



Lean Six Sigma Awareness:

*How Lean Six Sigma
can complement your
current expertise*



Engr. Olson Jodl Ignacio Gayatin

March 1, 2019
PICHE National Convention
Metro Manila

+ Objectives



- Explain Lean Six Sigma in own words
- Identify some Lean Six Sigma Tools
- Explain how Lean Six Sigma can complement your expertise

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About me

Jodl Gayatin



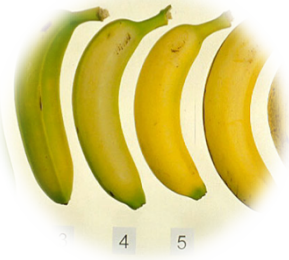
+ Blackbelt



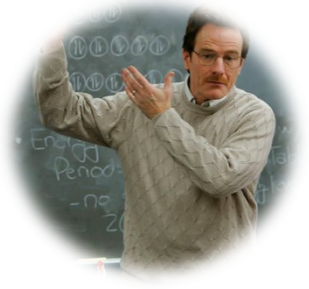
+ Backpacker



+ Bohemian



6σ



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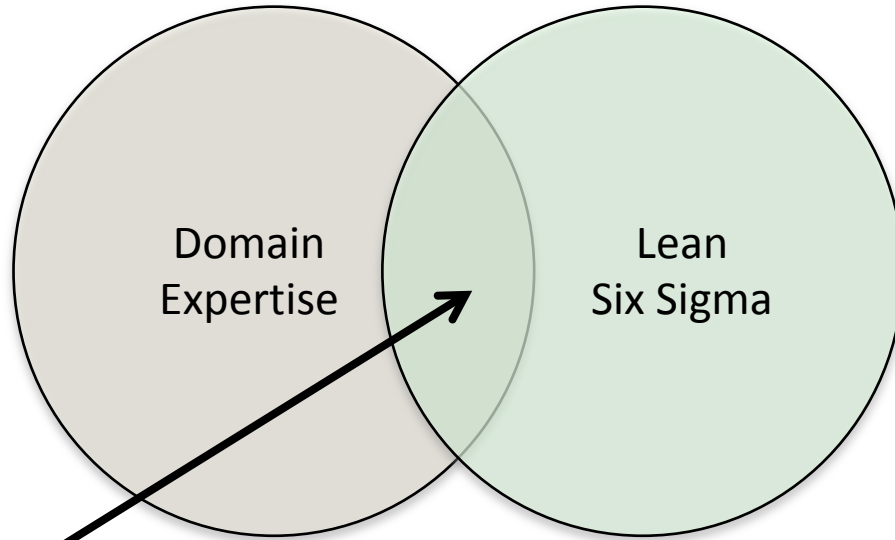
Why Lean Six Sigma?



Benefits

6σ

+ Why Lean Six Sigma



Sweet Spot

Customer Focus
Process Orientation
Structured Thinking

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Six Sigma

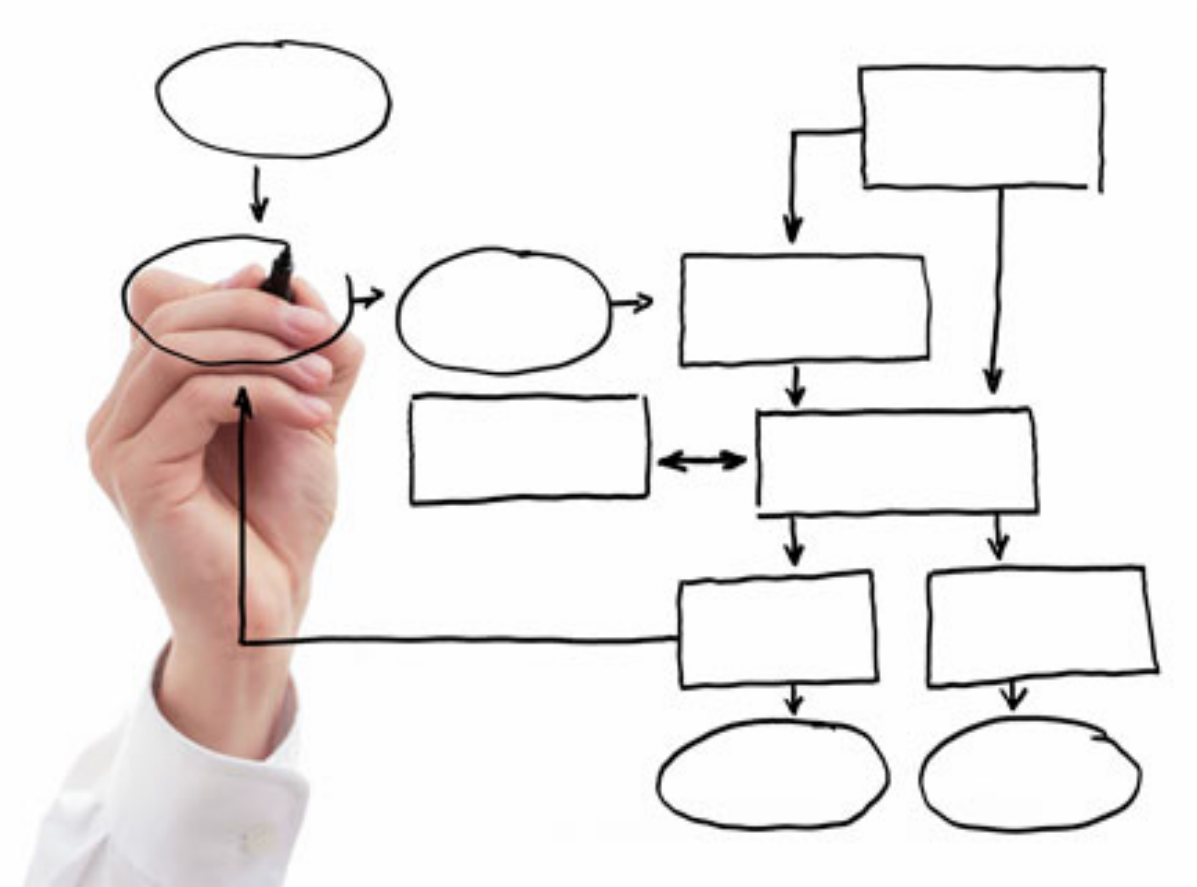
What is Six Sigma?



6σ

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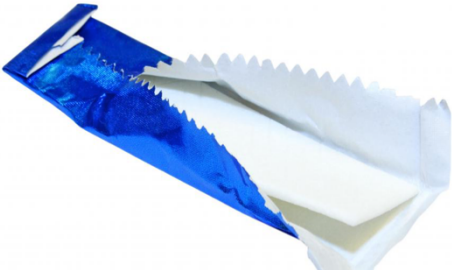
“My process is better than your process.”



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Sample Data

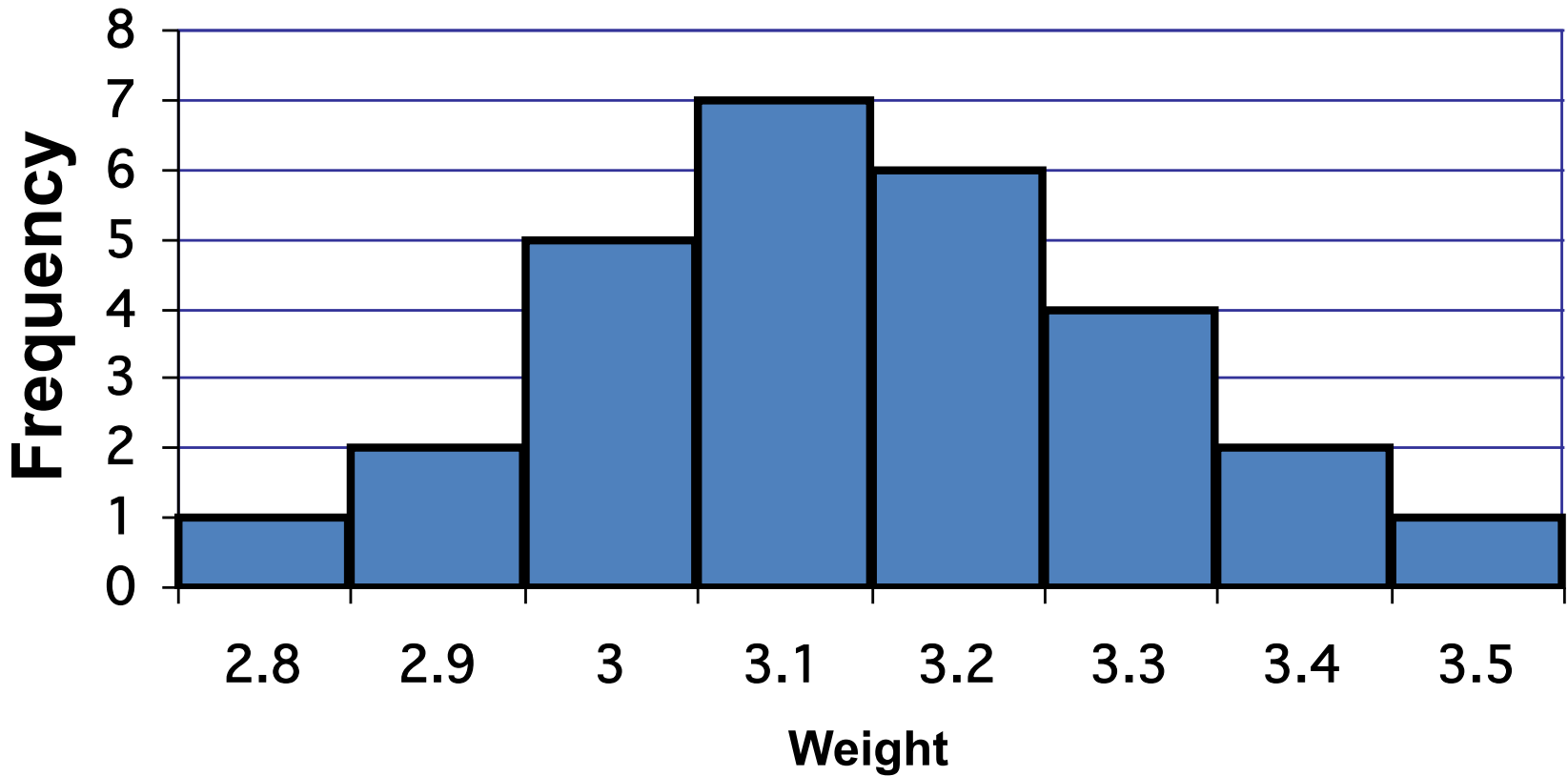


3.1 g	3.1 g	3.2 g	3.3 g	3.1 g	3.2 g
3.3 g	3.3 g			3.3 g	3.1 g
3.0 g	3.0 g			3.0 g	3.3 g
2.9 g	2.9 g	3.0 g	3.0 g	2.9 g	3.0 g
3.2 g	3.2 g	2.9 g	3.3 g	3.2 g	2.9 g

Weight of stick gums

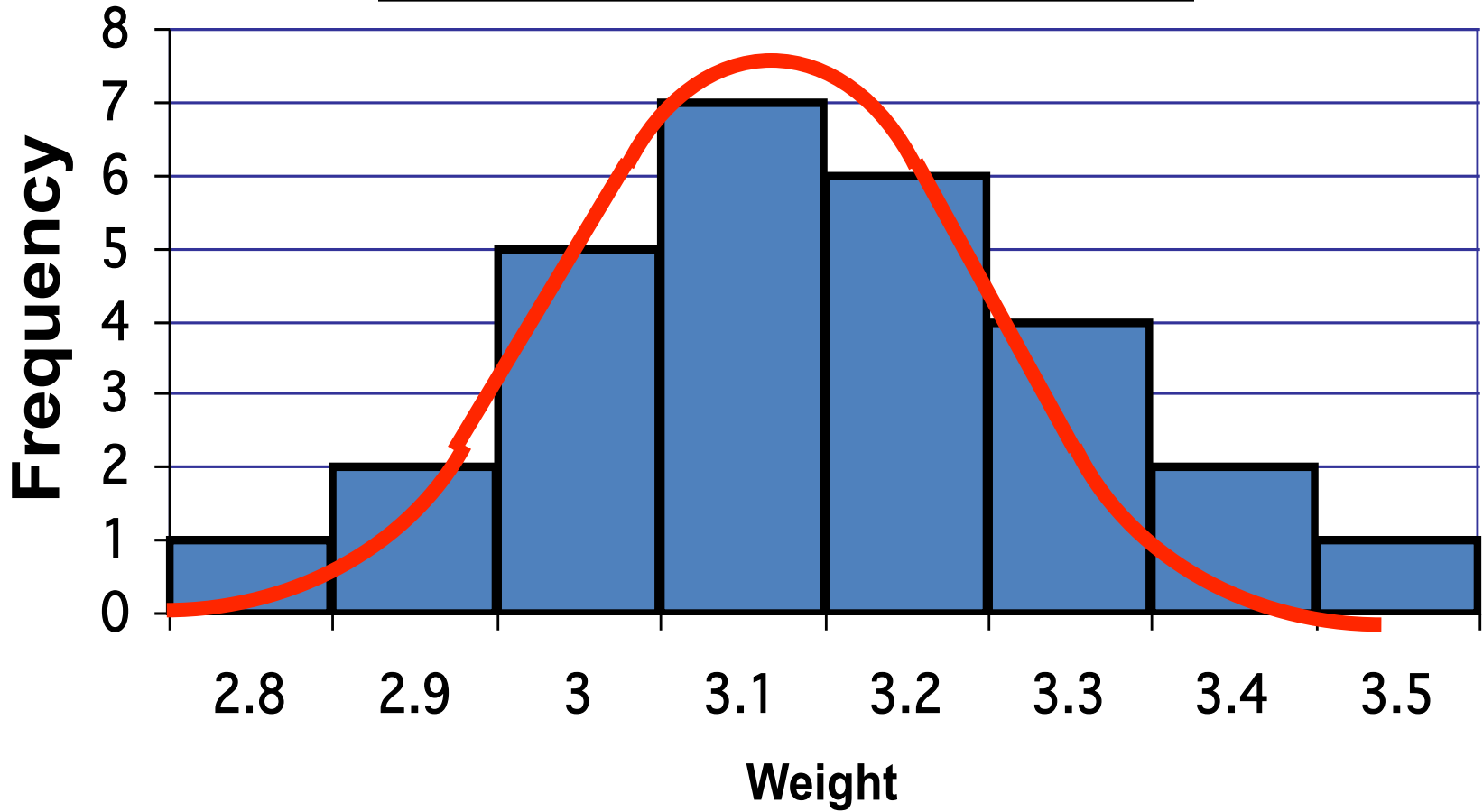
Graphical Representation

HISTOGRAM

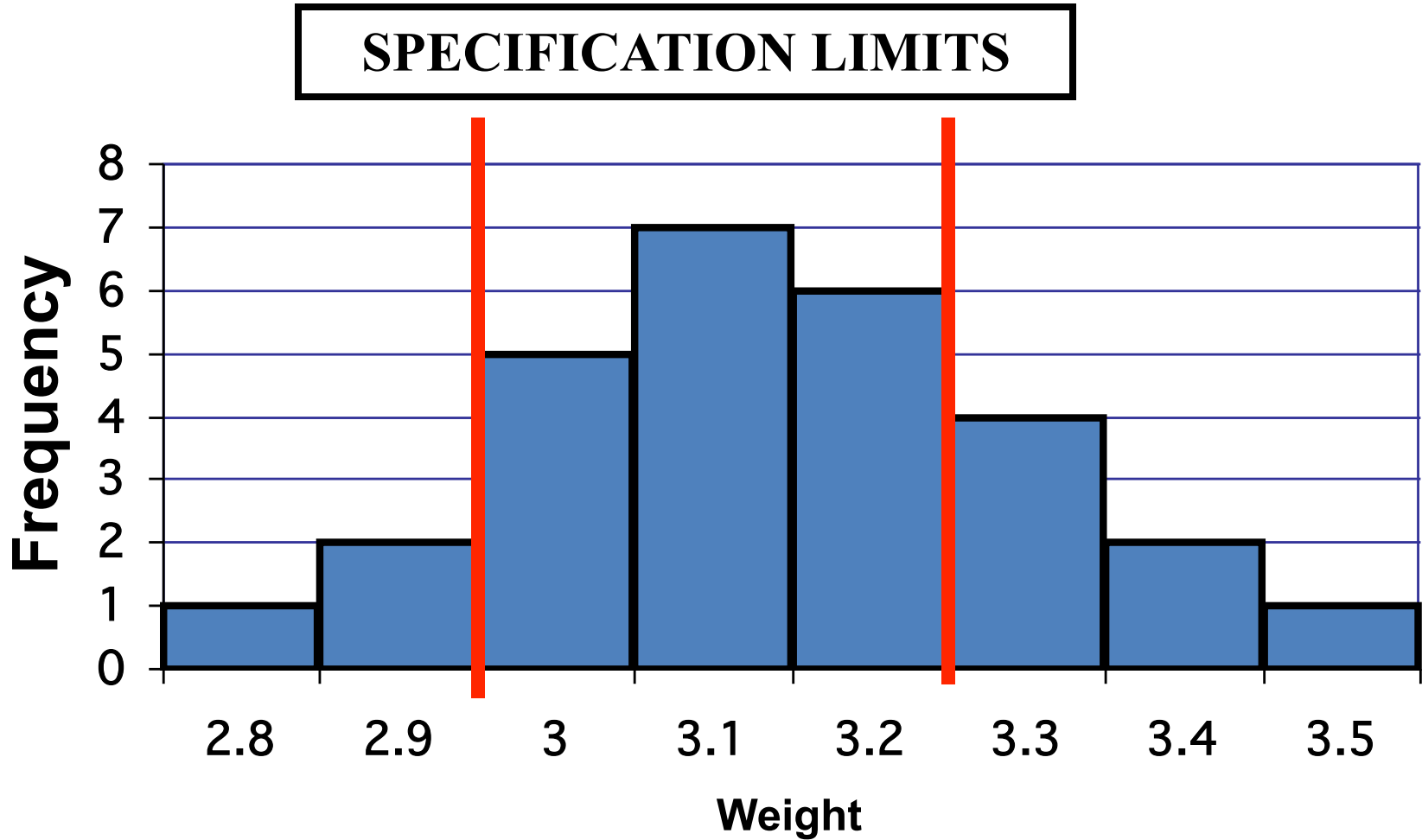


Graphical Representation

NORMAL DISTRIBUTION

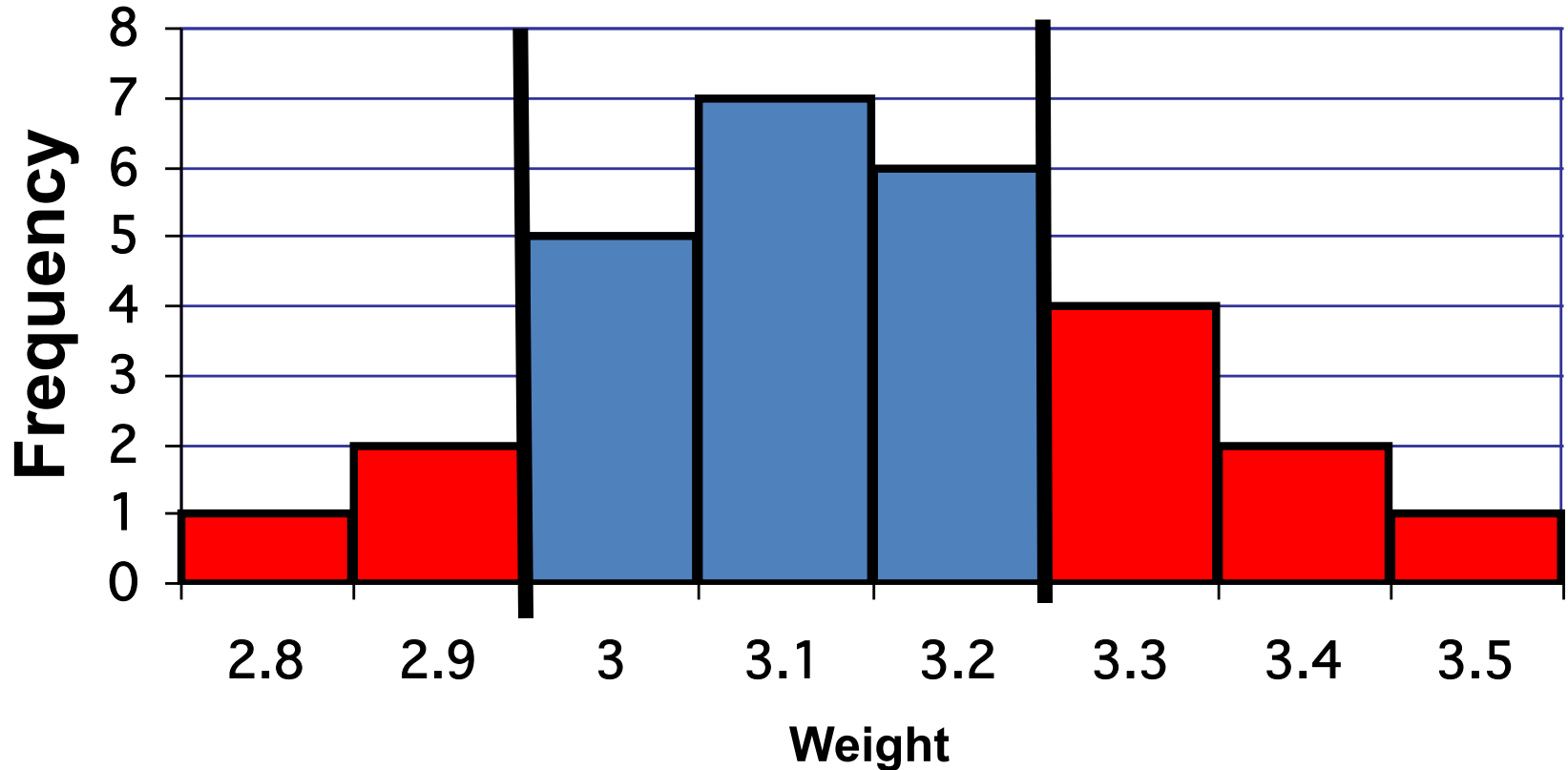


Graphical Representation



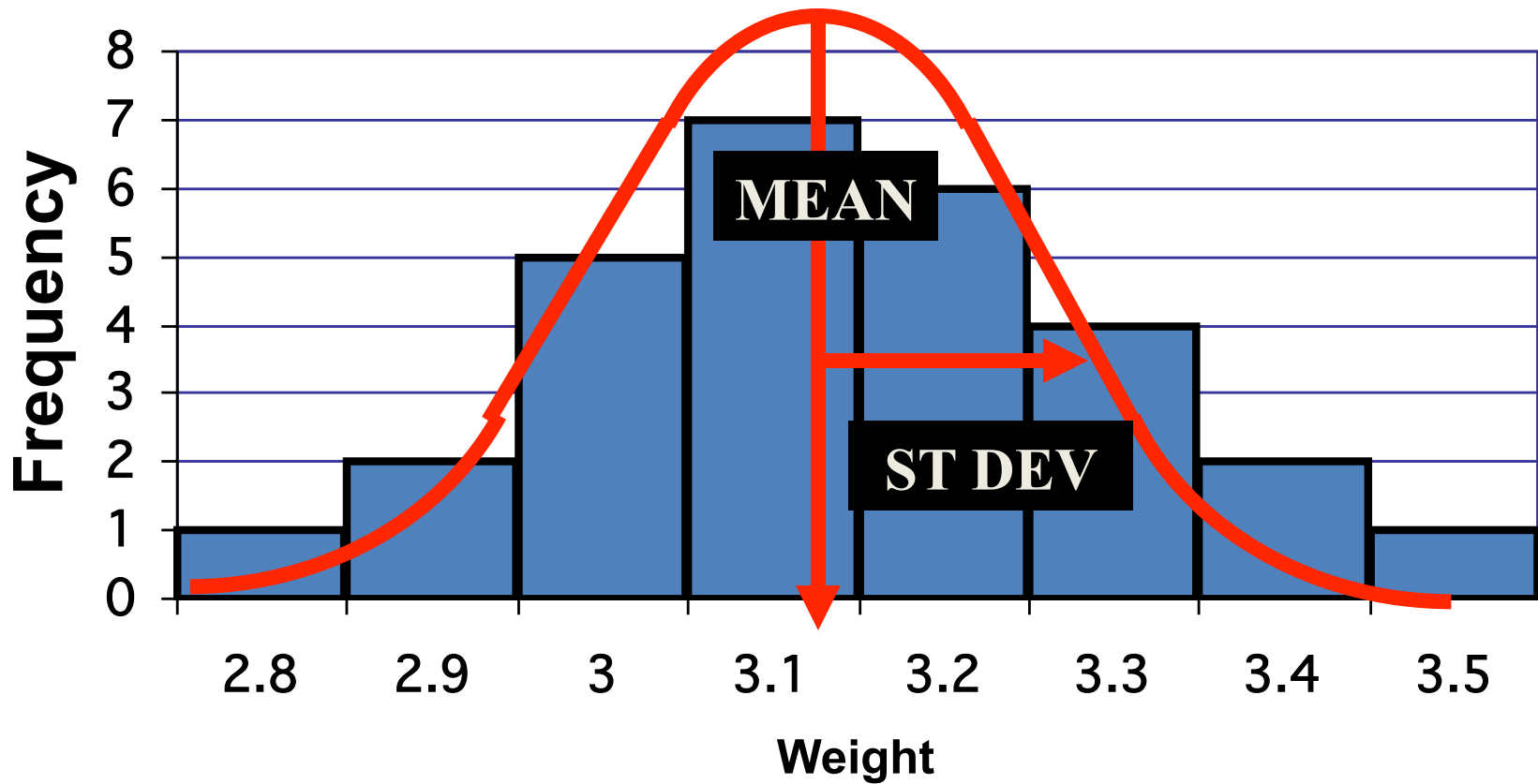
Graphical Representation

DEFECTS



Graphical Representation

AVERAGE & VARIABILITY



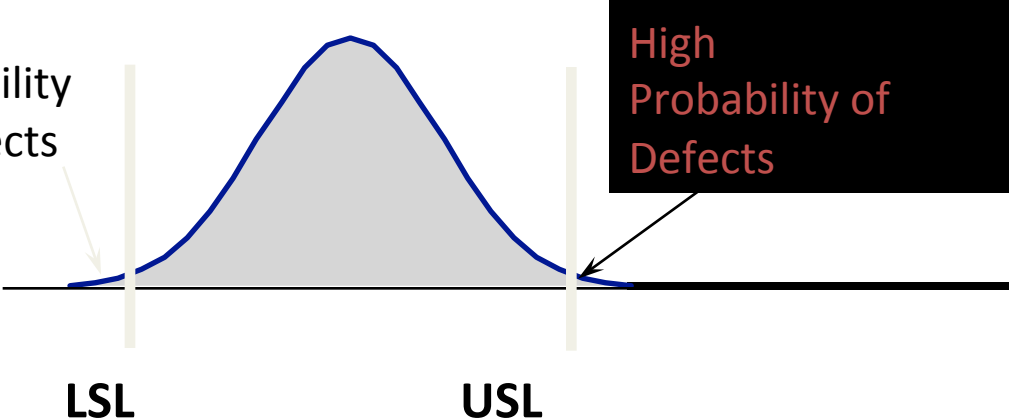
Process Capability



Poor Process Capability

High Probability of Defects

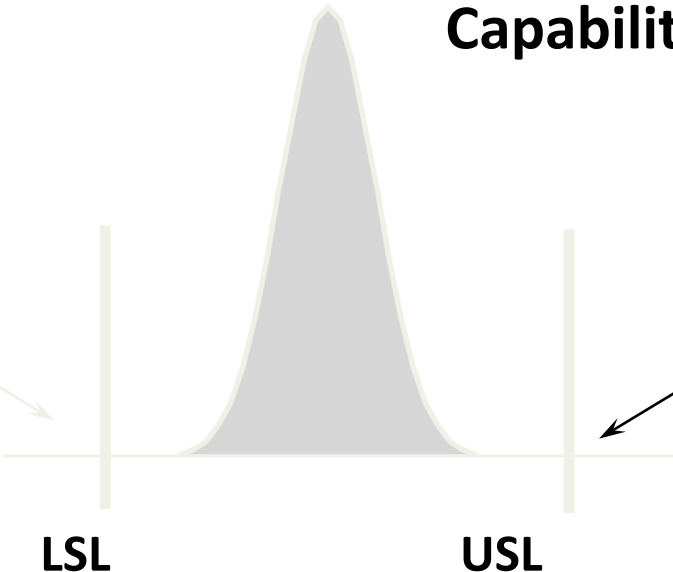
High Probability of Defects



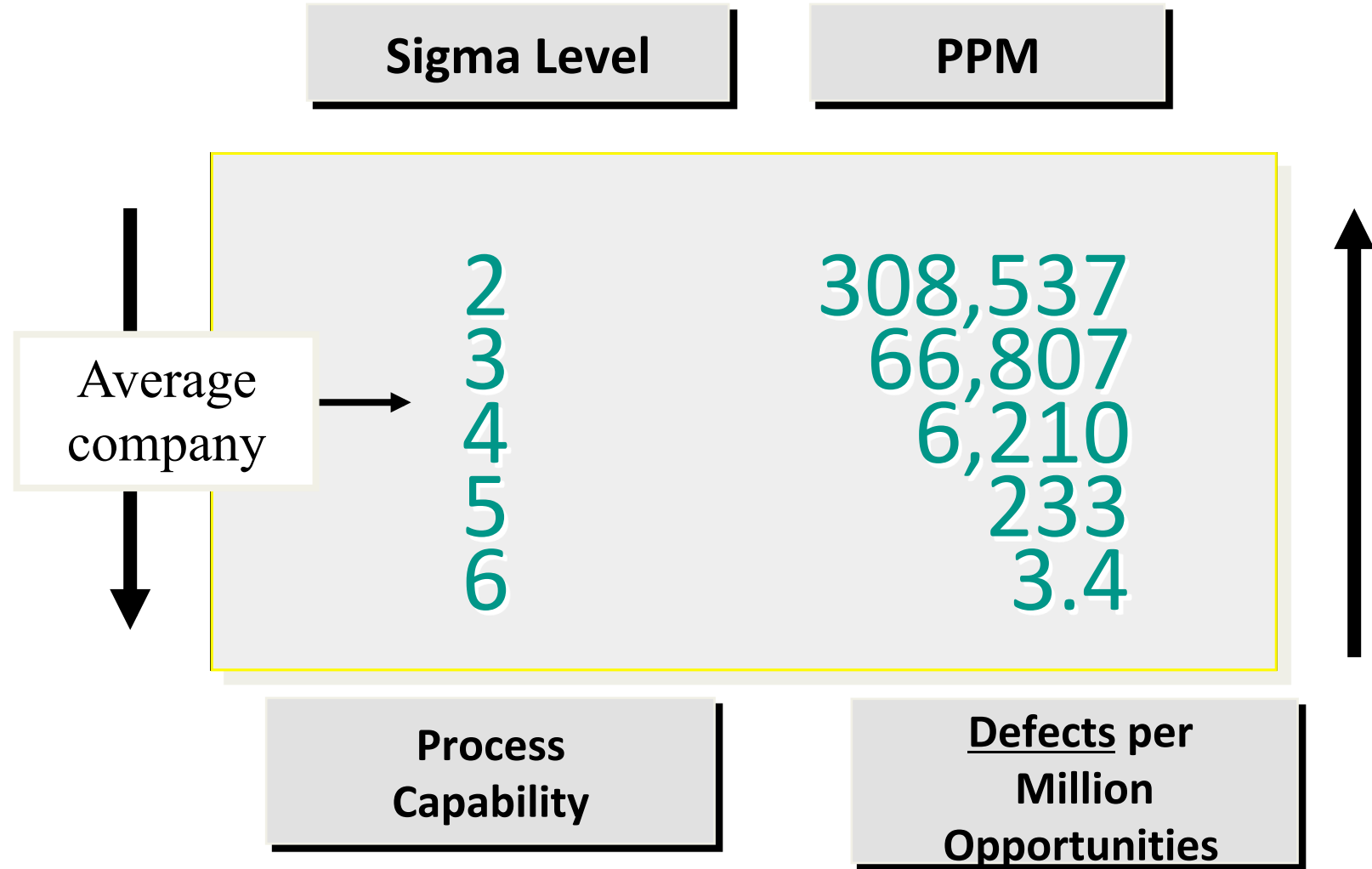
Good Process Capability

Low Probability of Defects

Low Probability of Defects



+ Sigma Level vs DPMO



+ Reference

$$F(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

Real World Examples

The Classical View of Quality
“99% Good” (3.8s)

An MRT breakdown every 4 hours

The Six Sigma View of Quality
“99.99966% Good” (6s)

An MRT breakdown every 2 years



Real World Examples

The Classical View of Quality
“99% Good” (3.8s)

***3 Cebu Pac flights
delayed by at least 1
hour every day.***

The Six Sigma View of Quality
“99.99966% Good” (6s)

***1 Cebu Pac flight
delayed by at least 1
hour every 2 years.***



Real World Examples

The Classical View of Quality
“99% Good” (3.8s)

*No electricity for almost
7 hours each month*

The Six Sigma View of Quality
“99.99966% Good” (6s)

*One hour without
electricity every 34 years*



What is Six Sigma ?

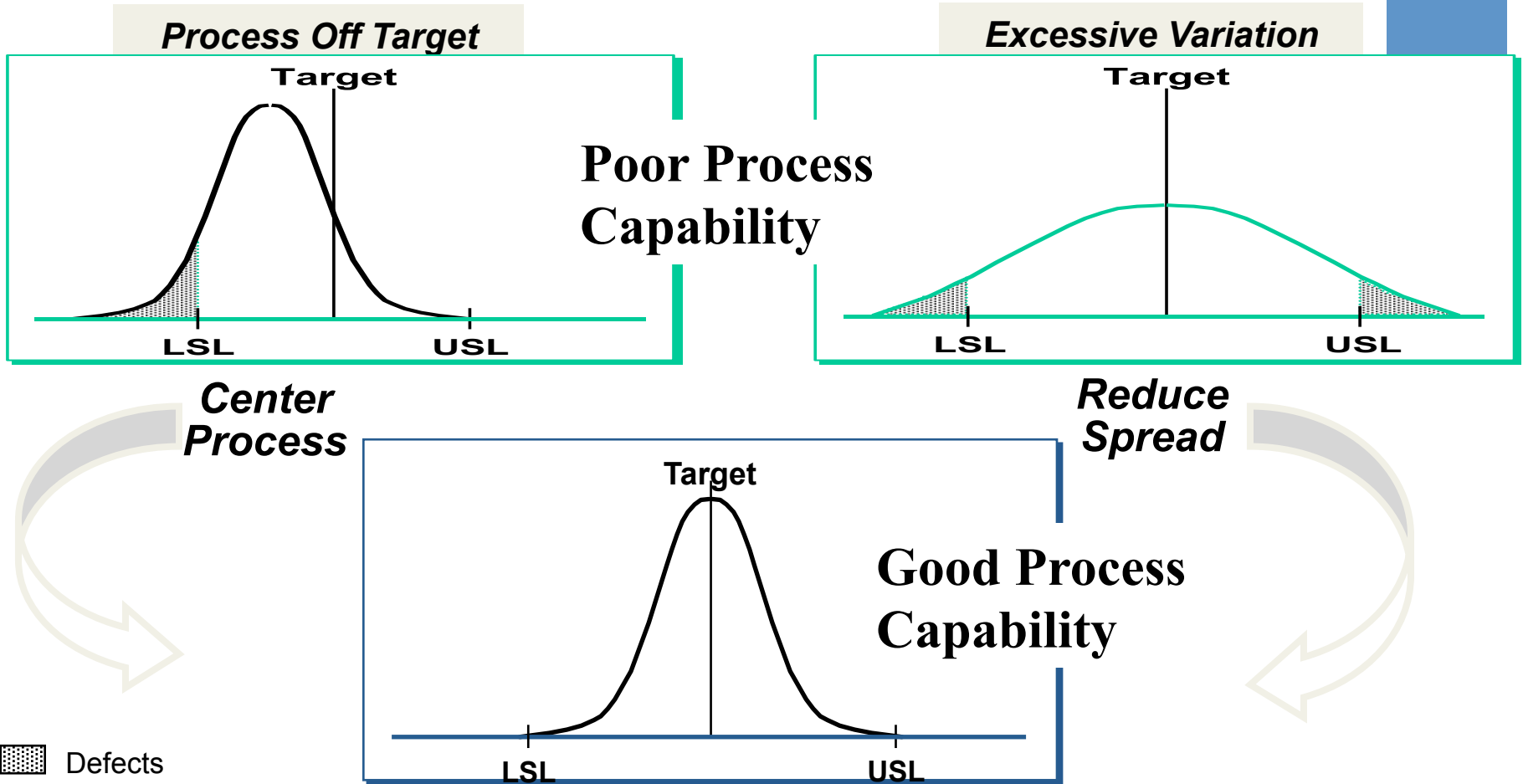
- Six Sigma is a description of a near-perfect process (3.4 DPMO) or 99.99966%
- Six Sigma is also a methodology or an approach to achieve a near-perfect performance.

A near-perfect quality goal

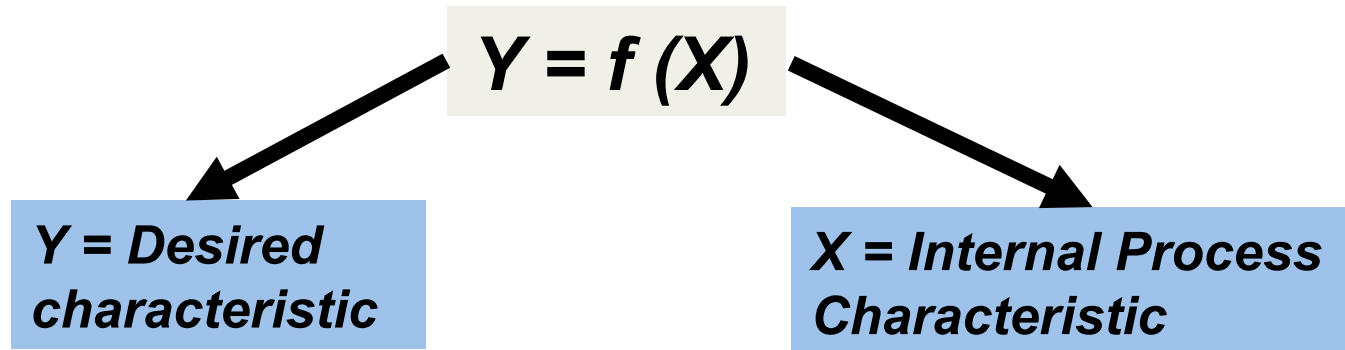
+ The Six Sigma Difference



+ The Statistical Objective



+ DMAIC Methodology



Define	1.	What does the customer expect of the process?
Measure	2.	What is the frequency of defects?
Analyze	3.	Why, when, and where do defects occur?
Improve	4.	How can we fix the process?
Control	5.	How can we make the process stay fixed?

+ Recap



- Six Sigma is a description of a near-perfect process (3.4 DPMO)
- Six Sigma is a data-driven methodology to deliver improved customer quality

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Lean

What is Lean?



+ What is Lean?



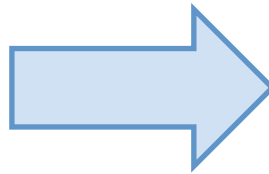
- A strategy for maximizing value to customers
- The relentless pursuit of the perfect process through waste elimination

Provide what is needed, when it is needed, using absolute minimal resources

+ What is Value?

An activity adds value if

- ❑ It changes the product toward something the customer expects
- ❑ The customer is willing to pay for it



+ What is Value?



+ Eight Types of Waste



Transportation
Moving product from one place to another

Inventory
Building and storing extra services/products the customer has not ordered

Skills
Not using employees full intellectual contribution

Motion
Extra physical/mental motion that doesn't add value

Defects
Reprocessing, or correcting work



Waiting
Employees waiting for another process or a machine/tool

Over-processing
Adding excess value when the customer does not require it

Over-production
Producing more than what the customer needs

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Recap

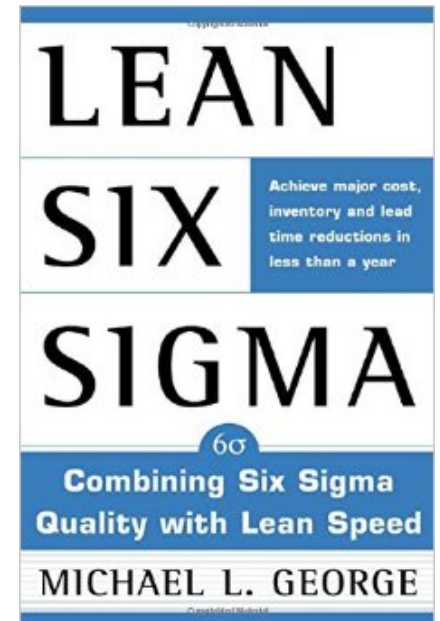


- Lean is **maximizing value** to the customer
- Lean is the relentless **elimination of waste**

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Lean Six Sigma

What is Lean Six Sigma?



+ History



1913- Ford
Production
Model



MOTOROLA

1986 - Six Sigma
Initiated by
Motorola



1996 – Lean
Thinking

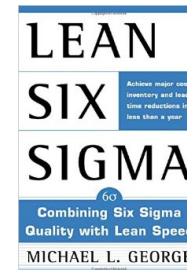
1930s-
Toyota
Production
System



1995 - Six
Sigma
Adopted by
GE



2002- Lean
Six Sigma
Coined



+ So what is Lean Six Sigma?





Integration of Lean and Six Sigma



	Lean	Lean Six Sigma	Six Sigma	
		✓	✓	Defects and variation reduction
Reduction of cycle time	✓	✓		
		✓	✓	Data driven strategy
Ability to improve organization wide processes	✓	✓		
		✓	✓	Statistical relationship outcome and process
Improvement of flow	✓	✓		
		✓	✓	Understanding variation in measurement



WARNING !



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Tools

Lean Six Sigma as a Toolkit





Chinese-made condoms too small, Zimbabwe's health minister complains

South China Morning Post Laura Zhou
South China Morning Post 1 March 2018

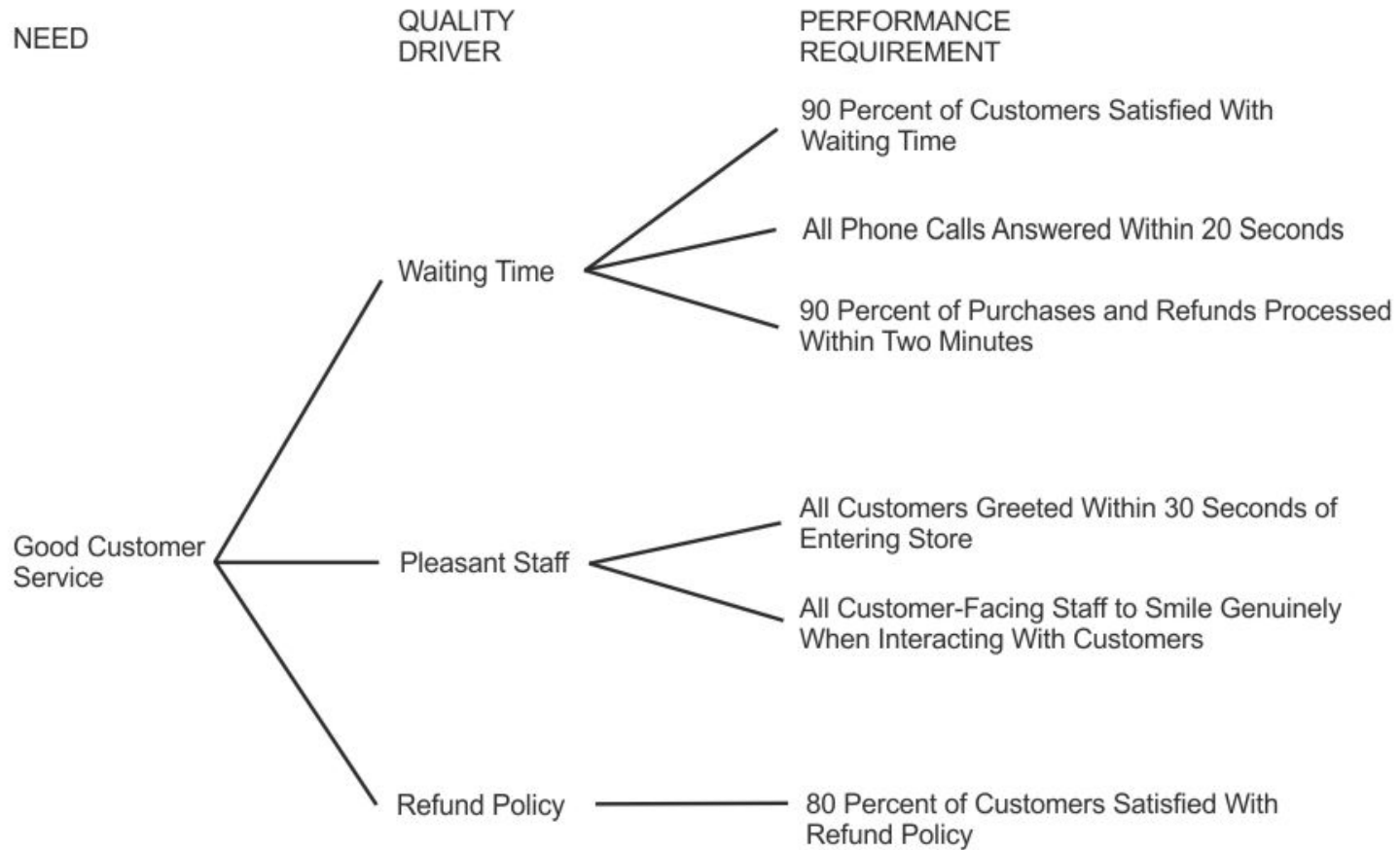
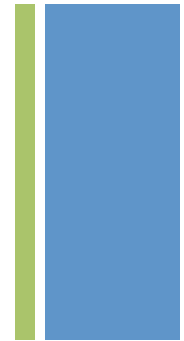


Chinese-made condoms too small, Zimbabwe's health minister complains

A Chinese condom manufacturer says it is considering making its products in different sizes after Zimbabwe's health minister complained that contraceptives made in China and exported to the African nation were too small for its men.

Health Minister David Parirenyatwa made the comments at an event in the capital Harare last week to promote HIV/Aids prevention, according to the website New Zimbabwe.com.

+ VOC to CTQ

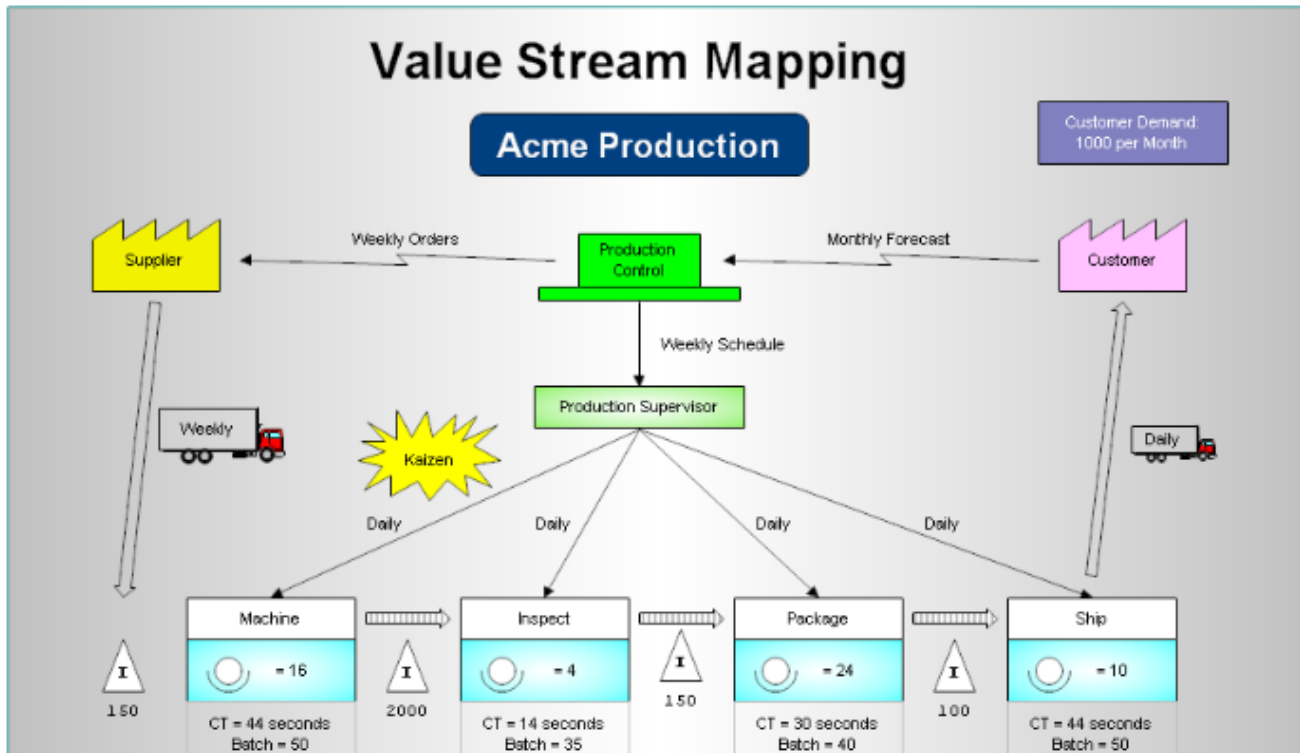
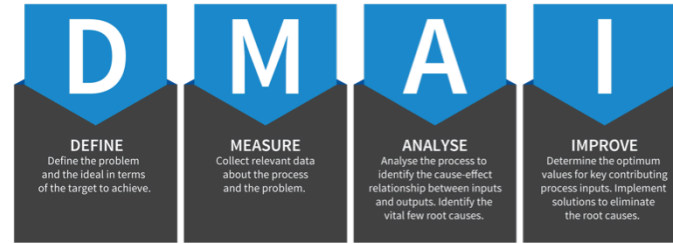


Translating Customer Needs

My NBI Clearance Experience



+ Value Stream Map



Identifying Wastes along the Process

WORLD 3,267 SHARES



Kenyan doctor performs brain surgery on wrong patient

Agence France-Presse / 11:59 AM March 05, 2018



The accident and emergency wing of Kenya's oldest hospital, the Kenyatta National Hospital (KNH), in Nairobi. Image: Tony Karumba / AFP

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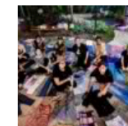
MARCH 07, 2018 07:57 PM



ENTERTAINMENT

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PREEN

These Artists Laid Out 140 Women's Clothes to Show a Daunting Statistic

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BUSINESS

End-Feb dollar reserves dip slightly

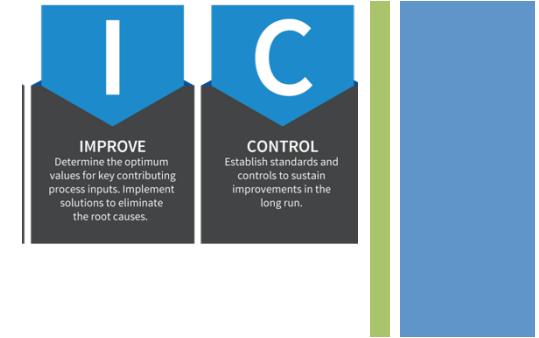
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TECHNOLOGY

Chikka shutting down

+ Poka Yoke



Item	What can go wrong?	Poka Yoke solution
ATM	Card is inserted the wrong way and could be “eaten” by the machine.	Sensor prevents the card from entering if orientation is wrong.
Elevator	Doors could hit someone while closing	Sensors prevent the door from closing if an object is in the doorway.
Excel file	A user could accidentally enter a value on a cell overriding embedded formulas	“Cell protection” prevents accidental inputting of values

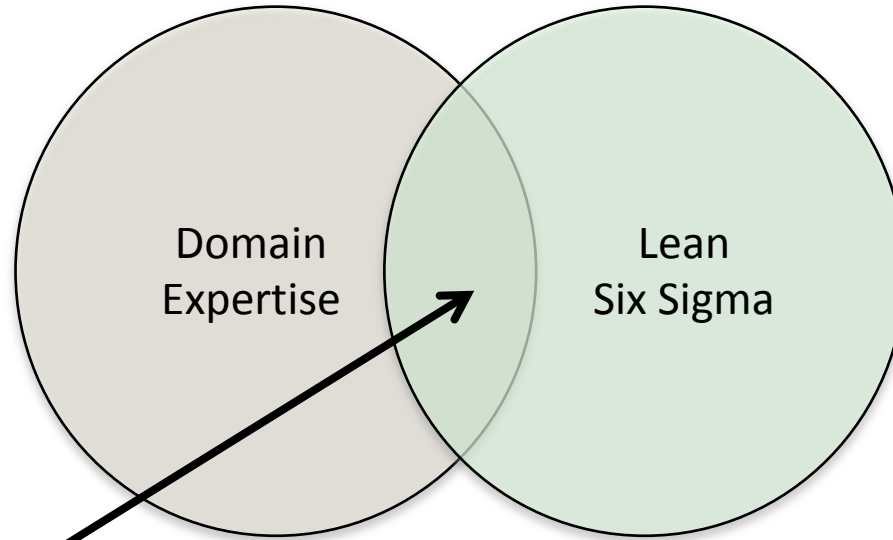
Preventing Errors

Tools Complexity



	White	Yellow	Green	Black
Problem Type	Quick wins	Known X's, Y's	Unknown X's	Multiple X's, Y's New Process
Data Type	Discrete	Discrete	Continuous	Continuous
Distribution	NA	NA	Normal Distribution	Non-Normal Distribution
Tools & Concepts	<ul style="list-style-type: none"> VOC to CTQ Pareto Fishbone FMEA Process Map Types of waste 	<ul style="list-style-type: none"> Pareto Box Plots Histogram Mean-Mode Fishbone RRS FMEA Value Stream Map Control Charts Process Map Discrete Capability 	<ul style="list-style-type: none"> Types of Data Data Collection Methods DOE Gage R&R Kano Model QFD Hypothesis Testing Normality Test Cpk TPM Kaizen Blitz 	<ul style="list-style-type: none"> Taguchi DMADV Multivariate Analysis Data transformations Non-parametric tests Hoshin Kanri Simulations
Training Days	1 day	2 days	6 days	15 days
Course Fee	PhP 7,000	PhP 12,000	PhP 45,000	PhP 110,000

+ Why Lean Six Sigma



Sweet Spot

- *Customer Focus*
- *Process Orientation*
- *Structured Thinking*

+ Sample Issues



- I want to find out how to **improve my EHS scorecard** in 12 months.
- I want to reduce my **purchasing cycle time**.
- I want to improve my **maintenance process**.
- I want to reduce my **sugar variance**.
- I want my face to face **meeting to be effective**.
- I want to make sure that the new process **has addressed the inherent risks**.

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Recap





Recap



- Six Sigma
- Lean and Lean Six Sigma
- Tools
- Benefit



“Give them quality.
That’s the best kind of advertising.”

– *Milton Hershey*



Questions ?



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