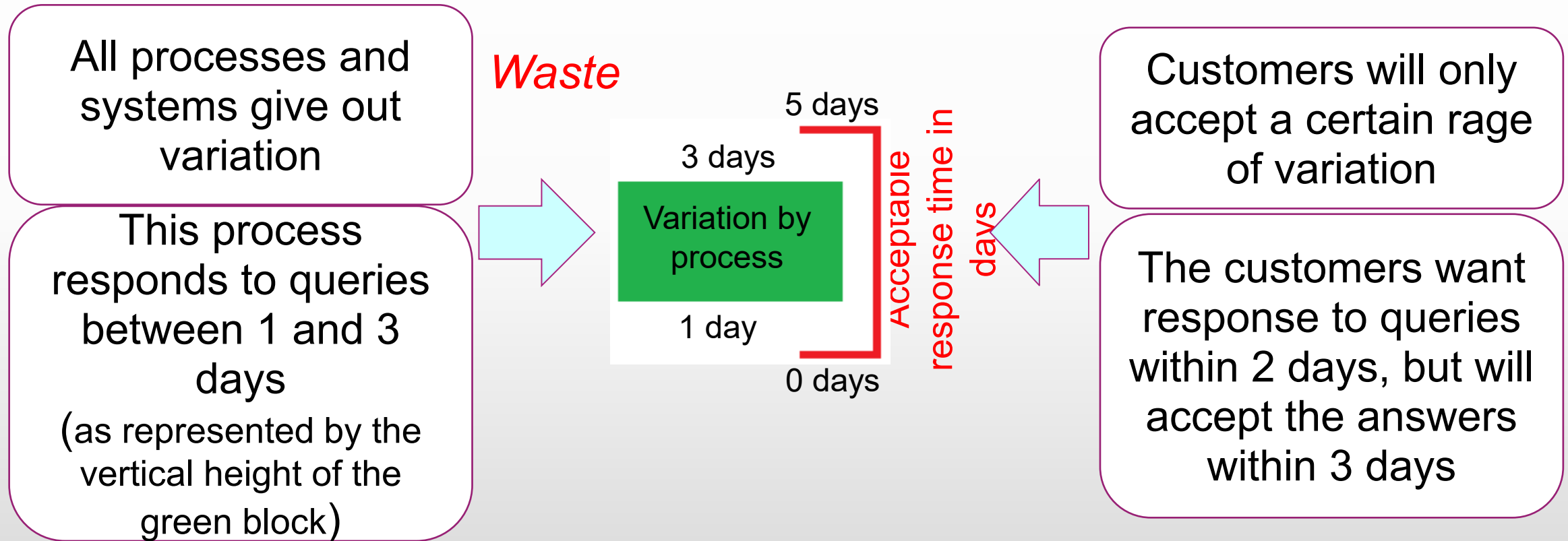
The value in making a sigma calculation is that it abstracts your level of quality enough so that you can compare levels of quality across different fields (and different distributions)

In other words, the sigma value (or even DPMO) is a universal metric that can help anyone with the industry benchmark/competitors

Basically, how many mistakes or defects that your process delivers determines **QUALITY** for you!

# The Focus of Six Sigma

**To reduce variation and avoid giving the customer defective output**

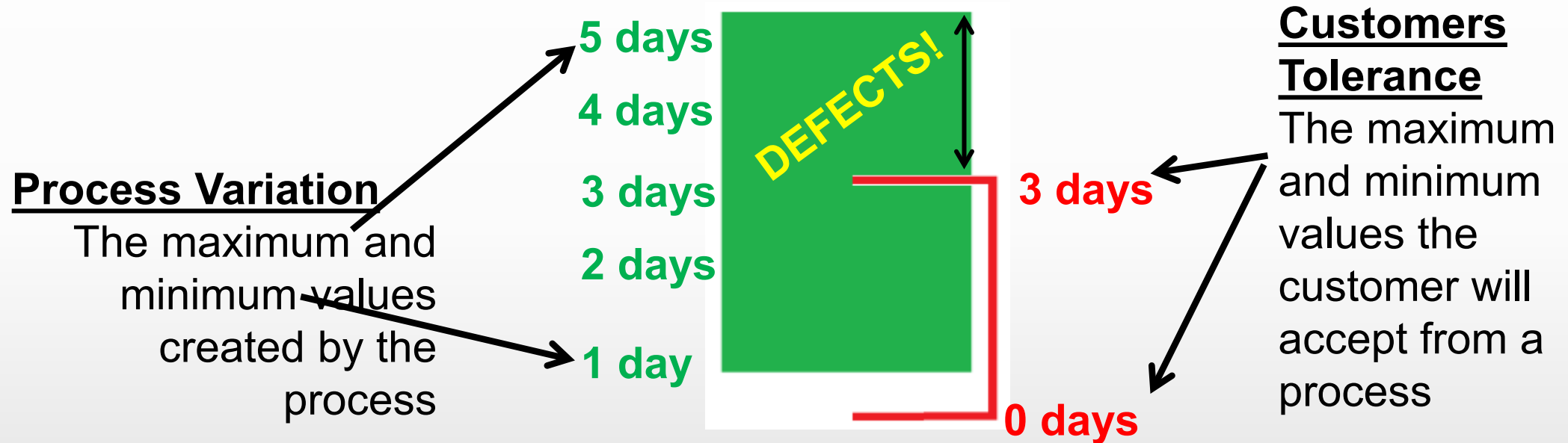


***Waste is whatever gives rise to unacceptable deviation (defects)***



# Defects

*Anything produced greater or smaller than the customer specifications (i.e. outside their tolerance)*



**Example:** Customers expect a response to a question within three days. When measured the company responded to all questions within 1-5 days. This is therefore **NOT** a **capable** process

# Lean and Six Sigma

## Lean is...

A *passionate* belief that there is always a simpler and better way

A continuous drive to identify and eliminate waste and remove road blocks to improvement

The empowerment of employees to drive improvement – **no blame culture**

**Trust** is a major factor

The rigorous application of lean tools and techniques across the whole organisation

## Six Sigma is...

A never ending passionate journey to competitive leadership by satisfying customer requirements profitably

A statistical measure of a process' inherent ability to meet customer requirements

A continuous drive to reduce defects and variability

Finding and solving root causes to failure

Having a *rigorous* control methodology

# The Costs of Lean Six Sigma

**Both Lean and Six Sigma are license and royalty free**

**But there are  
costs:**

Training

Co-ordination and culture  
change

Also, if people are spending  
time improving a process they  
are not serving customers etc

# How they Complement Each Other

## Six Sigma helps Lean because...

Lean does not really have a formal project methodology whereas Six Sigma has DMAIC.

DMAIC allows the improvement team to have a clear set of activities for the **Measurement** and **Analyse** phases.

Lean does not consider the problems with variation; however, Six Sigma adds statistical modelling tools to track down and investigate variation.

## Lean helps Six Sigma because...

Lean provides alternatives to DMAIC for less complex improvement areas.

For example, Kaizen events can be performed frequently by everyone.

Lean focuses on waste and end-to-end flow. Lean defines waste from the customer's perspective. By itself, Six Sigma may take an insular view, optimising a process to meet a local target. Process sigma levels are reached more rapidly by also considering waste



# Key Principles of Lean Six Sigma

## 1 – Customer focus

Focus on the Customer (VoC) first; not the business process

## 2 – Know the value stream

Identify and understand how the work gets done (the value stream)

## 3 – Business Process

Manage, improve and smoothen the process flow  
→ Identify and eradicate waste wherever possible

## 4 – Manage by facts and data

→ Not by opinion  
→ Identify and understand how the work gets done and not how you think it gets done  
→ Reduce variation

## 5 – Trust and empower people

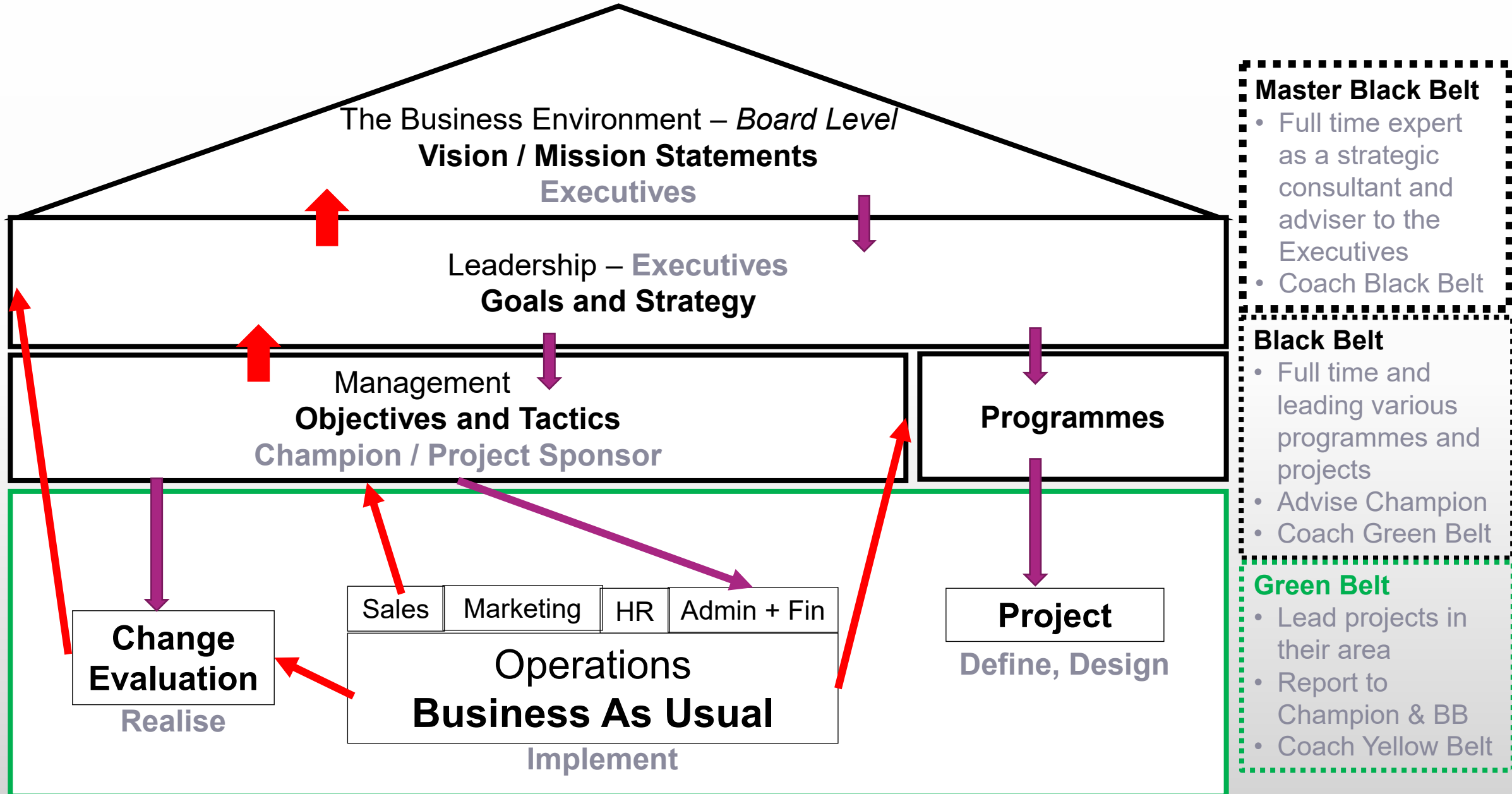
→ Those closest to the work are usually the true Subject Matter Experts (SMEs)  
→ Empowerment must be resourced  
→ Transparency (is two-way)

## 6 – Drive for perfection

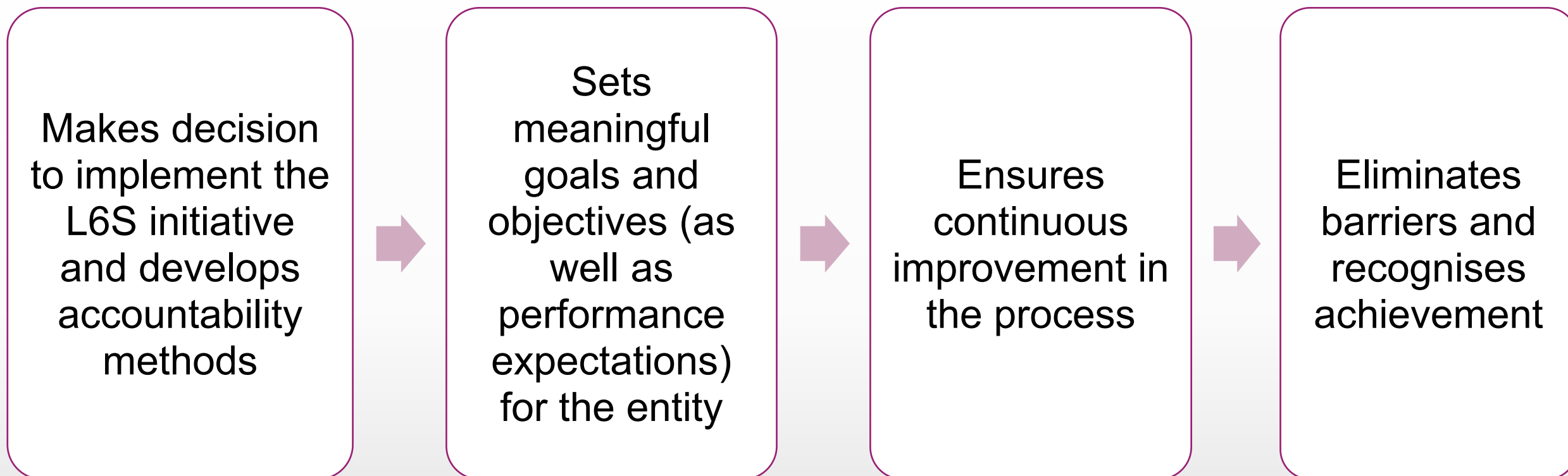
Improve processes systematically

# The Lean Six Sigma Framework

Align  
Align  
Align



# Board Level / Senior Management



***Not all Lean Six Sigma deployments are driven from the top by Executive Leadership. It has been proven, however, that those deployments driven by executive management are much more successful than those that are not.***

# Lean Six Sigma Belt Certifications

## Master Black Belt

- Responsible for the strategic deployment in the organisation
- Promote, support and direct improvement activities in all areas of the organisation

## Black Belt

- Full time project leader
- Leads, directs and coaches Green Belt
- Leads more complex business improvement projects

## Green Belt

- Use the L6S tools to effect measurable and significant business impact
- Provides the skills to implement improvements within their departments
- Coaches the Yellow Belt

## Yellow Belt

- Knowledge-based entry level certification
- Provides a good understanding of Lean Six Sigma methods, techniques and project selection

# Contrasting Team Structures

	<i><b>Working Group</b></i>	<i><b>L6σ Team</b></i>
<i><b>Leadership</b></i>	Manager/Supervisor	Shared
<i><b>Accountability</b></i>	Same as broader organisation	Mutual
<i><b>Purpose</b></i>	Broad	Focused
<i><b>Development</b></i>	Little	A lot
<i><b>Meetings</b></i>	Sharing Information	Review issues/ make decisions
<i><b>Relationships</b></i>	Superficial	Strong and deep
<i><b>Aspiration</b></i>	Sum of individual bests	Result beyond expectation
<i><b>Size</b></i>	Large (>10)	Small (<10)

# Setting up the Team



Always include people from the ‘grind’

- Those doing the work are usually best placed to work out how to improve it

Try and include the best people for a task not necessarily just the best available

Try to get the correct mix of personalities

The aim is to develop a High Performing Team (HPT)

***When setting up the team, ensure that the individuals are well-skilled – all too often we get whoever is free, or easy to do without, instead of the real experts we need***

# Project Charter

**A Project Charter is a living document that outlines the issues, targets and framework for working on a process improvement**



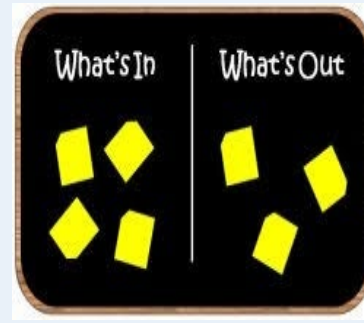
**Team  
Development**

Those who will participate on the project



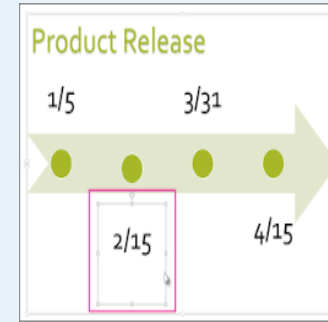
**Problem  
Statement**

The problem captured - make it measurable



**Scope**

What areas the project will cover and what is excluded



**Business  
Opportunity**

State the business reasons for fixing the issue



**Goal  
Statement**

The SMART target to achieve the improvement



**Timeline**

When varied deliverables will be attained

# Project Charter – Focus and Direction for a Team

Aids in communicating  
the purpose of the  
team  
(why are we doing this?)


Clearly  
communicates the  
scope  
(what is in / what is out)

Aids in team design  
and selecting  
participants  
(do we need specialists?)

Helps to clarify  
roles and  
responsibilities

Clearly defines  
expected  
accomplishments  
(benefits)

Outline approach the team  
will use  
(get validated by a  
champion or BB)



*The charter  
is a teams'  
blueprint for  
success*

Lists specific deliverables

- Review charter regularly at weekly progress meetings
- Start reviewing plans



# Managing Progress and Demonstrating Control

## Why?

- Teams are self-directed and autonomous
- However, control and direction are still necessary
- It is the responsibility of the Team Sponsor to satisfy themselves that the team is in control

## How?

- Use of Team / Kanban Board
- Daily stand-up
- MoSCoW prioritisation

# Team Boards

Contain relevant information to allow the team to understand and perform their work

Allow them to track trends

Pick up on waste

Simple graphical information

- ☐ The Board belongs to the team
- ☐ Makes a topic of conversation – it is not decorative wallpaper!
  - ☐ Boards need to be accessible and close to the workplace
  - ☐ Visual management boards do not have to look beautiful
  - ☐ Do not kill ownership with standardisation

# Team/Kanban Board

Visually illustrates the progression of tasks

Simplest version shown, however you may want to add extra columns depending on your business environment	Signed off Passed User Acceptance Testing Shipped Etc
--	--

Tasks can be prioritised perhaps using MoSCoW

Can be part of the Team Board

## Kanban board



# Daily Stand-ups

## Ideally scheduled first thing daily

- **All** Team Members attend
- Wider stakeholders (including Leaders) can attend as non-participating observers

## Each team member has **2 minutes** to report to the group:

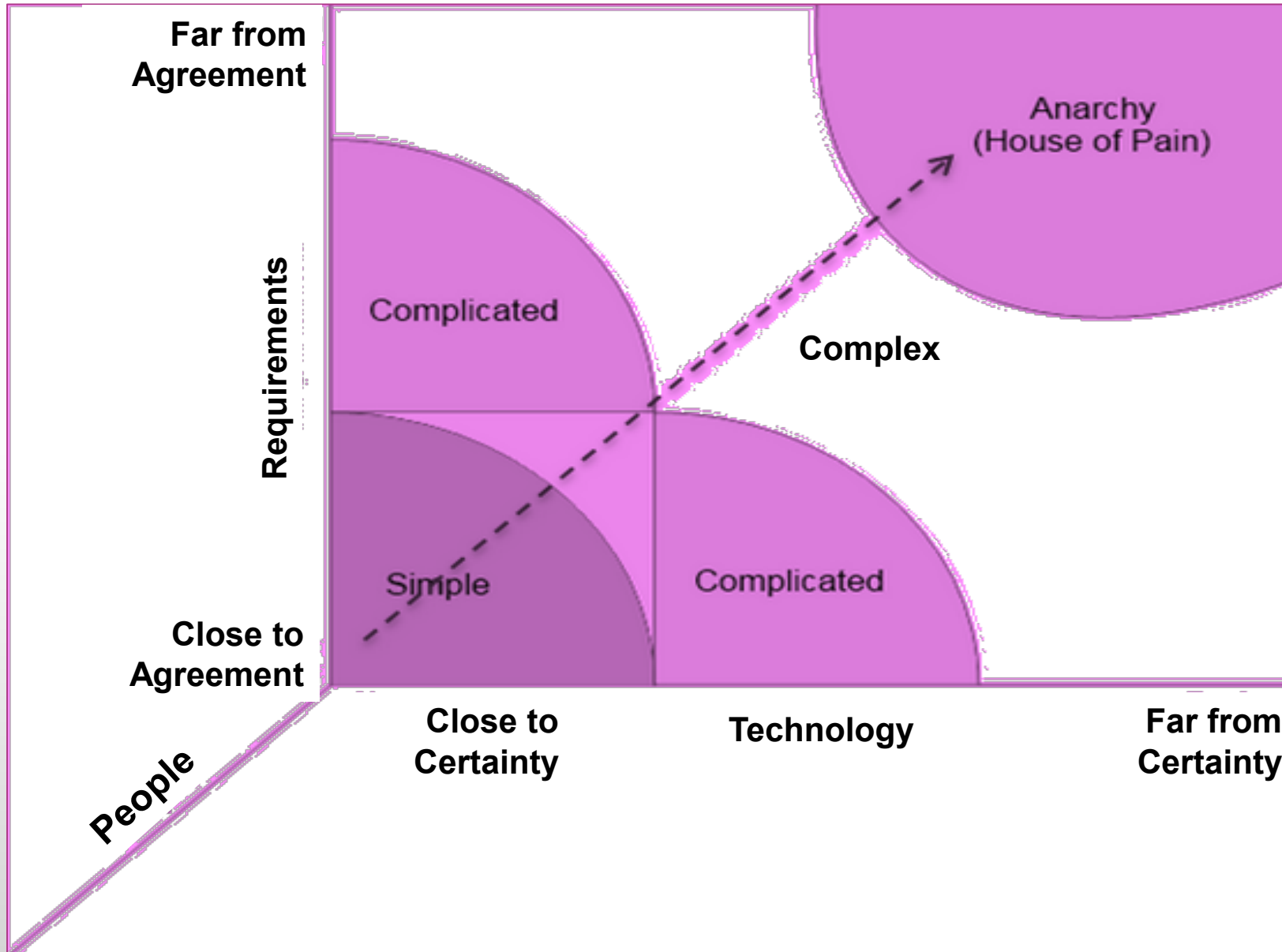
1. Work and activities performed since last meeting
  2. Work and activities planned for the next period
  3. Any potential barriers to individual or team progress
- Additionally – group leader sums up

## Short and focused

- No discussions (these can happen *after* the stand-up ends)

***Stand-ups maintain progress, demonstrate control  
and improve team integration and morale***

# Improvement Project Selection



## Project Prioritisation

- Impact on Customer
- Value to the business
- Resource availability
- Time to complete
- Current capability of the process
- A change in regulation
- Connection to key business priorities
- Current cost of dealing with failure

# Typical Improvement Project Areas (Services)

- Call centres
- Customer orders
- Receivable invoices
- Payable invoices
- Capital authorisation requests
- International shipper forms
- Insurance claims
- Regulatory Assessments and Audits
- Customer service
- Supplier management
- Project Management

# Introduction to Problem Solving Methodologies

Context	No problem, but an idea	Immediate problem	Simple problem requiring agreement	Problem requiring some analysis	Complex issues	Problem requires a new process and may involve strategic investment
Action	I have an idea	I know what I need to do quickly with little cost or changes	A simple problem for which an improvement is proposed	Jointly with people who work within the department or process	This is a project that requires a tooled methodology	This issue requires investment in a new product, service or process
Execution: Duration / No. of People	1 hour - 1 week	1 hour - 1 week	1 - 4 weeks	1 - 3 months	3 - 6 months	6 months - 3 years
	1 person	1 person	The team	3 - 7 people	4 - 10 people	> 20 people
Tools	Idea Management System	3C	8D / Kaizen / PDCA/PDSA	Kaizen	DMAIC	DMADV (DFSS)
Lean					Six Sigma & Lean Six Sigma	

# Kaizen

## Kai + Zen (Continuous Improvement)

A philosophy of small improvements that involves any level of employees from top management to the lower cadre. The culture is driven so that area or people can be considered.



**Individual philosophy:**  
Everyone is encouraged to come up with small improvement suggestions on a regular basis



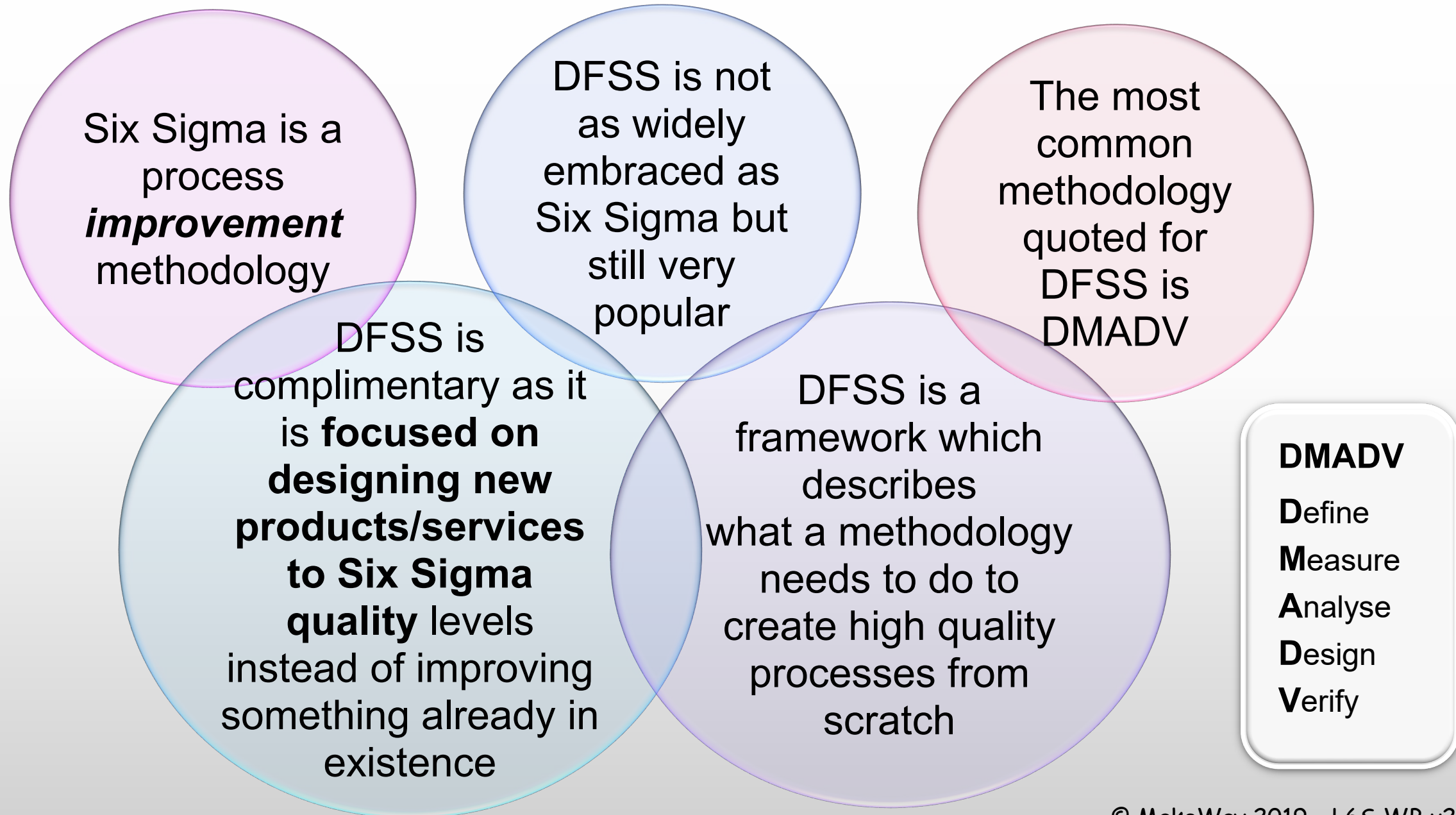
Kaizen is based on making little changes on a regular basis and not major changes. The emphasis is to always improve productivity, safety and effectiveness while reducing waste

**An umbrella term covering several areas typically:**

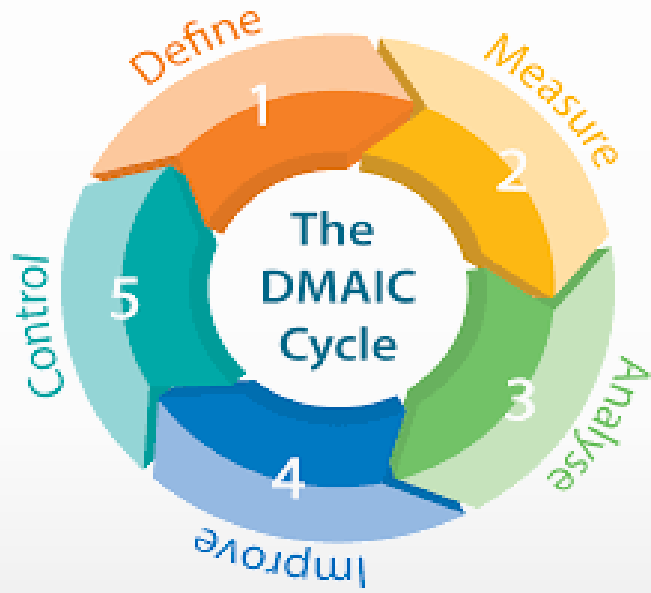
- An individual philosophy
- A team based improvement methodology (Kaizen Event / Kaizen Blitz)



# DFSS: Design For Six Sigma



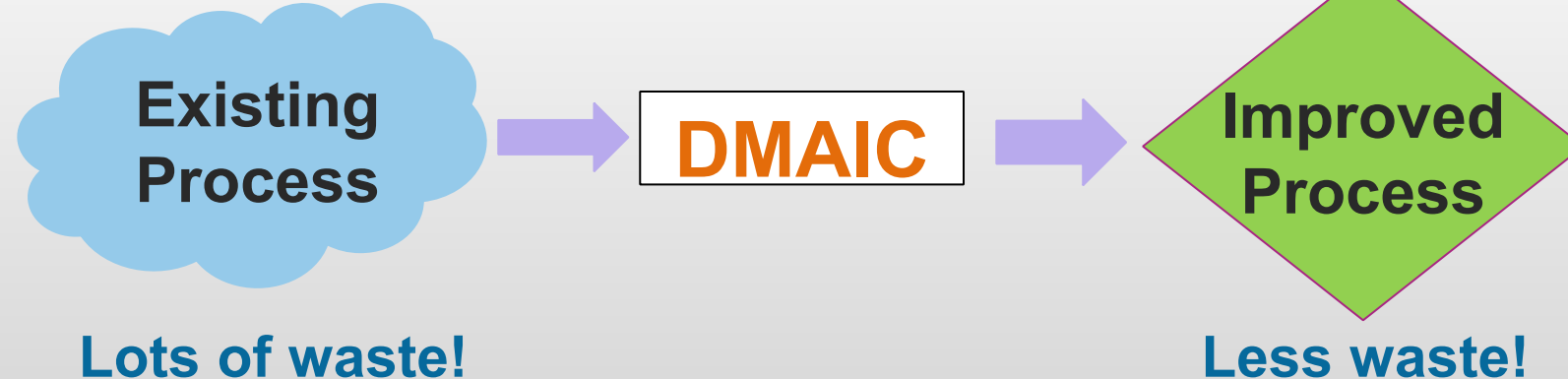
# DMAIC – a logical flow to problem solving



A 5-step methodology that provides a structured framework to improve an **existing** process

The DMAIC framework helps ensure that improvement projects:

- Are clearly defined
- Are clearly implemented
- Have their results embedded in standard operations



# A View of the DMAIC Phases

## DEFINE

- Establish the project (get the team together and agree governance)
- Define the problem (Set the scope of the project)
- Talk to Customers and seek to understand their needs from the processes under investigation

## MEASURE

- Collect data about the process being investigated
  - Create a Data Collection Plan and Data Collection Forms
- Illustrate how the process is now ('As Is')

## ANALYSE

- Analyse the data (probably using statistical tools)
- Determine genuine areas of waste and their root causes
- Illustrate how an improved process would look ('To Be')

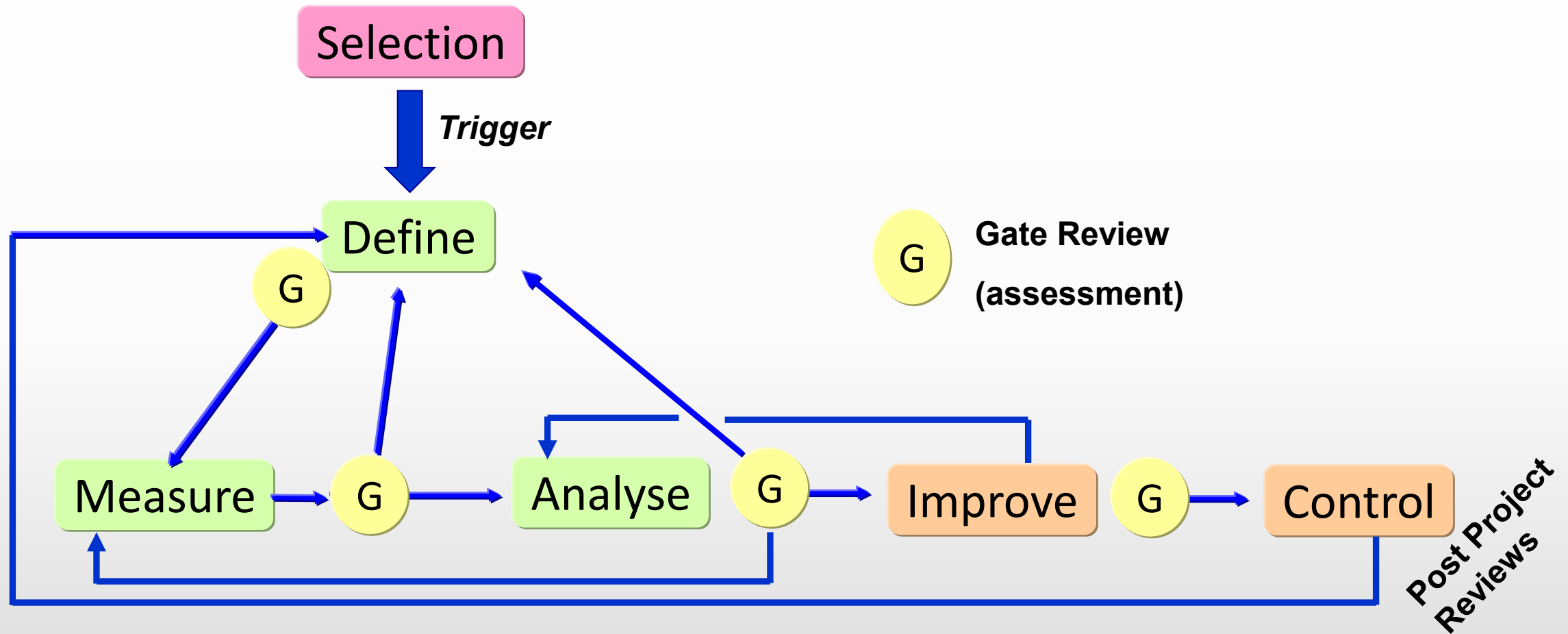
## IMPROVE

- Select, trial and implement solutions
- Create a Control Plan

## CONTROL

- Close the improvement project
- 'Sustain the change' – monitor the improved process (if performance degrades, this triggers corrective action)

# DMAIC is not necessarily a straight sequence



# Gateways / End term assessments

It is sensible to review a project from time to time to see if all is well and if it should continue

- Often called 'Tolls', 'Tollgates', 'Gates' or 'Gateway' reviews
- A logical place for this in DMAIC is at the end of each phase

At this time those running the project should discuss the state of the project with the sponsors of the project

If you are running the project as a Green Belt, then your sponsors are likely to be your local Champion and perhaps your manager and also your Black Belt

# Questions to Answer at a Review

Is the project still likely to deliver a worthwhile result?

Is it forecast to end on time?  
• If not what is the new projection?

Is the cost forecast still ok?

What is the updated status of the business risk?

What other significant risk is there?

How are these risks being handled?

Any barriers to successful conclusion – particularly political ones?

How is the team getting on?  
What are the next steps?

**Schedule 15-90 mins for this (keep the meeting lean and light)**

**Avoid meeting overrun**

**Some people use power point slides and either present them or e-mail them out**

# *Some Lean Six Sigma Tools & Techniques*

## **TOOLS**

- Brainstorming
- RACI / RASCI
- Gemba / Process Stapling
- Process Maps: SIPOC / Swim Lane / Value Stream Maps
- CTQ (Critical to Quality)
- SPC (Statistical Process Control) – a group of tools which model a system using some form of statistical analysis
- Process Capability

## **TECHNIQUES**

- 5S (Sort / Set in Order / Shine / Standardise / Sustain)
- 5 Why's
- Poka Yoke



# Benefits Assessment – An Example

**Document process re-design**

**Methodology: DMAIC**

**End Date: April 23<sup>rd</sup>**

**Savings and costs estimated over 5 years**

**Staff time estimated @ £20/hour**

## Saving 1:

1 min saving per document

40 docs/week = 9600 docs @ 33p per document

+ £3168

## Saving 2:

New process will stop us losing documents or ‘forgetting’ them

Estimated cost of above is 30 mins per doc

Last year we lost or mislaid 17 assuming that we now only lose 2 per year (a saving of £300 per year) + £1500

## Project Costs:

5 staff members for 10 hours each

- £1000

## On-going maintenance costs:

None/minimal

## Estimated cost savings over 5 years

+ £3668



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