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Continous improvement in research libraries, by using Lean Six Sigma

IFLA Satellite meeting: Demystifying Statistics and Evaluation in Libraries:
The What, How, Why, and When of Statistics and Evaluation in Libraries

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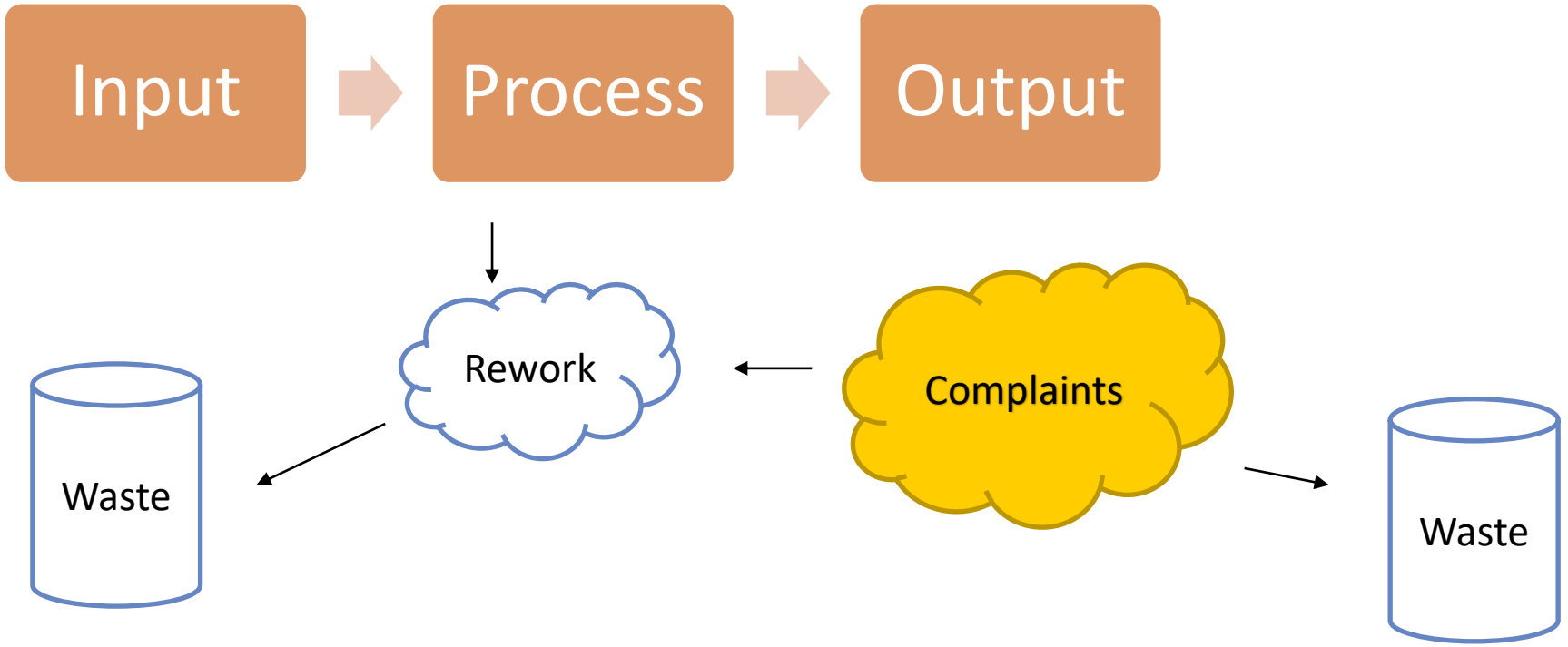
In this presentation:

1. Why using statistics for continuous improvement?
2. Five steps – DMAIC
    1. Design
    2. Measure
    3. Analyze
    4. Improve
    5. Control
3. Some final remarks about outcome and context

Why using statistics for continuous improvement?

Business Process Improvement

- Start and ends with the customer
- Process oriented
- Data driven



"Hidden Factory"

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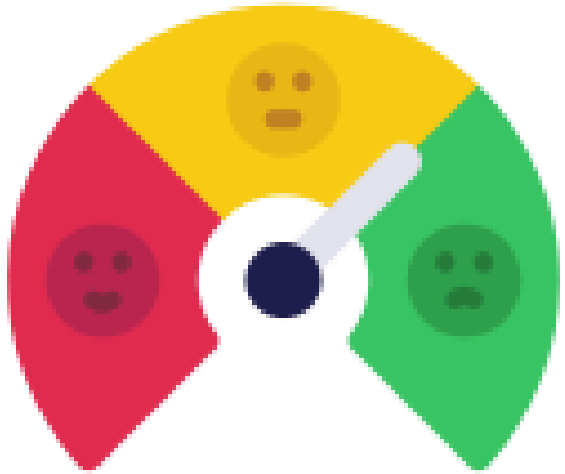
Why using statistics for continuous improvement?

What you would like to achieve:

- Improve customer satisfaction
- Reduce costs
- Knowledge development



Low quality has impact on:

- Efficiency
- Direct costs
- Cash flow
- Investments

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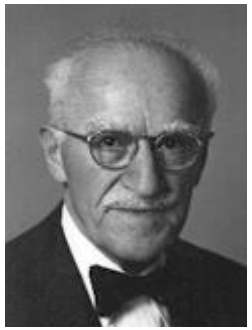
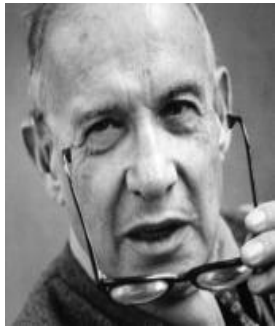
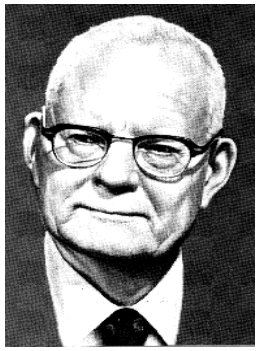
Why using statistics for continuous improvement?

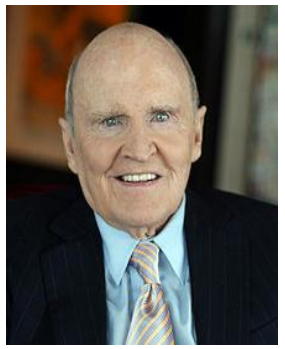
Lean Six Sigma does not come out of the blue:

Pre 1900: craftmanship
1920: Taylor & Ford: standardization of work
1930: Walter Shewart: statistical process control (Bell)
1950 Joseph Juran: Managing of Quality (Pareto principle)
1955 Peter Drucker: Knowledge worker
1970 Philip Crosby: Zero defects
1970 Deming: Plan-do-check-act
1980 Taiichi Ohno: Toyota production system (Lean)
1995 Jack Welch: Six Sigma









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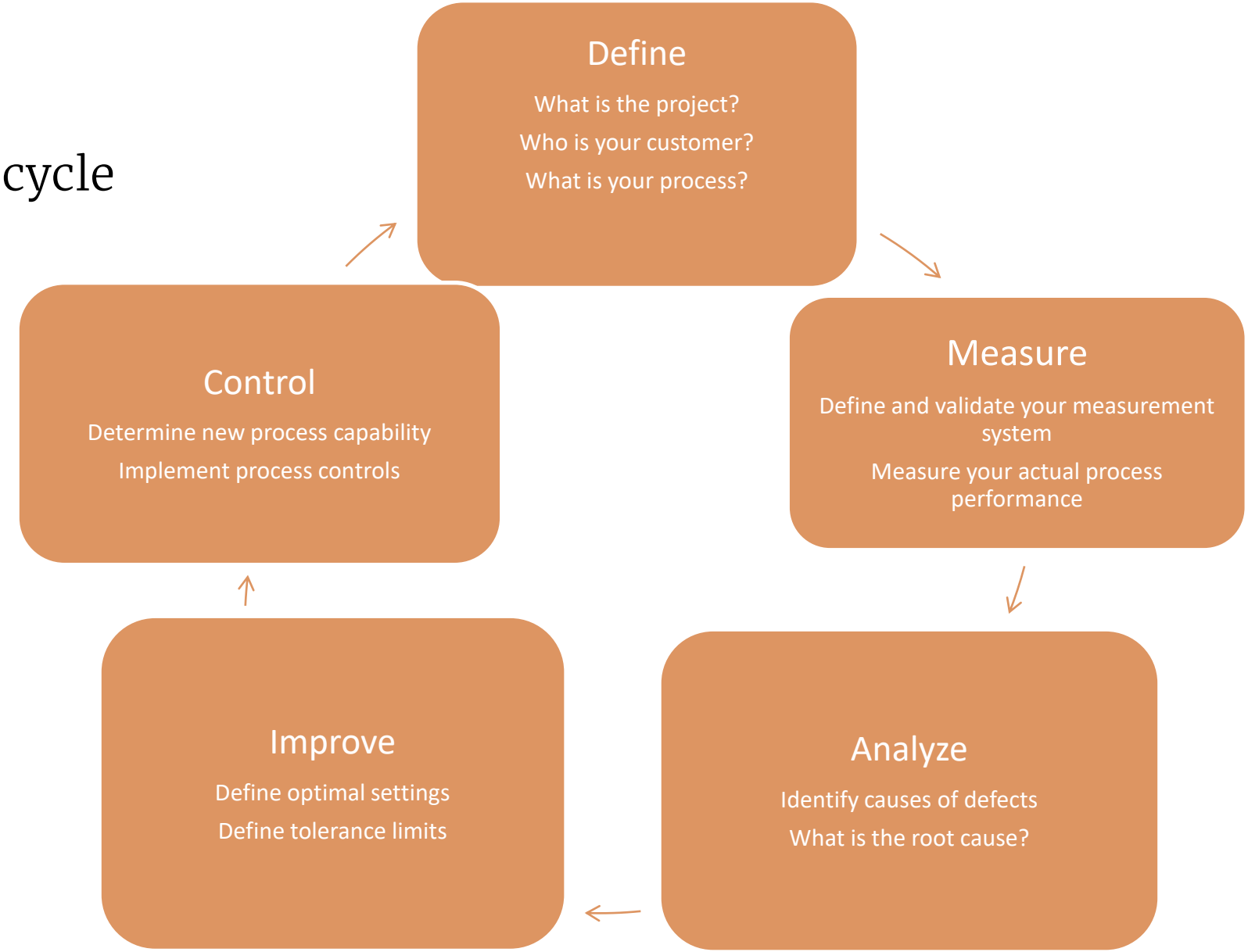
DMAIC – cycle



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Define

What is the project?

Who is your customer?

What is your process?

What is critical to quality?

- Establish measurement definitions

Scoping	
External CTQ	
Internal CTQ	
Unit	
Upper specification limit	
Lower boundary	
Defect	
Opportunity	
Population	
Constraints	

Define

What is the process?

- Make a SIPOC

Feed the dog

Suppliers	Inputs	Process	Outputs	Customers
Grocery Store	• Go shopping • Buy dogfood • Return home • Put groceries away in cupboard	• Open cupboard • Get bowl • Fill bowl • Call dog	• Dog eats • Dog fertilizes garden	• Dog • Family • Garden

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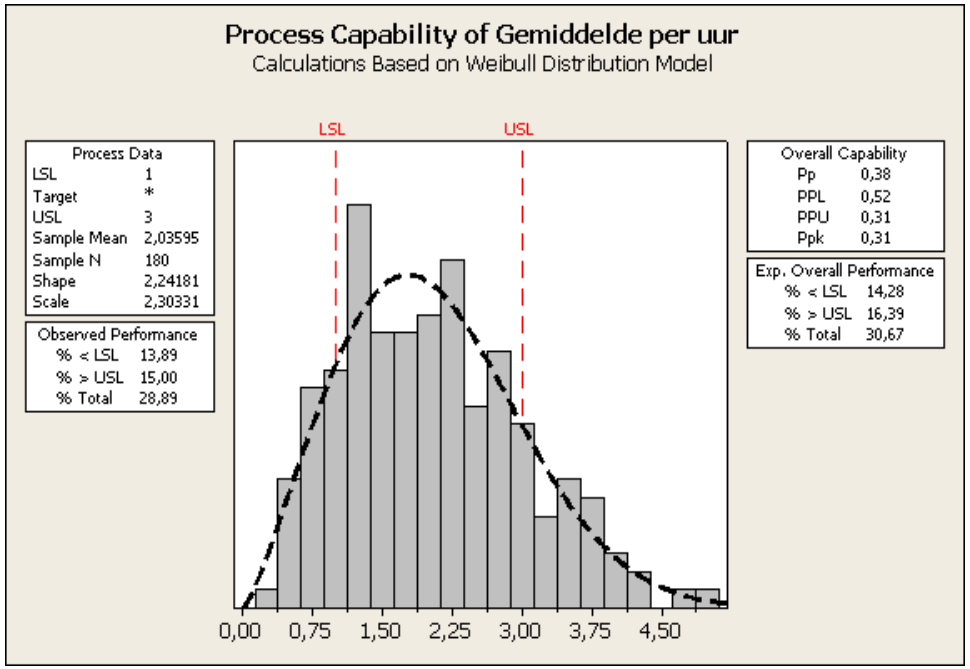
Measure

1. Define measurement system
2. Validate your measurement system
3. Actual process Performance
4. Define statistical success



What is your goal:

- Changing the mean?
- Reduce variance?

Big Five:

Descriptive statistics (graphs)

Distribution identification (probability plot)

Control chart

Run Chart

Process capability analysis

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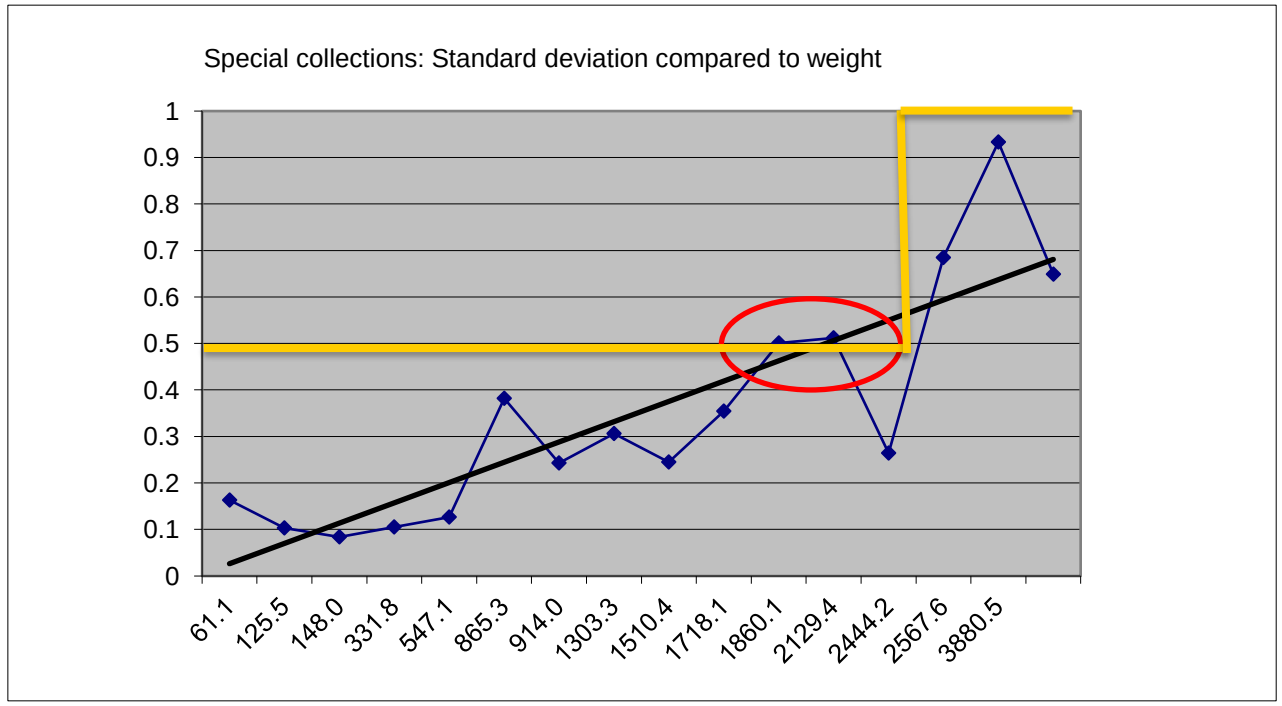
Measure: validation of your measurement system

- Linearity & bias study
- Kappa test (discrete values)



Appraiser	# Inspected	# Matched	Percent	95% CI
Margot	12	2	16,67	(2,09; 48,41)
Marlies	12	8	66,67	(34,89; 90,08)
Donita	12	3	25,00	(5,49; 57,19)
Mattie	12	7	58,33	(27,67; 84,83)

Matched: Appraiser's assessment across trials agrees with the known standard.

Response	Kappa
a	0,031901
c	-0,100512
g	0,310119
Overall	0,091443

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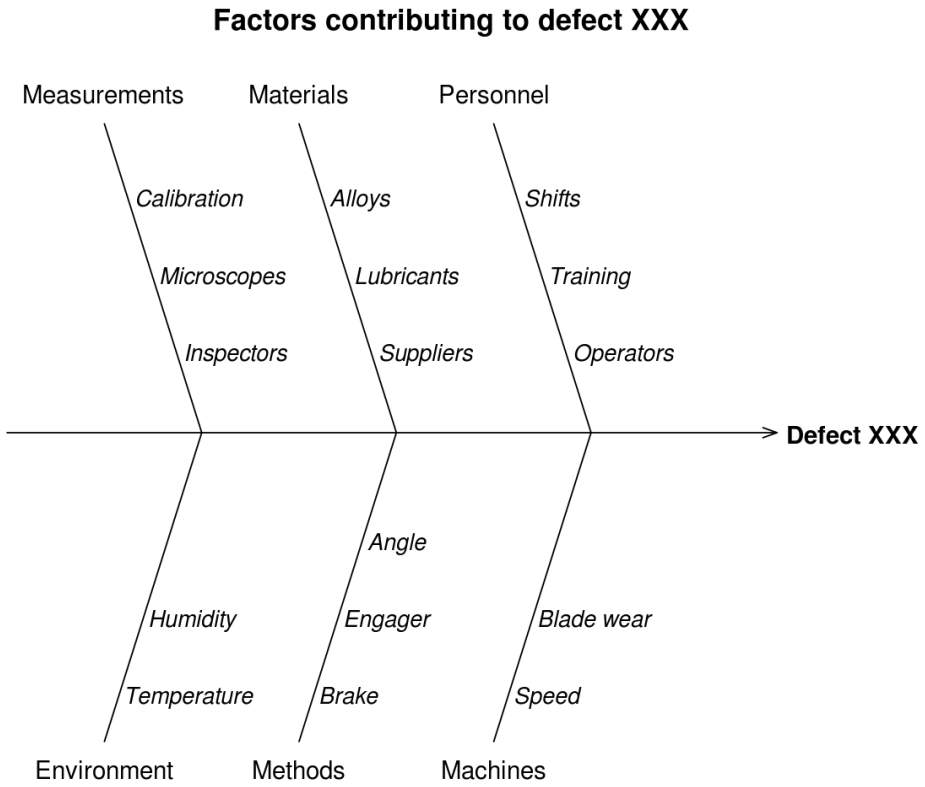
Analyze

- Identify causes of defects
- Determine vital causes



Types of variables:
1. Controllable
1. Noise
1. Disruptions

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Improve

This is the fun part! Now we are going to solve the issue!

Quantitative	Qualitative
Modelling	Brainstorm
Design of experiments	Reverse brainstorm
Regression	Green field
	Analogy

- Define optimal settings
- Define tolerance limits

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Control

Basically, control is a repeat:

- Validate your measurement system
- Process capability analysis of the new situation
- Methods for process control
  - New dashboard
  - Out of control plan