

# Introduction on Lean, six sigma and Lean game

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# Lean is....

- a philosophy
- a method
- a set of tools
  - Waste reduction
  - User value
  - Create flow
  - Improve performance



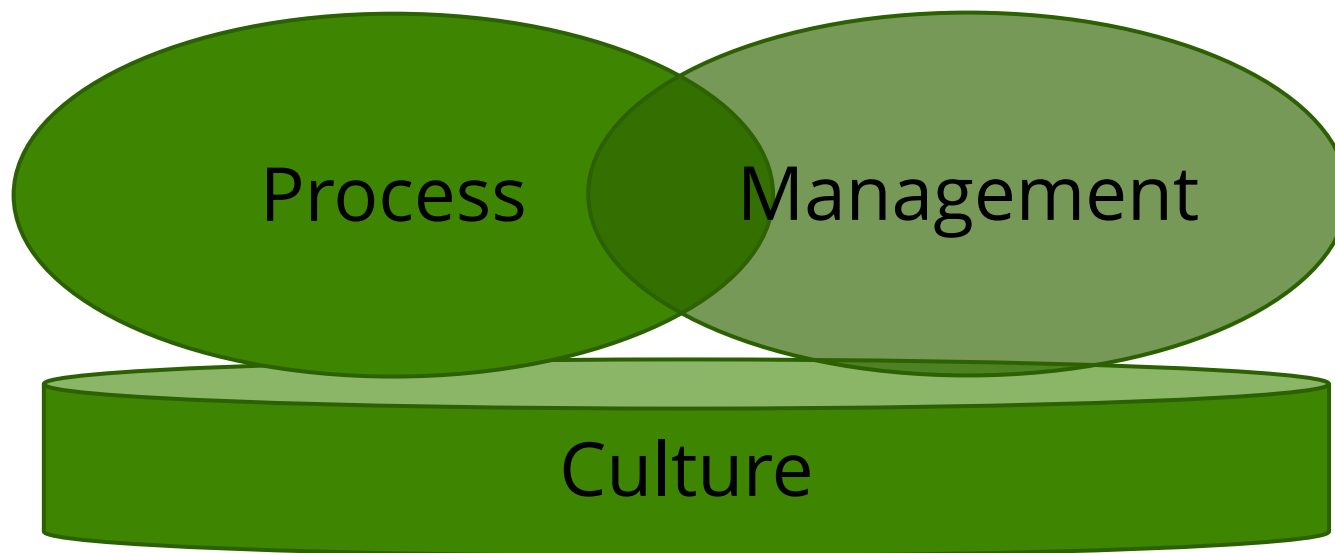
# Lean is..



- A methodology that involves all parts of the organisation in a continuous process of improvements
- Goals are set by the management
- All staff are participating in developing and continuously improving work processes

# The lean methodology...

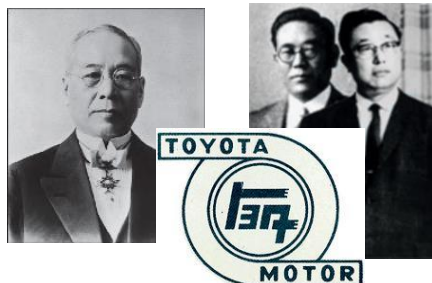
...is based on the understanding of the business along three dimensions



# The Lean Pedigree - ancestors within Venetian Ship builders to a lean management approach

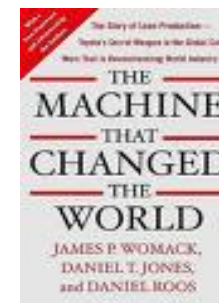


1903



1930

1960-70



2017

→ Mass Production

→ Toyota Production System (TPS)

→ Lean

## Henry Ford 1910-1920

- Ford T (1908)
- Time is money. Cost effective
- Taylor and "Scientific management" First assembly lines (1913)
- Standardizing; "Any colour as long as it is black.."

## Alfred Sloan / GM 1930

- Proces layout
- Lead time

- Postwar WW2 Japan was short on resources
- Industrial buildups.
- Inspired by Ford , but focus is flow instead of economies of scale
- Deming & Juran
- Reduced stock / JIT
- Built-in-quality / JIDOKA
- Teamorganisation & continuous improvement / KAIZEN.
- Pull/ KANBAN.

- Late 80's: Toyota factories in US and Europe. Toyota suppliers
- Same high level of quality and efficiency. **TPS**
- Benchmark by MIT on efficiency and quality of the global car industry.
- 1990. Womack. Based on principles of TPS, he named it «LEAN»
- Formally introduced in Statistics Norway in 2012
- Formally introduced in Statistics Netherlands in 2014

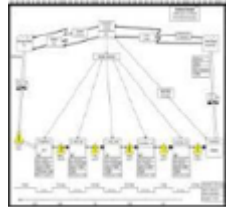
# Lean thinking - 5 basic principles



Value

What is value and what creates value for your customer?

Customer/ user oriented approach



Value stream

Mapping the value stream enables common understanding. Remove waste and what's non value-adding . Visualisation & Involvement



Flow

Tasks should flow through processes with fewest possible stops, bottlenecks, responsibility swaps, fixing or error corrections

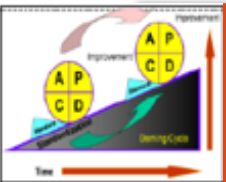


Pull

Improve management principles

Overview . Involve and engage

Standardize work processes. Best practice



Continuous improvement

Strive for perfection (the optimal delivery)

Openness and Confidence: challenge the current

Ensure learning

# TIMWOODS

To  
reduce  
waste  
is  
an  
essential  
part  
of  
lean  
thinking

Transport

Unnecessary movements of products, files, dossiers, etc.

Inventory

Finished goods or half products (also contents of mailbox, physical dossiers, files, etc.)

Motion

Unnecessary movements of the employee, like getting tools and materials, switching apps, etc.

Waiting

Waiting time between activities (also response times applications)

Overprocessing

Produce better quality than required

Overproduction

Produce more than requested (more responses, more output)

Defects

Reject products due to flaws (resulting in creating a new one or repairing)

Skills

Not using capacity and knowledge of employees







2 min.

½ min.

¼ min.

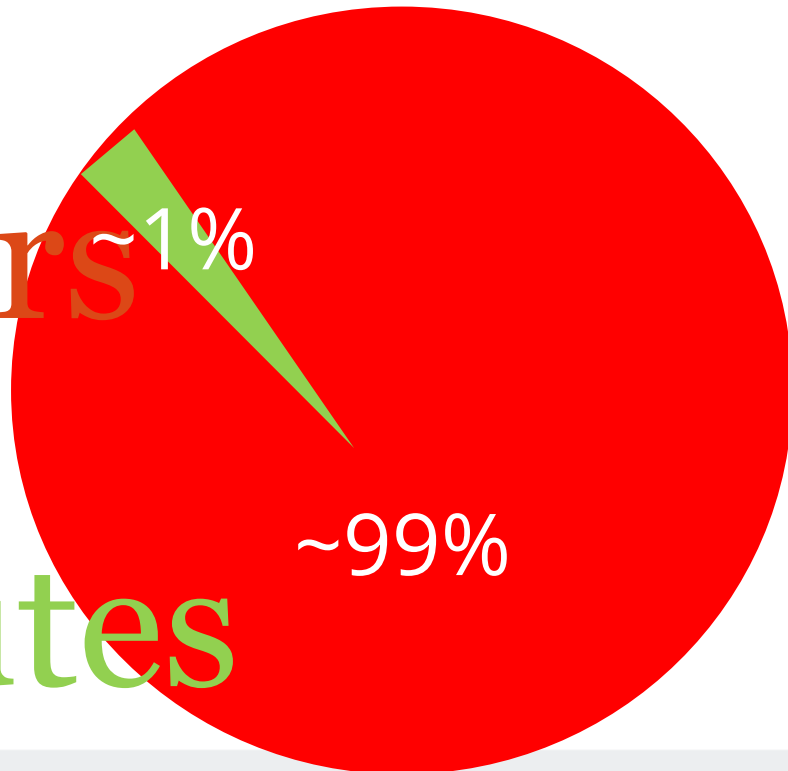
¼ min.

A

B

2 hours ~ 1%

3 minutes ~ 99%





2 min.

½ min.

¼ min.

¼ min.

A

B

PROCESS TIME

50% ↓



PRODUCTIVITY

20% ↑

# Lean offers a set of facilitating tools and techniques



Statistisk sentralbyrå  
Statistics Norway

Angitt/kravde - Selskapsgrupp 01 187000

Dette er en mal for periodiske rapporteringsoppgaver. Det skal brukes utgående fra den fastsatte avtale om data og tjenester, for en beskrivelse av innhold og når sending.

Måned:	Ulfen (statistikksentral)
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**Del 1: Felles for alle virksomheter**

Opplysning:	Statistisk sentralbyrå for Avdelingen
Prosjekt:	Statistisk sentralbyrå
Ansvarlig:	David Skarvnes (12)
Dato:	06.03.2020

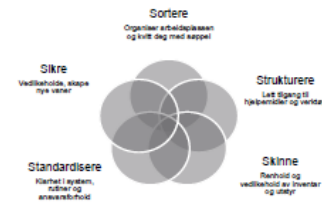
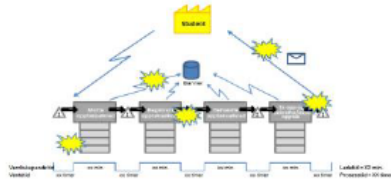
**Formål og innhold**

Etterspørsel: Dette dokumentet inneholder en mal for periodiske rapportering av data til Statistisk sentralbyrå. Det er et dokument som skal sendes inn til Statistisk sentralbyrå. Det er et dokument som skal sendes inn til Statistisk sentralbyrå. Det er et dokument som skal sendes inn til Statistisk sentralbyrå.

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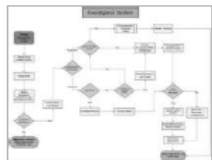
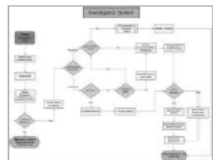
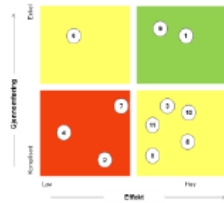
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Angitt	Akutt	Kritisk	Kritisk	3
OK	Akutt	Kritisk	Kritisk	2
Stevne	Akutt	Kritisk	Kritisk	1



# History of Six Sigma and Lean Six Sigma



## Walter Shewhart 1920

- Statistical Quality Control
- Control charts
- PDCA
- Variance is a root cause of defects

## Bill Smith / Bob Galvin 1987, Motorola

- Focus on quality
- Less variance results in less defects
- $6\sigma = 3$  defects per million
- Data driven

## Jack Welch 1988, General Electric

- Six Sigma company-wide
- DMAIC as project structure
- Belt structure
- Focus on price, quality and leadtime

## Lean Six Sigma first mentioned in 2001 in some books

Combining the best of both worlds:

- Focus on customer
- Combining the Lean and Six Sigma toolset and applying when needed
- DMAIC project structure
- Belt structure

2000: adoption by Healthcare, Finance, Supply Chain

2010: adoption by Government

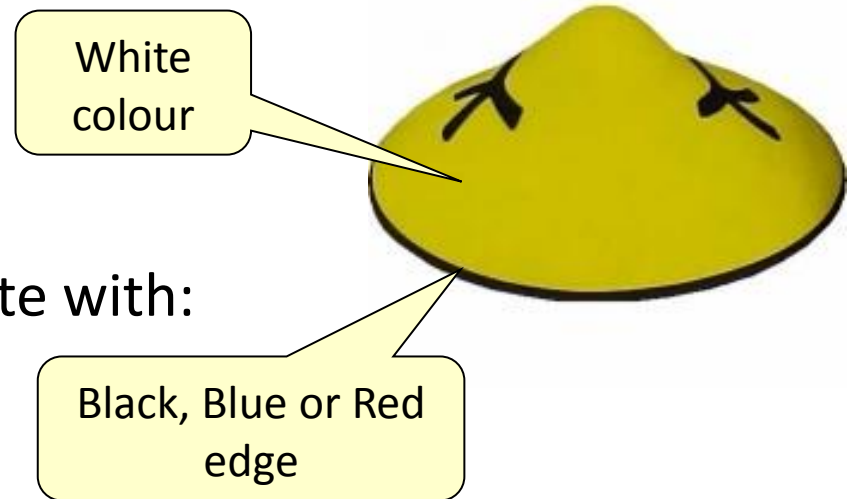


# Chinese hats

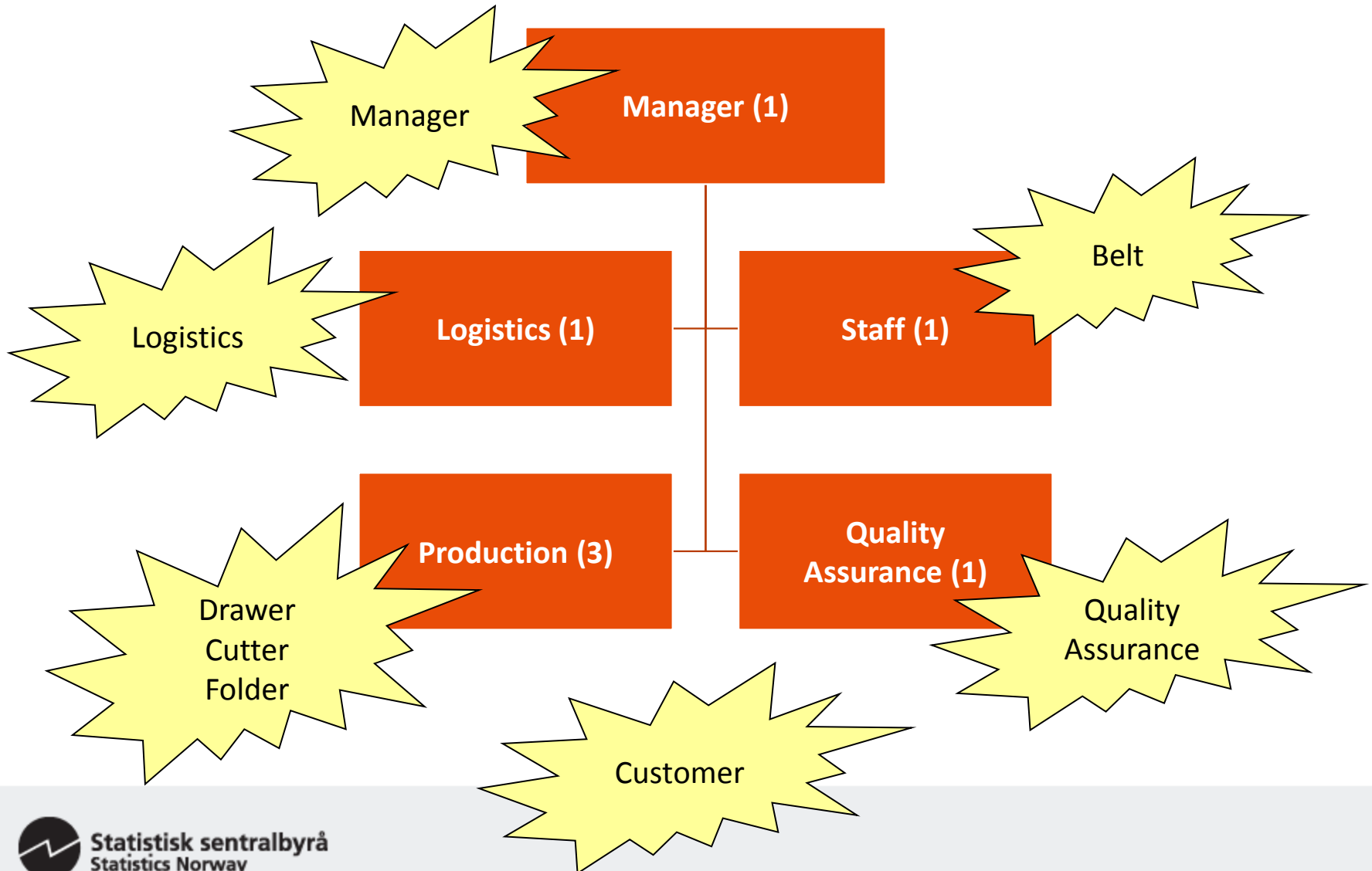
# Short history and products



- As of 1999, our product is on the European market
- There are six production locations
- Production of “Chinese hats”
- Chinese hats in the colour white with:
  - Black edge,
  - Blue edge, or
  - Red edge



# Organisation: 7 people



# Rules



- Do not change anything!
- Carefully read the instruction and perform your tasks as described
- Work hard!
- Pay attention to the start and end-signal:  
if time has finished, please put everything down

