

Lean Sigma

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Far Shore Ltd



New company located in Kilbrittain, County Cork.

- Over 20 years of experience of helping companies / organisations and individuals to develop and realise organisational excellence.
- Providing training and consultancy services in Lean, Six sigma and Business Transformation Strategies.

Just as people all differ from each other; every organisation may require a different approach in order to realise their potential, let us help you to find the right way.

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Contents



- Why Lean and Six sigma? (The Benefits)
- What is it?
- Where can it be used?
- How can it be applied?
- The flavour of the month or?
- It really does make a huge difference!

Why?



- Adoption across all sectors
- Process thinking
- All types of processes
- It works – Proven
- Single point improvement
- Organisational transformation.

Customer Focus



“The purpose of a business is to create and retain customers”

Peter Drucker (writer and management consultant)

Process Focus



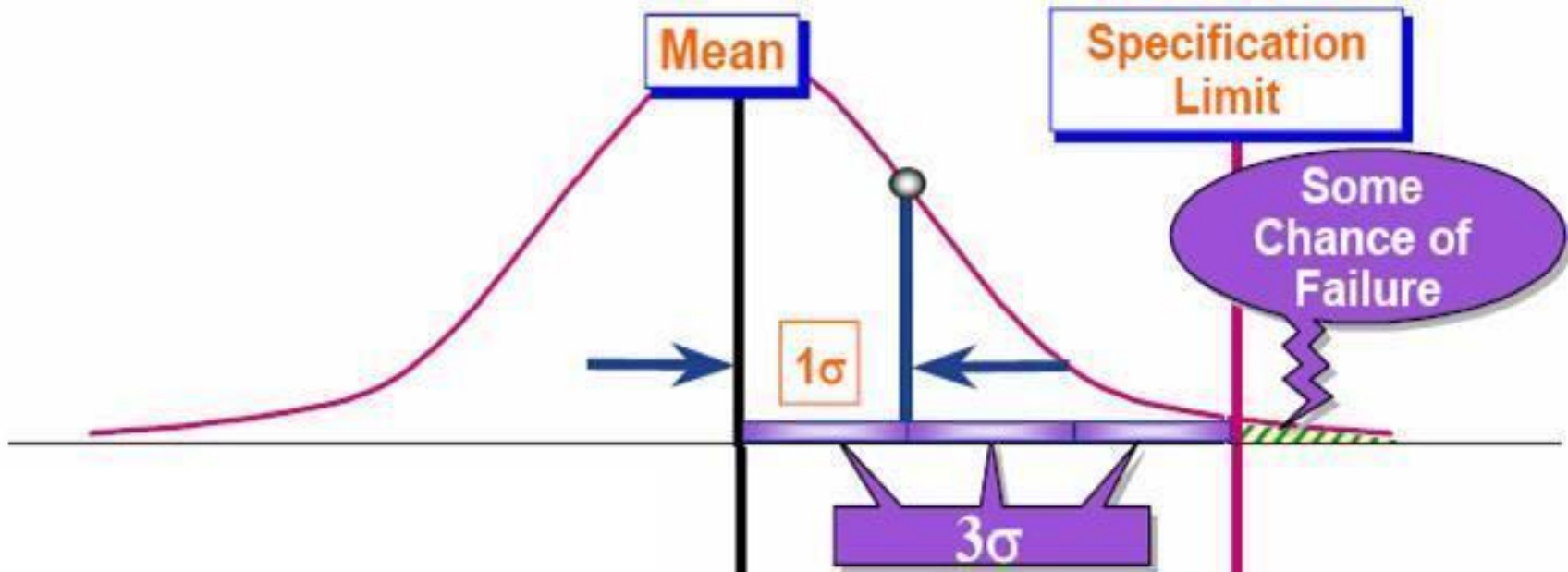
Edward Demming

“Every system is perfectly designed to get the results that it gets.”

“85% of the reasons for failure to meet customer requirements are related to deficiencies in systems and processes... rather than the employee.

The role of management is to change the process rather than badgering individuals to do better.”

Six Sigma – Output from a natural process

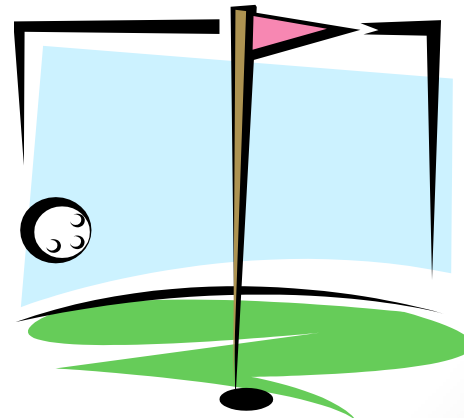


Golf Variability



If you played 100 rounds of golf per year, and played at:

- 2 Sigma - you'd miss six 12inch putts per round
- 3 Sigma - you'd miss one 12inch putt per round
- 4 Sigma - you'd miss one 12inch putt every 9 rounds
- 5 Sigma - you'd miss one 12inch putt every 2.33 years
- 6 Sigma - you'd miss one 12inch putt every 163 years!



Why SIX sigma?



99.9% is already VERY GOOD

But what could happen at a quality level of 99.9% (i.e., 1000 ppm)?

4.6 σ

- 4000 wrong medical prescriptions each year



- More than 3000 newborns accidentally falling

- Two long or short landings at US airports each day



- 400 letters per hour which never arrive





How Could We Get to Here?

- 13 wrong drug prescriptions per year
- 10 newborn babies dropped by doctors/nurses per year
- Two short or long landings per year in all US airports
- One lost article of mail per hour

Six sigma - History



MOTOROLA

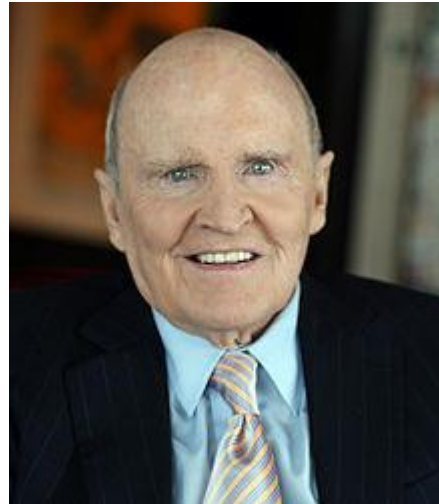


- Six Sigma was first popularized by Motorola, Inc. in 1986
- They promoted it as a way to measure defects and improve quality.
- It has evolved to a robust business improvement methodology that focuses an organization on customer requirements, process alignment, analytical rigour and timely execution

Six sigma - History



Jack Welch - GE

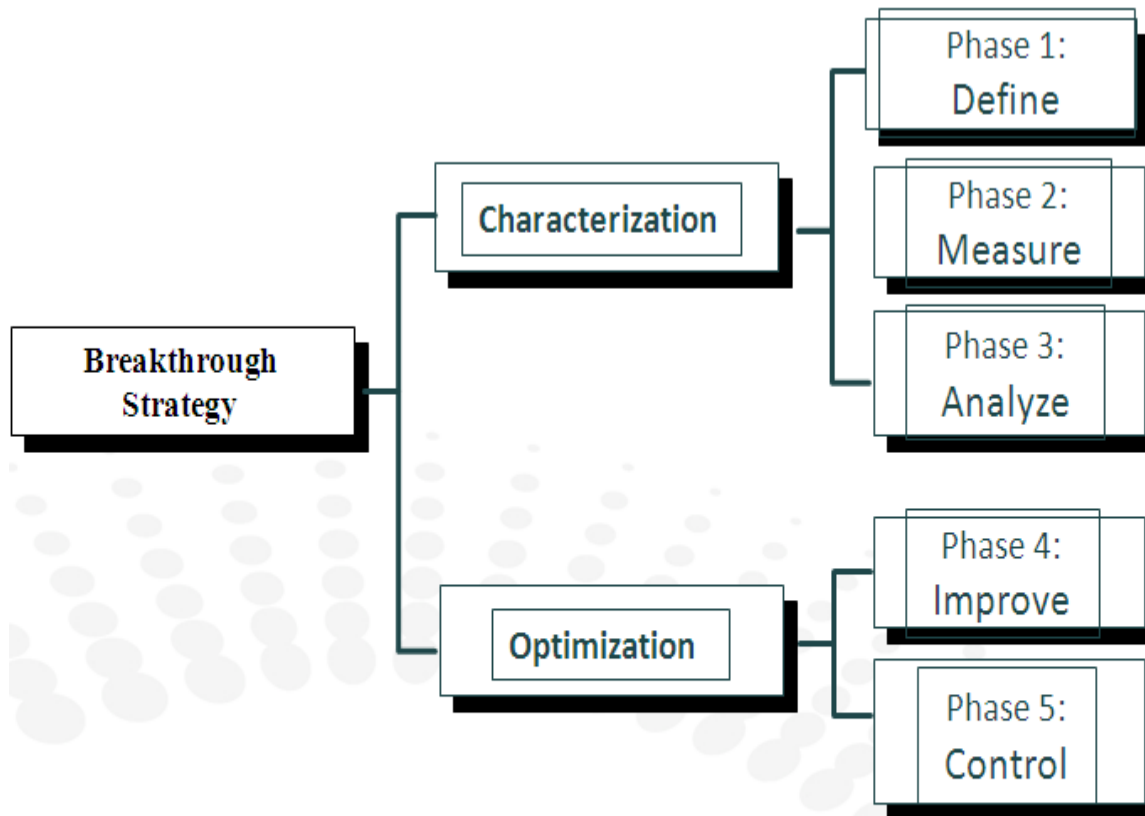


Six sigma from 1995

Oversaw increase in revenues from \$26.8 billion to \$130 billion

Worlds largest company

Problem Solving Methodology



Projects are worked through these 5 main phases of the DMAIC methodology

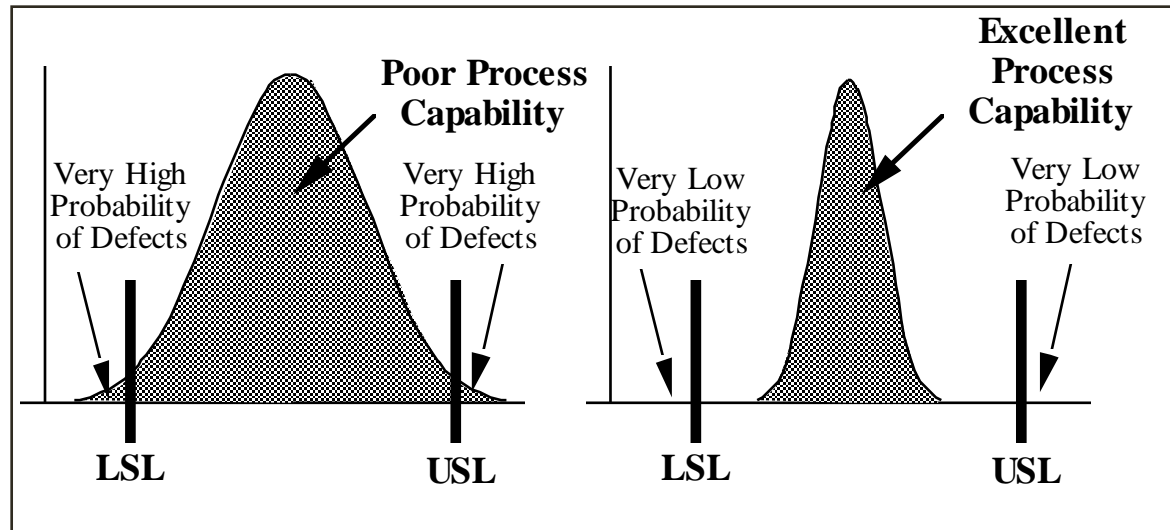


Process Capability



Process capability refers to the ability of a process to produce a defect-free product or service.

$$\text{Process Capability} \propto \frac{1}{\text{Process Variation}}$$



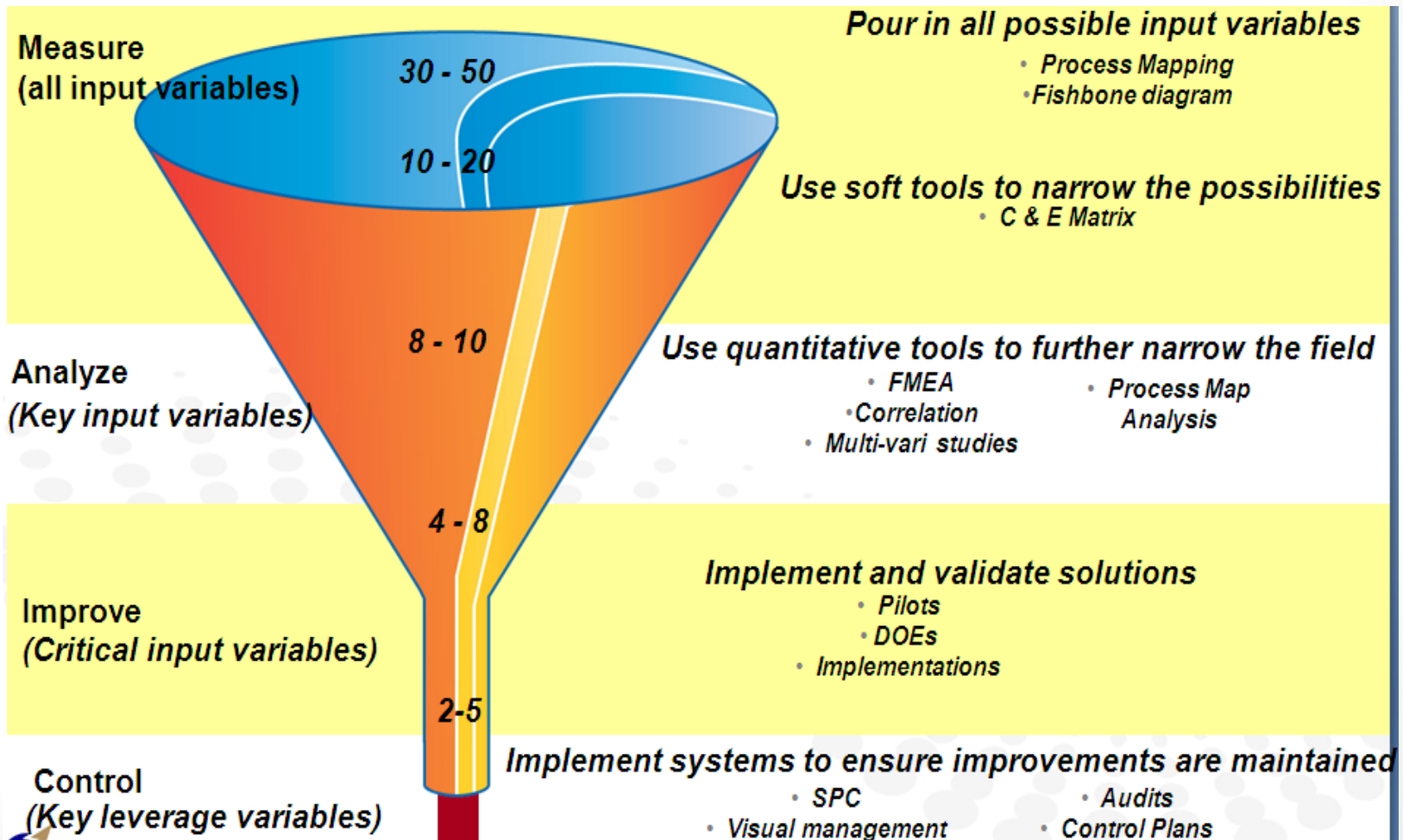


$$Y = f(X_i)$$

Which process variables (causes) have critical impact on the output (effect)?

$$\text{Crusher Yield} = f \left(\begin{array}{ccccc} & & \text{Material} & \text{Tool} & \\ \text{Feed}' & \text{Speed}' & \text{Type} & \text{Wear}' & \text{Lubricant} \end{array} \right)$$

$$\text{Time to Close} = f \left(\begin{array}{ccccc} \text{Trial} & \text{Correct} & \text{Sub} & \text{Credit} & \text{Entry} \\ \text{Balance}' & \text{Accounts}' & \text{Accounts}' & \text{Memoes}' & \text{Mistakes}' \\ & \text{Applied} & & & \end{array} X_n \right)$$



What is Six Sigma?



- A Vision and Philosophical commitment to consumers to offer the highest quality, lowest cost products
- A Metric that demonstrates quality levels at 99.9997% performance for products and processes
- A Benchmark of our product and process capability for comparison to 'best in class'
- A practical application of statistical Tools and Methods to help measure, analyze, improve, and control our processes

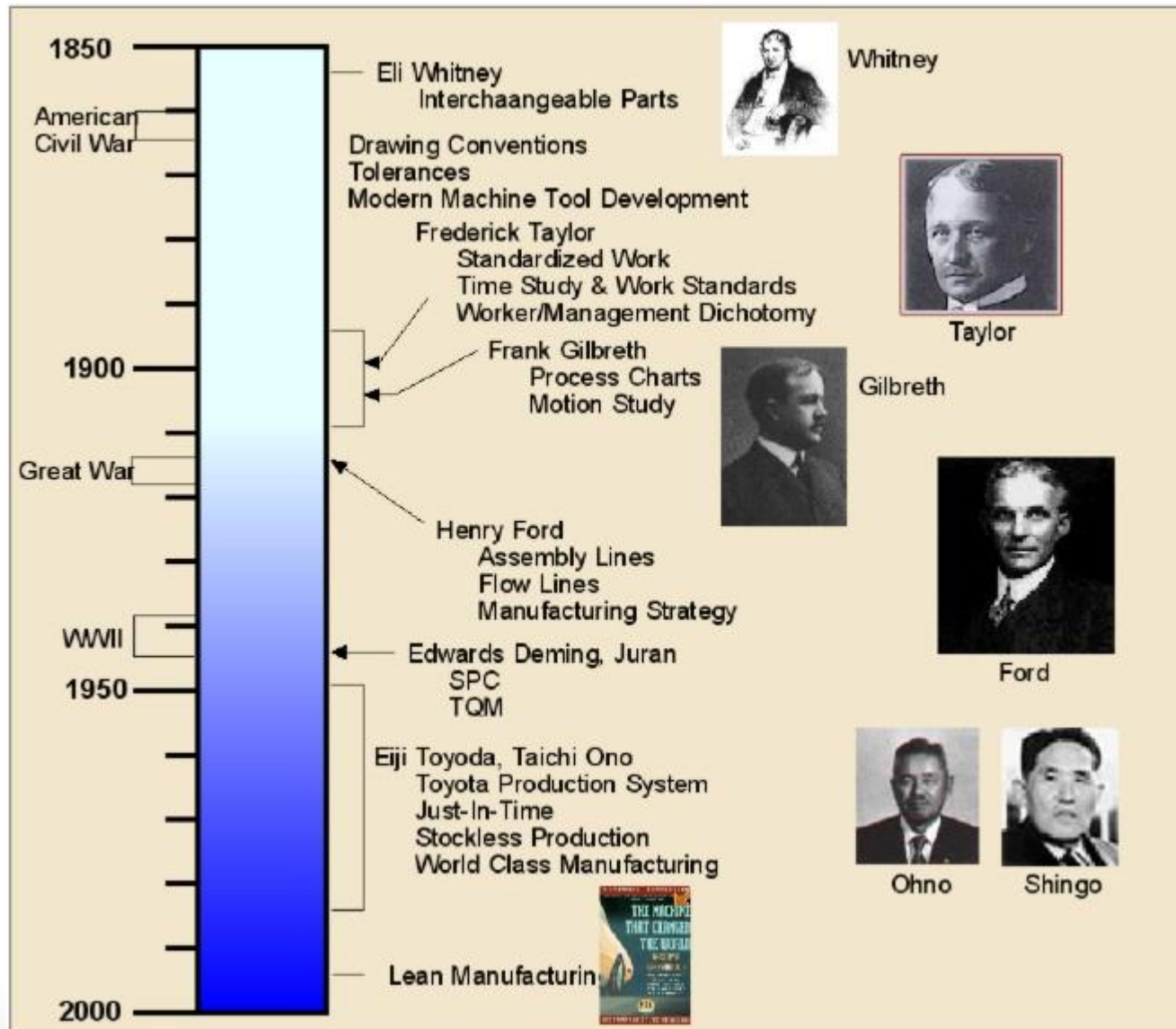
Lean Defined



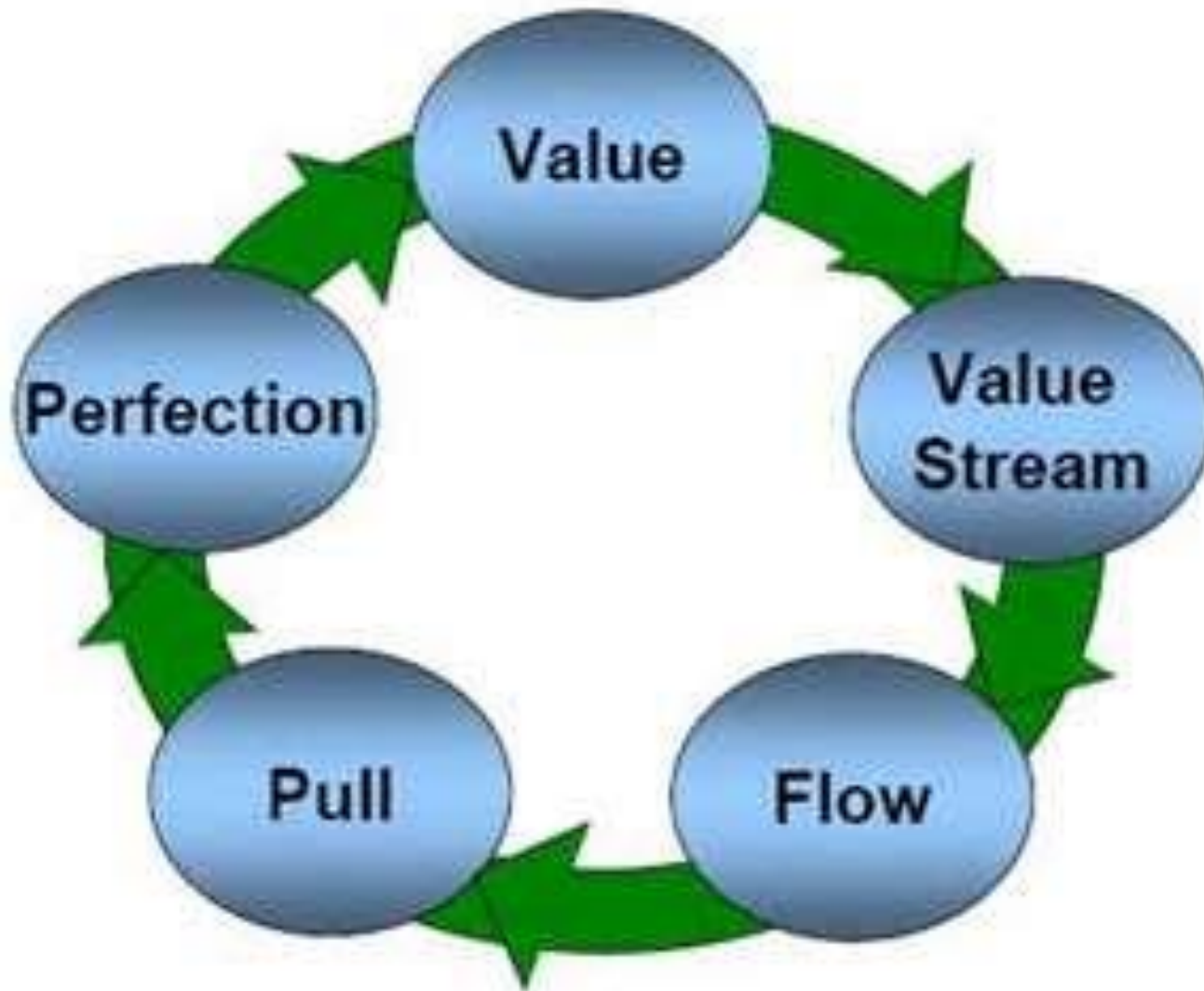
“The endless transformation of waste into value from the customer’s perspective.”

Lean Thinking
1996 Womack and Jones

Lean History



Lean Principles



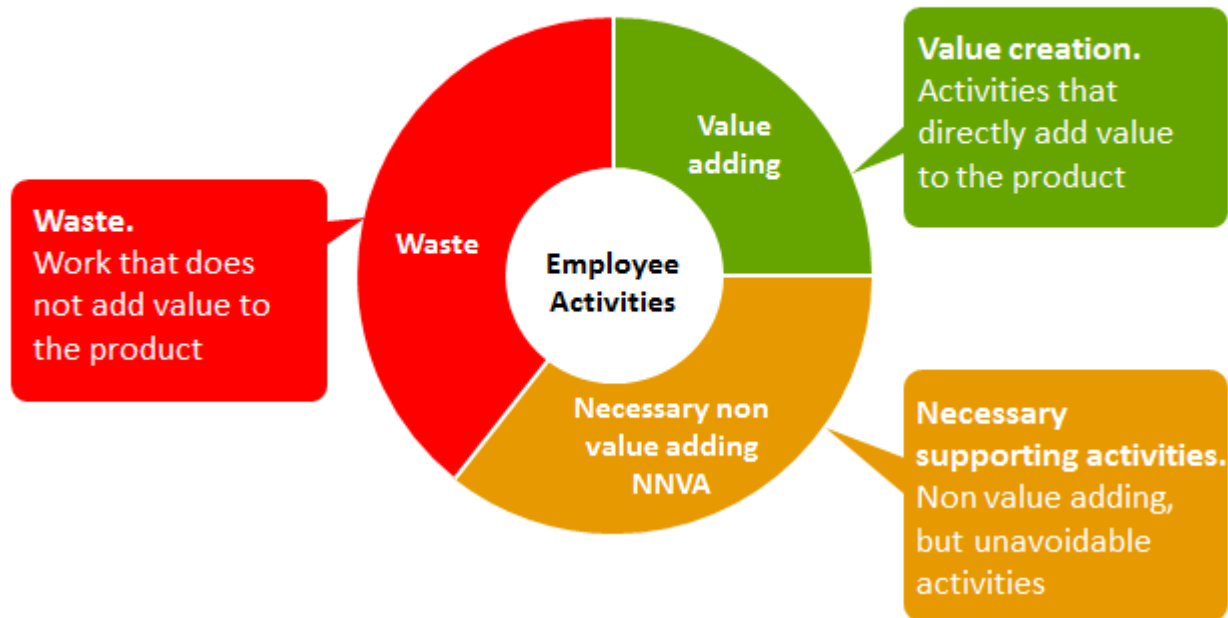
Lean Principles



Value

Any transformation process that the customer would be prepared to pay for adds value:

Activities Breakdown for Employees



Seven classic wastes



Transportation

Inventories

Movement

Waiting

Overproduction

Over processing

Defects



This can be remembered by using the acronym “TIM WOOD ”

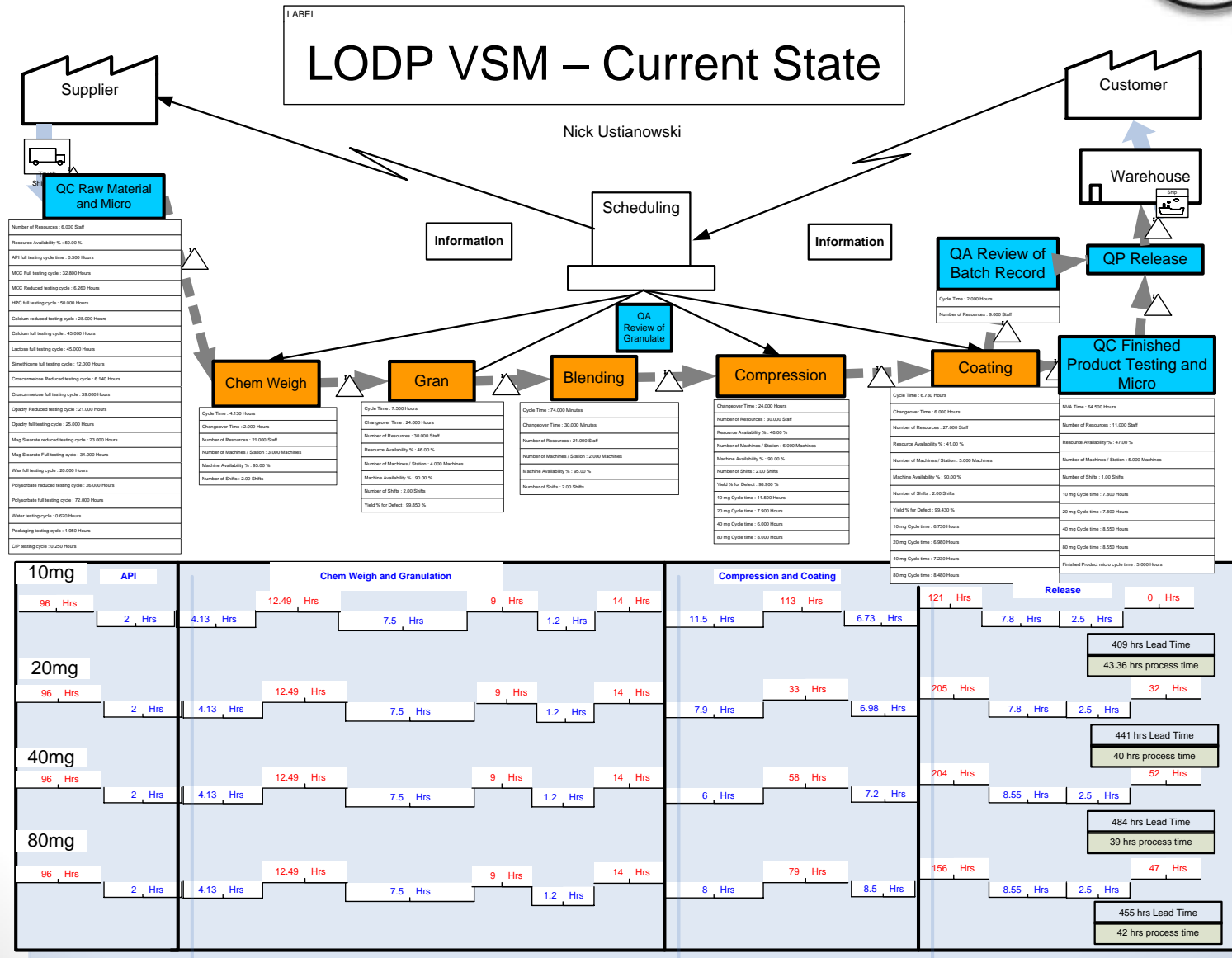
Lean Principles



Value Stream

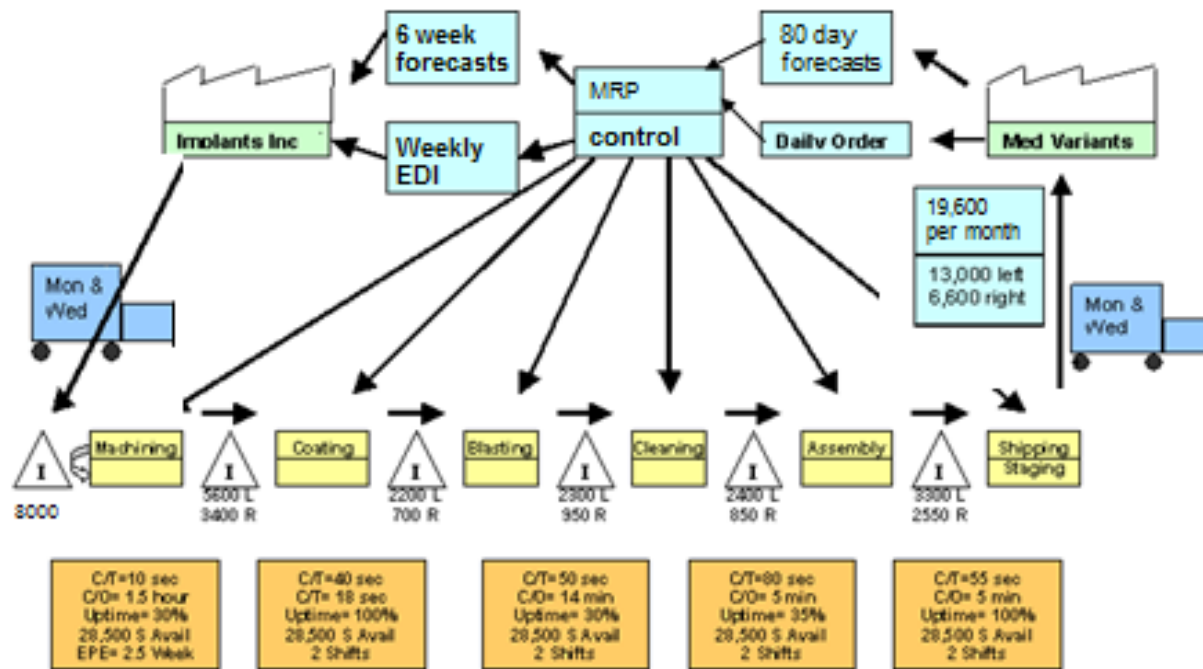
- The value stream is the end-to-end collection of processes that create value for the customer.
- The Value Stream is defined by the customer (internal and/or external)
- Internal customer can define value from one area to the next, from one process step to the next
- Ask yourself do these activities really add value to the end customer?

Value Stream Map



[illegible]

Value Stream Map



8.2D		9.2D		3D		3.3D		3.3D		6D	Total =33D
	10 sec		40 sec		50 sec		80 sec		55 sec		Total =235 Sec

VA = 235s

NVA = 33 days

Opp. time = 33 days

Total Lead Time = 33 days and 235s (round to 33 days)

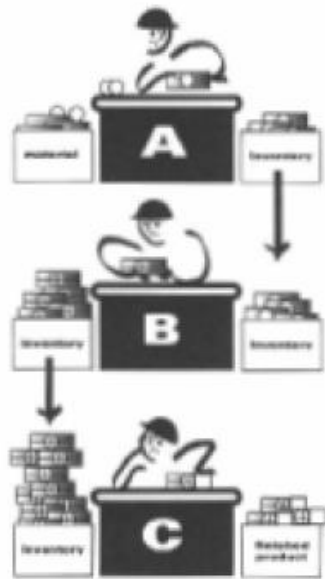
% activities that are value added = 0.0008% approx.

Lean Principles

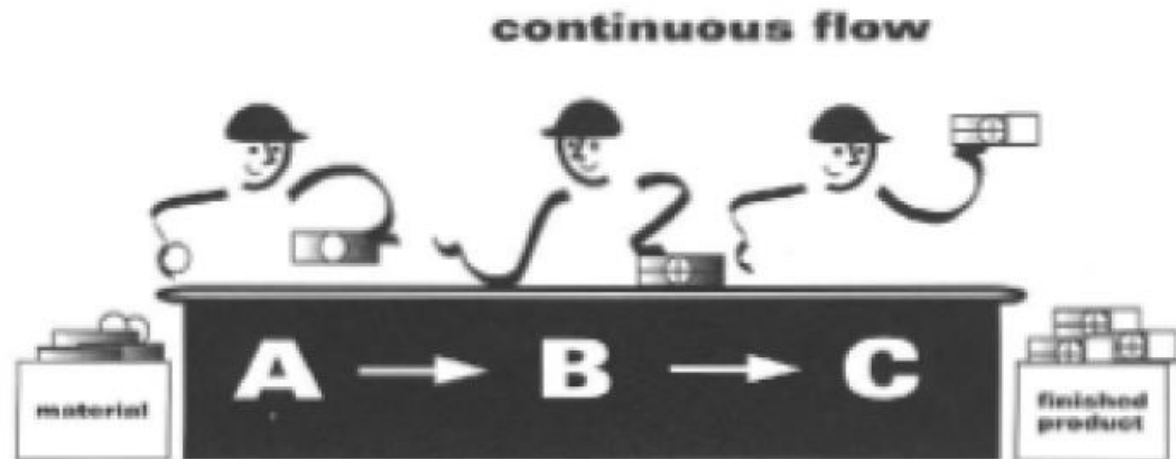


Continuous Flow

Flow refers to the linking of all activities and processes into the most efficient combinations to maximize value-added content while minimizing waste.



isolated islands



Lean Principles



Pull

- Pull refers to the actual customer demand that drives the value stream
- Nothing is produced by the upstream supplier/operation until the downstream customer signals a need
- Pull is based on **Customer Demand** rather than **Forecasts**



Lean Principles



Pull

- Strives for one piece flow or single piece flow
- Principle behind this is that if one part is ordered and I start to manufacture two parts then I have
- One more piece to
 - Order Products
 - Wait for delivery
 - Delivery to central store
 - Pick pack and ship to distribution store
 - Hold in distribution store
 - Deliver to shop
 - Store on shelves
 - Sell

Lean Principles



Pull Example: Dell

- One PC is manufactured based on Customer order
- Once payment is cleared signal is sent to the production line where the manufacturing process takes 4-5 hours
- Suppliers are signaled to supply components based on the customer demand not forecasts
- PC is dispatched
- Possible because the Lean Production process is backed up by a Lean replenishment process

Lean Principles



Perfection

Perfection is an ideal, so anything and everything can be improved. Principles in seeking perfection are:

- Status quo is unacceptable
- Putting aside preconceived ideas
- Finding root causes to problems
- Focusing on the process, not the people
- Accepting that the employees are the experts
- Allowing yourself the right to fail

Lean and Six Sigma



Lean + Six Sigma . . . a Powerful Marriage

Lean

- Waste Elimination
- Reduction of NVA steps
- Flow
- At the Pull of the Customer
- Continuous Improvement

Six Sigma

- Variation Reduction
- Scrap / Rework Elimination
- Process Control
- Continuous Improvement

Speed

+

Accuracy

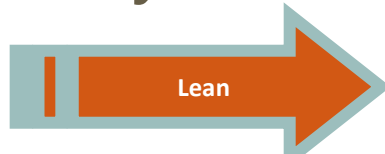
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Lean exposes NVA/VA and makes value added flow.
Six Sigma reduces variation within what remains



Individually, Lean and Six Sigma are very effective



Quick Definition:

A set of principles and tools that help us to eliminate process activities that don't add value, and to create "flow" in a process.

Customer Focus:

Customers define "value added" activities.

Leads to These Results:

- Product flows smoothly through process
- Waste (time, materials, movement) minimized
- All process steps add value

Involves These Risks:

- Risk of "tampering" -- i.e., making unnecessary (and potentially negative) changes due to inability to determine if what you're seeing is "signal" or "noise"
- Risk of not being able to resolve deep-seated quality or reliability problems



Individually, Lean and Six Sigma are very effective

6σ

Quick Definition:

A method – known as DMAIC – and statistical tools that help us reduce variation and defects.

Customer Focus:

Customers define “defects” and elements that are “critical to quality.”

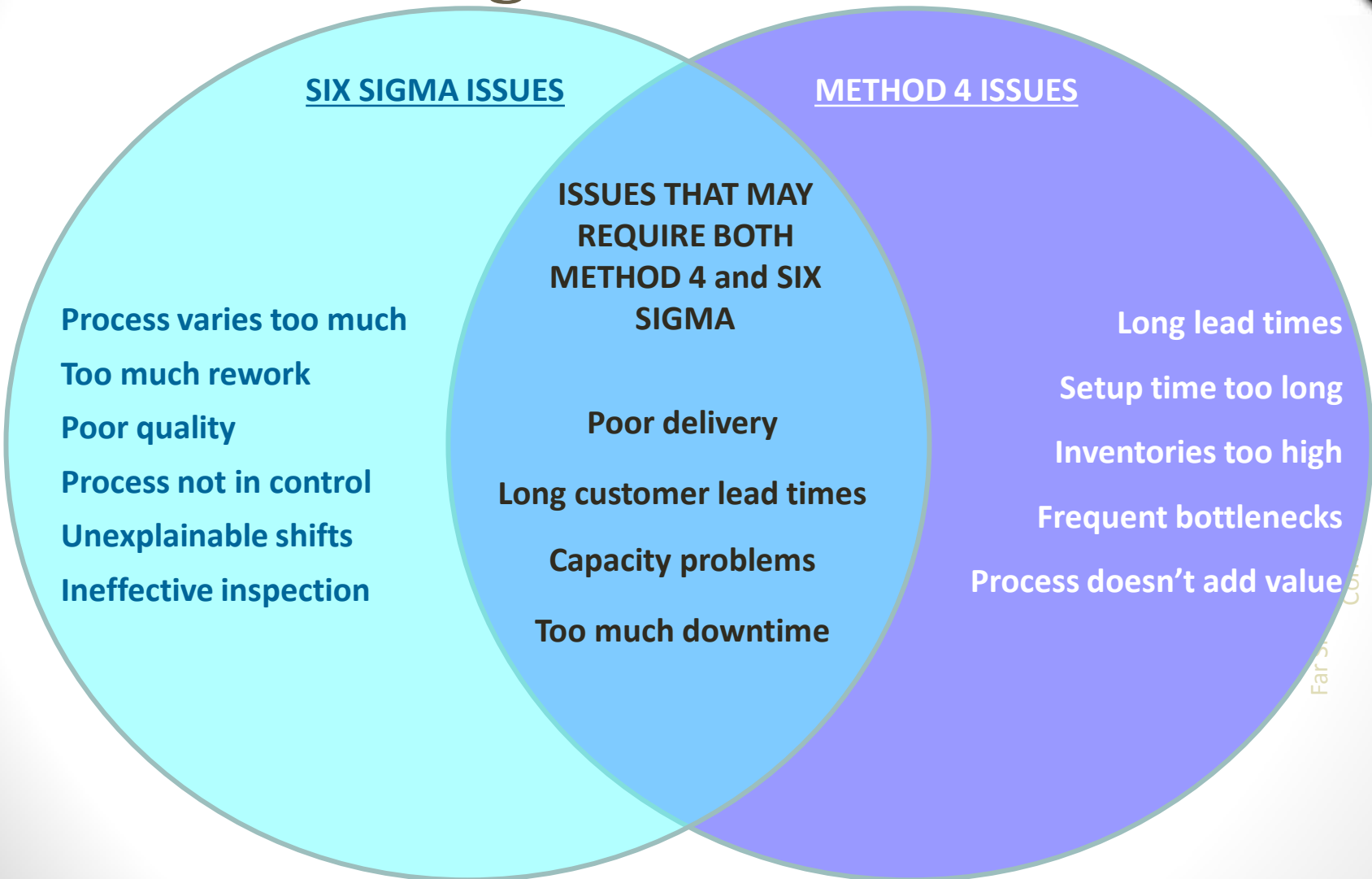
Leads to These Results:

- Variation is reduced/eliminated
- Defects are reduced/eliminated
- Process is “in control”

Involves These Risks:

- Failing to address critical flow issues
- Optimizing a process, but sub-optimizing the overall value stream

Process Improvement Methodologies



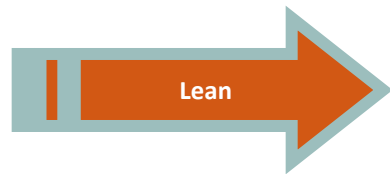
Together



and



- Provide a more complete approach to process improvement:
 - High quality
 - Little/no variation
 - Product flows smoothly
 - Little/no waste (time, materials, movement)



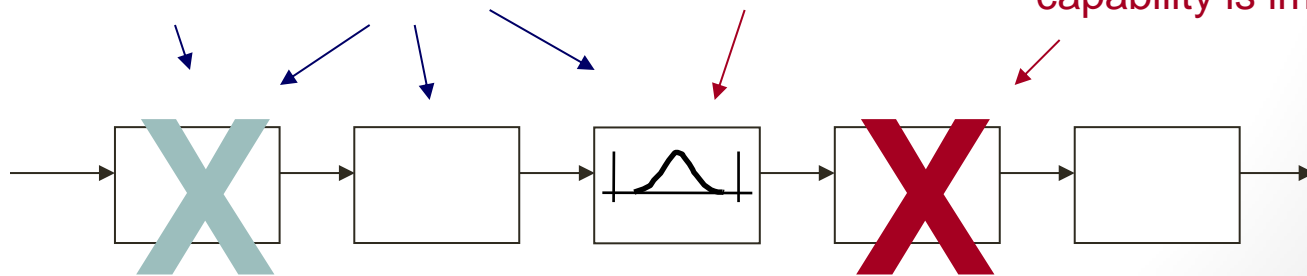
6σ

Helps identify steps that don't add value, and provides tools to eliminate them

Identifies problems in the overall flow

Improves the "capability" of steps that do add value

Helps eliminate steps that are no longer necessary when capability is improved



Lean complements Six Sigma



Lean

A set of principles and tools that help us to eliminate process activities that don't add value, and to create "flow"

- Elimination of waste
- Improvement of flow

Efficiency

Six sigma

A collection of methods and tools aimed at the significant reduction of unwanted variation in products and processes

- Reduction of variance
- Improvement of yield

Effectiveness

COST

**Improved
Process
Performance**

TIME

QUALITY

COMPLEMENTARY GOALS

Some of the Tools Used



Six sigma

- Project Charter
- SIPOC
- VOC
- Process Mapping
- Pareto
- COPQ
- Human Error analysis
- Affinity diagrams
- Fishbone Diagrams
- 5 Why's
- Gauge R&R
- Hypothesis Testing
- Regression analysis
- Multivariate analysis
- Design of Experiments
- TQM
- Quality Risk Management
- FMEA

Lean

- Value Stream Mapping
- JIT
- Jidoka
- Cell Manufacture
- Standard Work
- Kanbans
- Heijunka Box
- SMED
- 5S
- Kaizen
- Lean Supply Chain Management
- Visual Management (Visual Display, Visual Control)
- OEE
- TPM
- Zero Quality Control
- Poke Yoka
- Design for Manufacturing
- Hoshin



- Single point projects
- Building of internal capabilities
- Business transformations
- Colleague engagement
- Not just surviving but thriving.

Thank you

Questions?

