What is (Lean) Six Sigma and how it may improve your business performance

Facilitated by Arthur Valle

Wintec
WAIKATO INSTITUTE OF TECHNOLOGY
Te Kuratini o Waikato

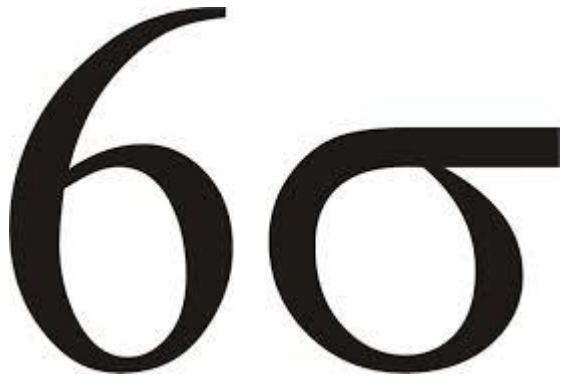
Arthur Valle, PhD

- PhD in Production and System Engineering
- Six Sigma Black Belt (since 2006)
- 22+ years of experience in IT Management: Lean Six Sigma, CMMI, Agile/Scrum etc
- Currently teaching (and researching) at Wintec-Waikato Institute of Technology, NZ
- CEO of trendsetconsulting.com (since 2000)

Wintec
WAIKATO INSTITUTE OF TECHNOLOGY
Te Kuratini o Waikato

Content

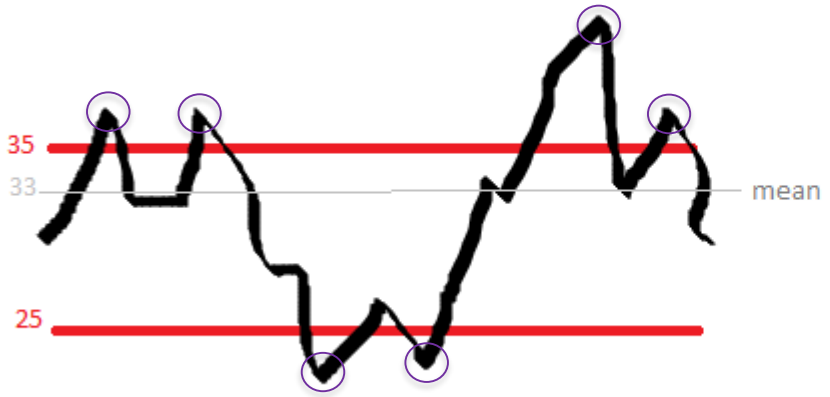
- Case study
- Six Sigma (big picture)
- DMAIC
  - D-Define
  - M-Measure
  - A-Analyse
  - I-Improve
  - C-Control
- Six Sigma (detailed)
- How to select a Six Sigma project
- Roles & certifications



Wintec
WAIKATO INSTITUTE OF TECHNOLOGY
Te Kuratini o Waikato

Case study

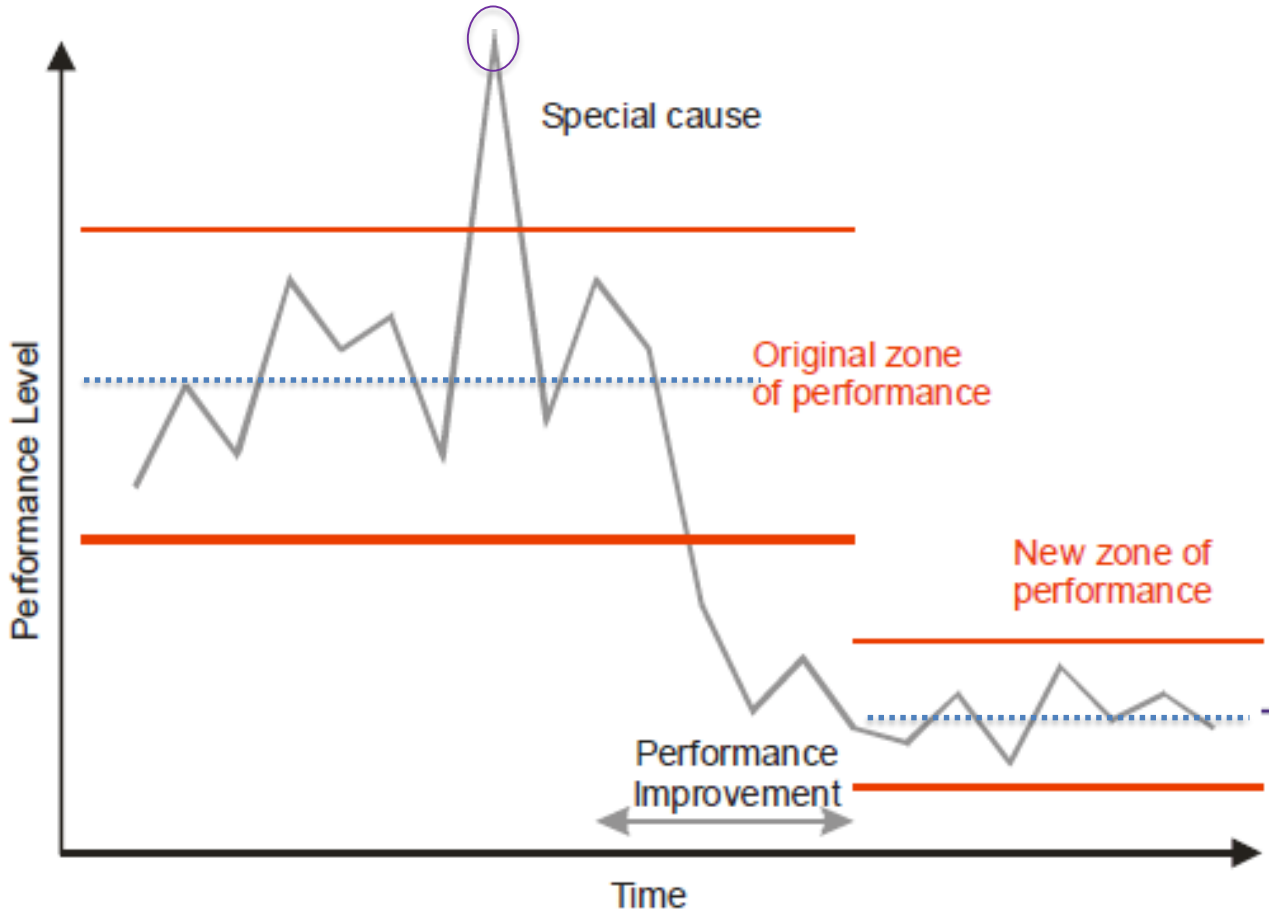
- Pizza Delivery.
- Clients are complaining about delays.
- Clients' expectations are: from 25 to 35 minutes.
- We measured recent days and <u>our average was 33 minutes</u>.
- *33 minutes seems to be OK, right?*



Not good enough!

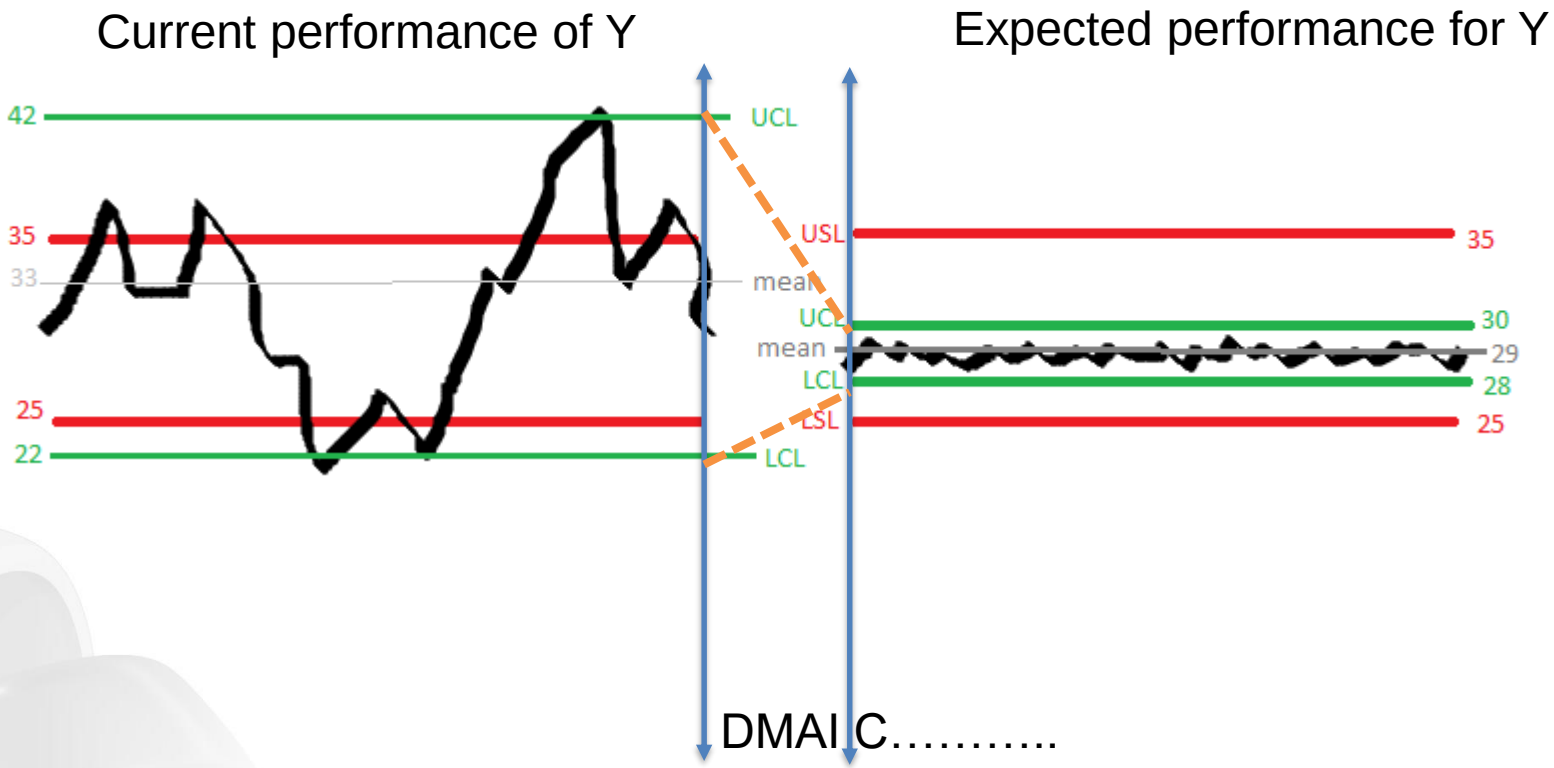
What is Six Sigma?

- An improvement method that aims to <u>improve the mean</u> and <u>reduce variation</u> of the performance of an outcome.
- In our example: *LeadTime, time elapsed from order up to pizza actually delivered at client's door.*



Wintec
WAIKATO INSTITUTE OF TECHNOLOGY
Te Kuratini o Waikato

Our case's Six Sigma project



Our Y is LeadTime

Wintec
WAIKATO INSTITUTE OF TECHNOLOGY
Te Kuratini o Waikato

DMAIC

- One of the Six Sigma's "lifecycles".
- It stands for Define, Measure, Analyze, Improve and Control.
- Each phase takes 1 month (on average).
- Deals with Y and x's:
- Y = function(x's) where
  - Y is the outcome(s). *Ex: Productivity, Defect Density, Lead Time*
  - x's are the factors that actually impact the performance of Y. *Ex: Seniority, Requirements Stability, Automation Level*

D-Define

Y?

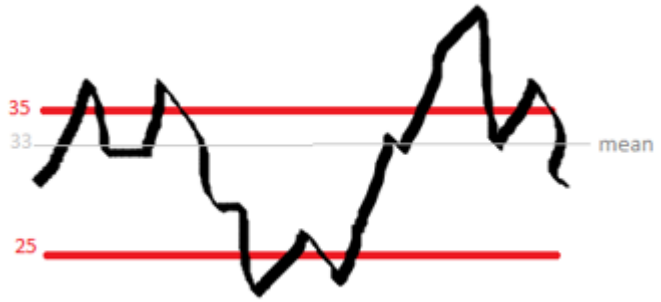
Main activities:

- Define the problem
- Plan the project

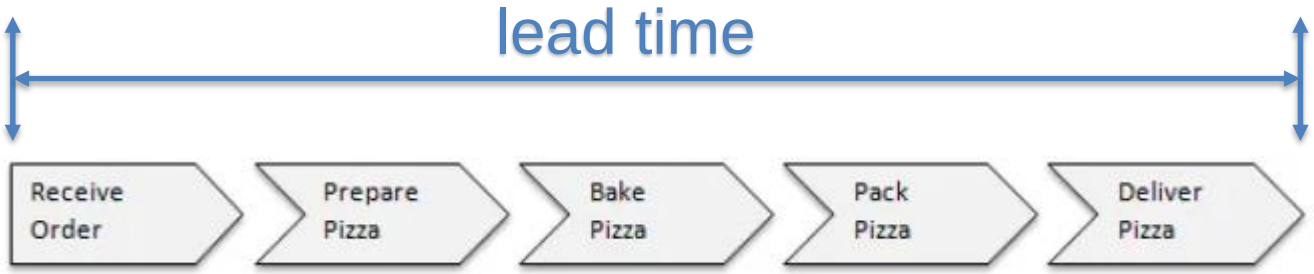
Main outputs:

- Problem statement
- Project scope
- Project charter (incl. business case)

D-Define (case study)



Our project aims to reduce our lead time by *this %* by *this date*



Wintec
WAIKATO INSTITUTE OF TECHNOLOGY
Te Kuratini o Waikato

M-Measure

Y! x's?

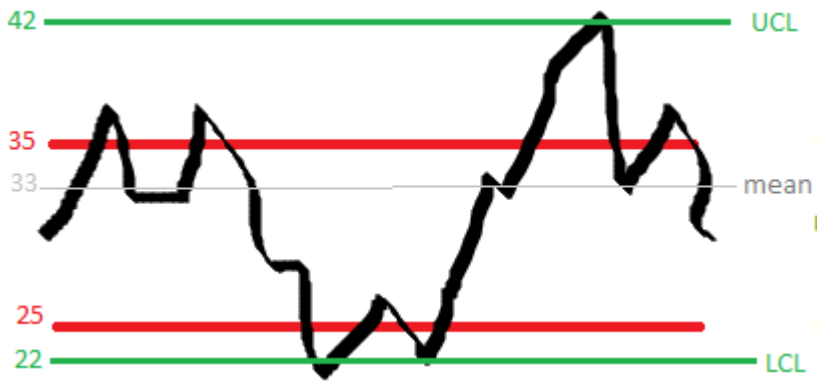
Main activities:

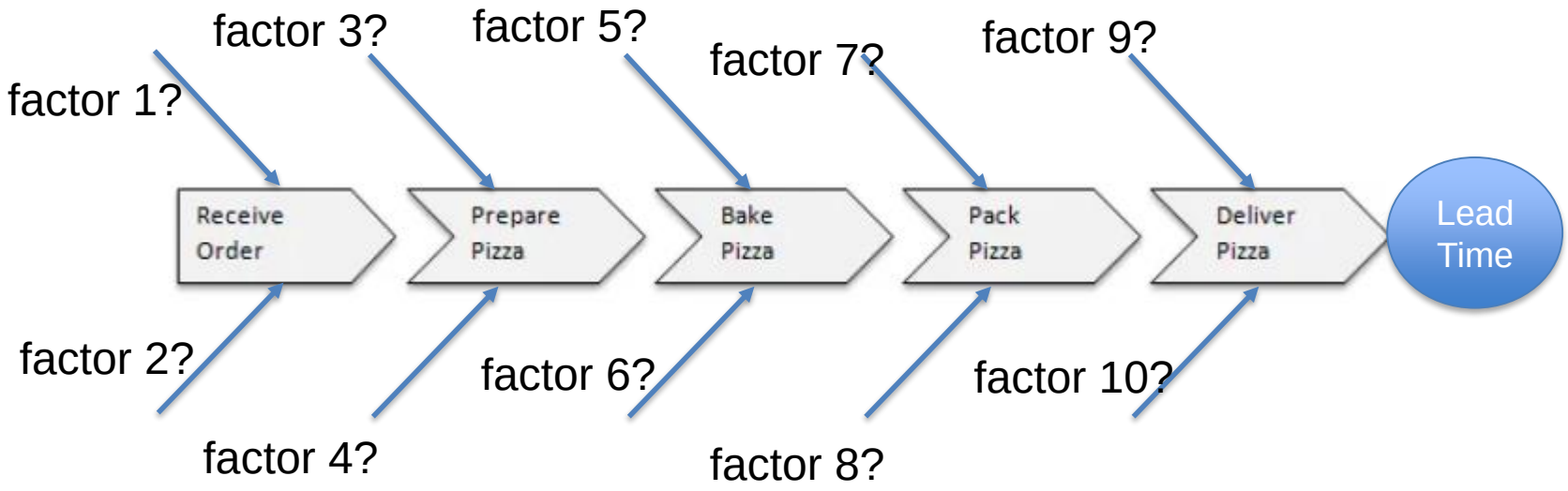
- Measure Y
- Identify and prioritize potential x's
- Collect data for x's

Main outputs:

- Performance baseline for Y
- Data collected about prioritized x's

M-Measure (case study)





Lean's VSM-Value Stream Mapping:

VAC: Value added to the client
VAB: Value added to the business
NVA: Non-value added
Also:
Active times, Waiting times, bottlenecks, waste, process efficiency

Wintec
WAIKATO INSTITUTE OF TECHNOLOGY
Te Kuratini o Waikato

A-Analyze

Y=function(x's) !

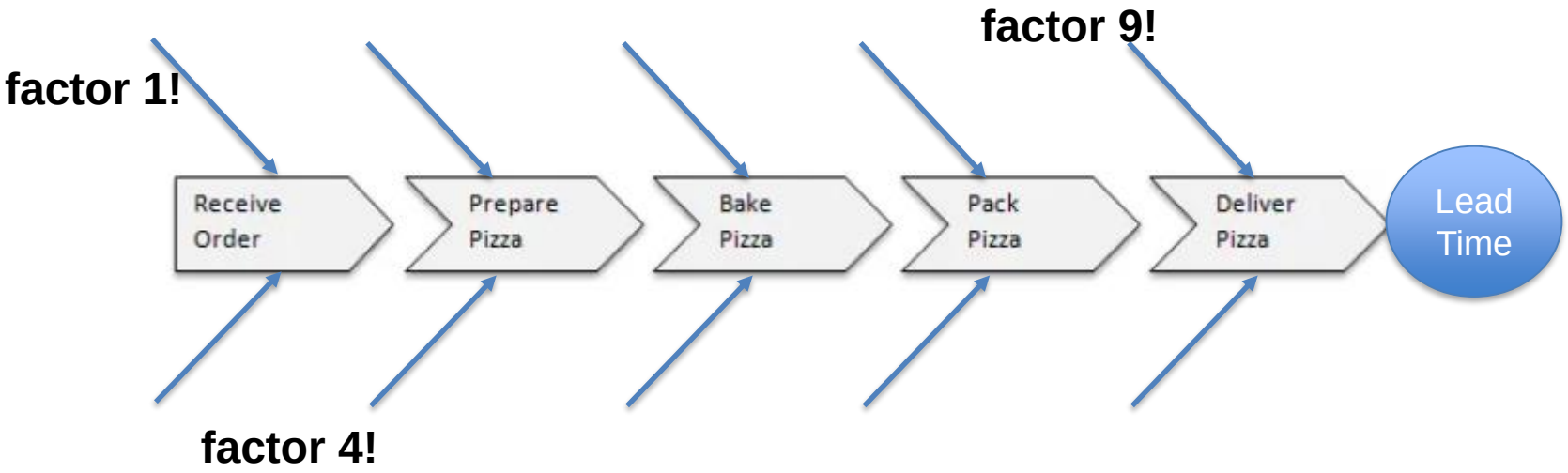
Main activities:

- (statistically) analyse data
- Prove (or not) potential x's
- Establish x's to Y function

Main outputs:

- Performance baseline for the proven x's
- Formula that relates proven x's to Y's

A-Analyze (case study)



LeadTime (minutes) = 31.32 – 2.45*factor1 – 1.17*factor4 – 0.95*factor9

factor1 – time to transfer the order from the phone operator to kitchen
factor4 – availability of ingredients
factor9 – delivery person's knowledge about the area

Wintec
WAIKATO INSTITUTE OF TECHNOLOGY
Te Kuratini o Waikato

I-Improve

Actions to improve proven x's

Main activities:

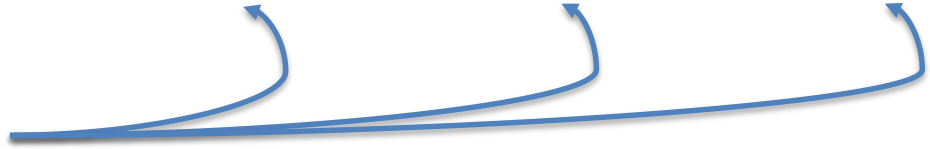
- Identify actions to improve performance of proven x's
- Plan implementation of identified improvement actions

Main outputs:

- Implementation plan(s)

I-Improve (case study)

LeadTime (minutes) = 31.32 – 2.45*factor1 – 1.17*factor4 – 0.95*factor9



Action for factor1 –> automate transference of the order to kitchen
Action for factor4 –> control and ensure availability of ingredients
Action for factor9 –> install GPS

factor1 – time to transfer the order from the phone operator to kitchen
factor4 – availability of ingredients
factor9 – delivery person's knowledge about the area

Wintec
WAIKATO INSTITUTE OF TECHNOLOGY
Te Kuratini o Waikato

C-Control

(Proven) x’s and Y under (statistical) control

Main activities:

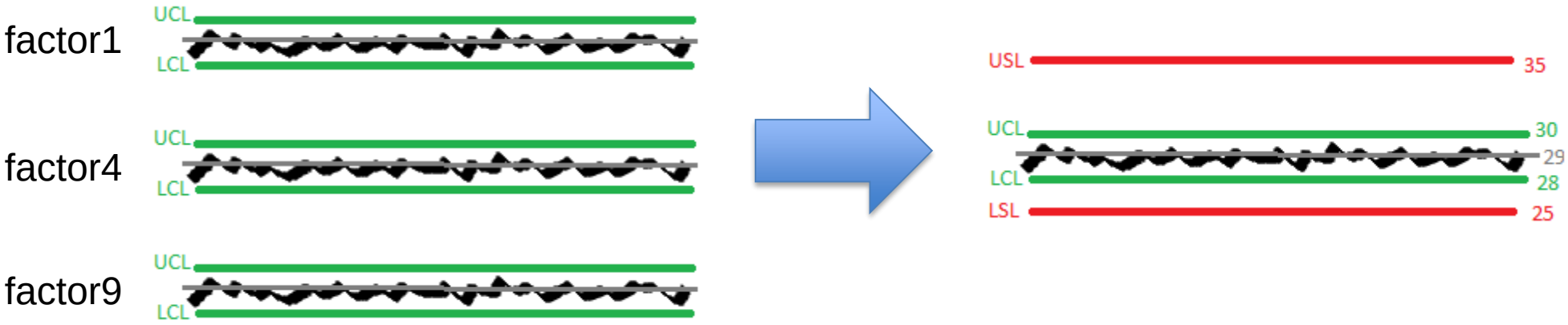
- Monitor performance of x's (and by consequence Y)
- To "put things back on track" when performance deviates from expectations

Main outputs:

- Action plan(s) for "special causes of variation".

C-Control (case study)

Proven x's under control …leads to… Y under control

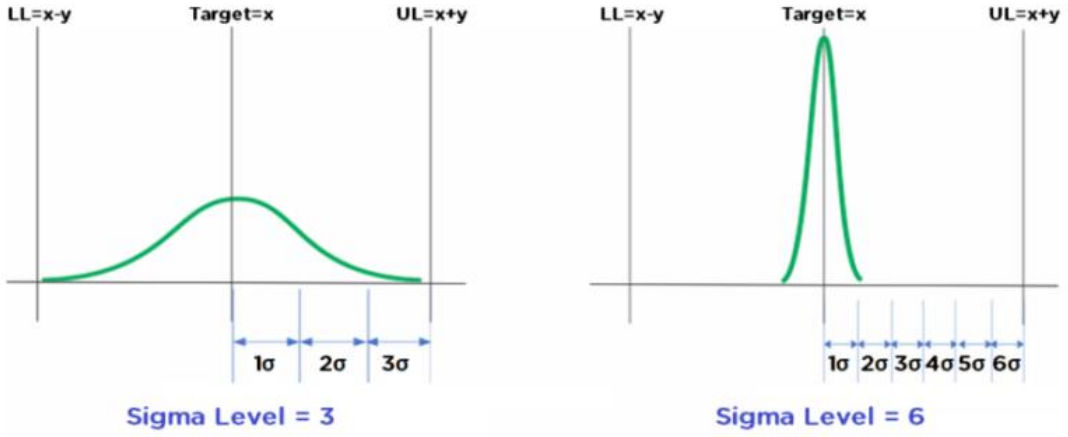


factor1 – time to transfer the order from the phone operator to kitchen
factor4 – availability of ingredients
factor9 – delivery person's knowledge about the area

Wintec
WAIKATO INSTITUTE OF TECHNOLOGY
Te Kuratini o Waikato

Six Sigma

- A **Process Improvement** Methodology
- Developed at Motorola and popularized by GE-General Electric
- Main characteristics:
  - It addresses a strategic problem or opportunity
  - It should positively impact the client
  - It solves a problem for which the cause is unknown
  - It involves statistics and data-driven decision making
  - It may be combined with Lean (i.e Lean Six Sigma)



Sigma Level	Defects per Million	Yield
6	3.4	99.99966%
5	230	99.977%
4	6,210	99.38%
3	66,800	93.32%
2	308,000	69.15%
1	690,000	30.85%

Wintec
WAIKATO INSTITUTE OF TECHNOLOGY
Te Kuratini o Waikato

How to select a Six Sigma project

- Main criteria:
  - Is this strategical to the company?
  - Does it positively impact the client?
  - Do we know the cause(s) of the problem?
  - Is the expected return higher than 100K dollars?
  - Can it be done in 5 to 6 months?

Roles & certifications

(project) roles:

- Champion (Sponsor)
- Process Owner
- Project Leader (Belt)
- Project team

SixSigma certifications:

- Master Black Belt
- Black Belt (at least 4 weeks of formal training + conduction of 1 complex DMAIC project)
- Green Belt (3-5 days of formal training + conduction of 1 simple DMAIC project)
- Yellow Belt (4-8 hours of formal training)

Note: there's no single institution managing Six Sigma and certification

Wintec
WAIKATO INSTITUTE OF TECHNOLOGY
Te Kuratini o Waikato

Thank You!

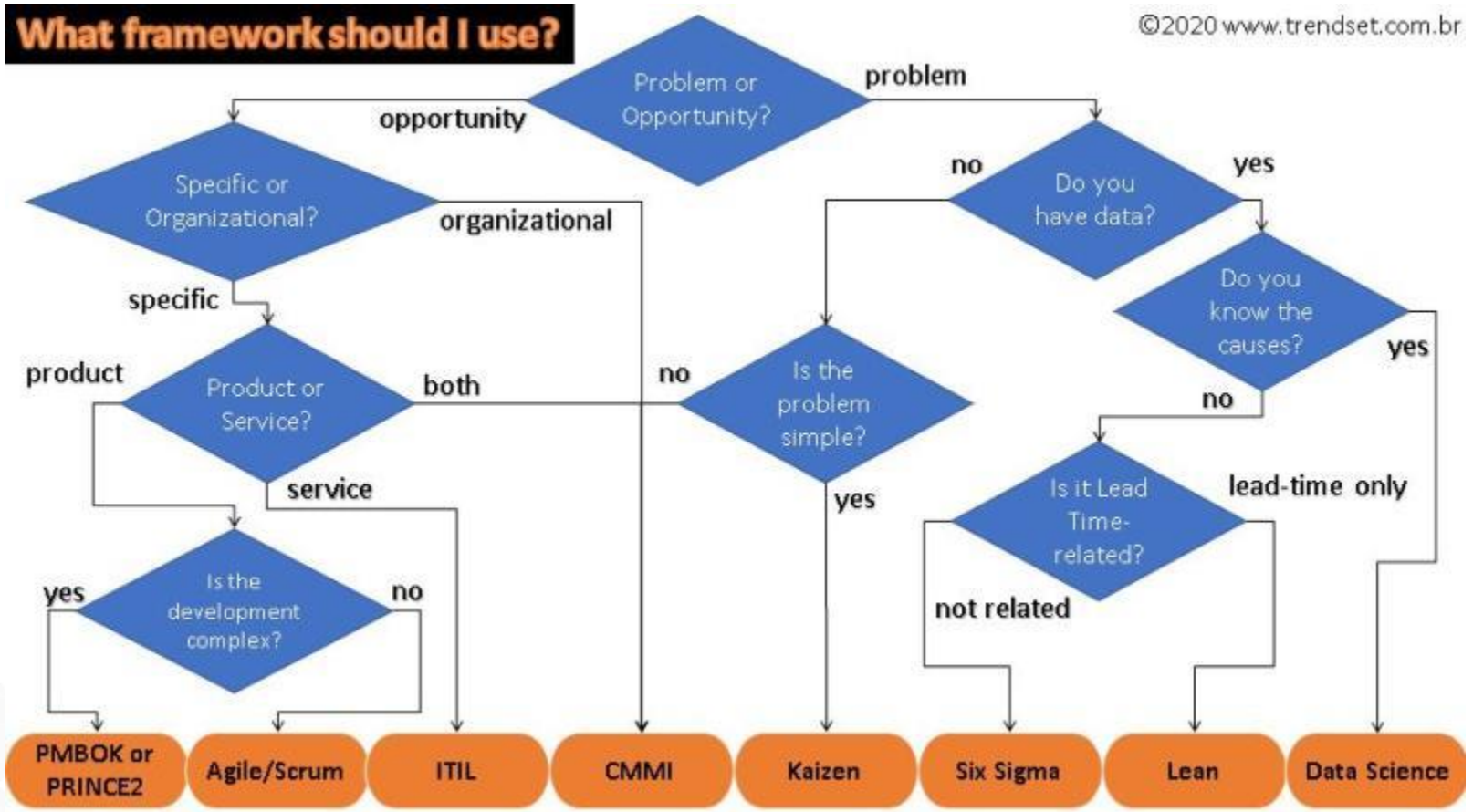
Arthur Valle, Black Belt

Principal Academic Staff Member

arthur.valle@wintec.ac.nz

Wintec
WAIKATO INSTITUTE OF TECHNOLOGY
Te Kuratini o Waikato

Additional slide(s)



Wintec
WAIKATO INSTITUTE OF TECHNOLOGY
Te Kuratini o Waikato