Introduction on Lean, six sigma and Lean game

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Lean is….

- a philosophy
- a method
- a set of tools

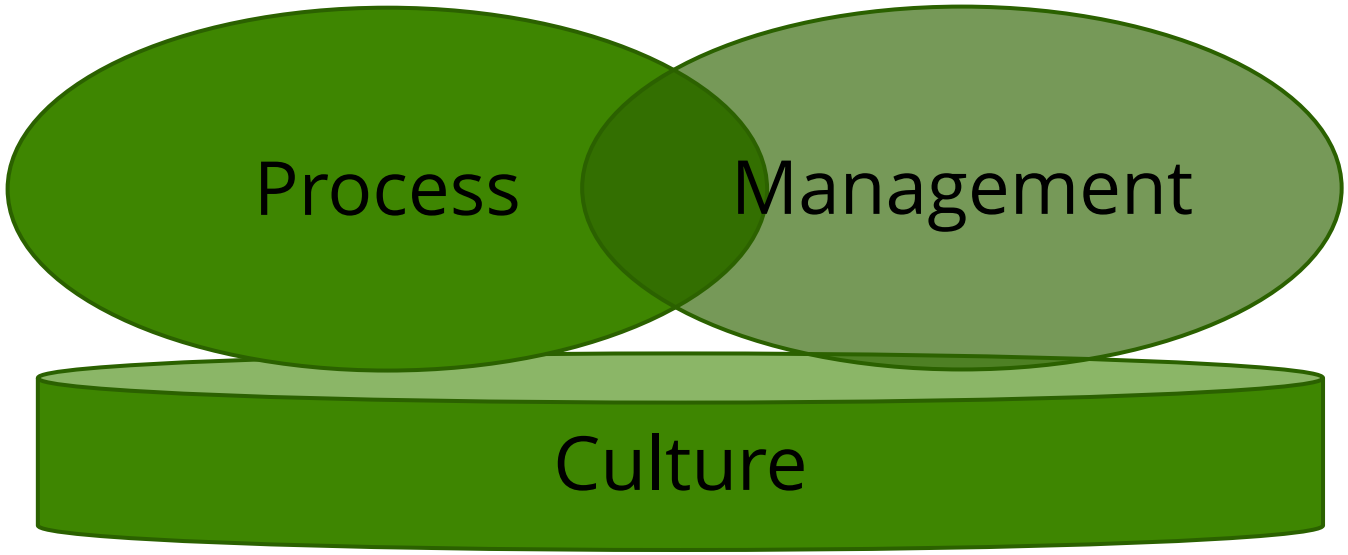
  - Waste reduction
  - User value
  - Create flow
  - Improve performance

Lean is..

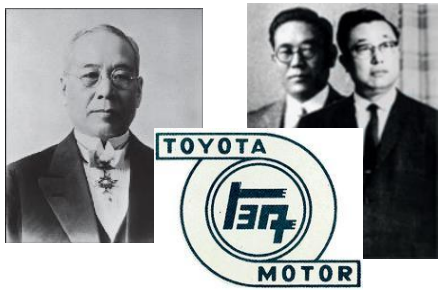
- A methodology that involves all parts of the organisation in a continuous process of improvements
- Goals are set by the management
- All staff are participating in developing and continuously improving work processes

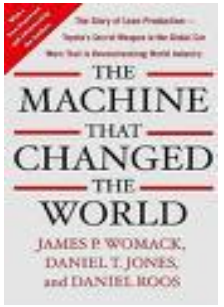
The lean methodology…

….is based on the understandig of the business along three dimentions



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





1903 → Mass Production

1930 → Toyota Production System (TPS)

1960-70 → Lean

2017

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.

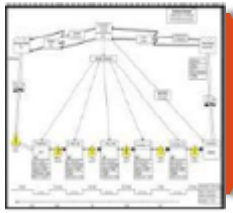
→ Late 80's: Toyota factories in US and Europe. Toyota suppliers
→ Same high level of quality and efficiency. **TPS**
→ Benchmark by MIT on efficiency and quality of the global car industry.
→ 1990. Womack. Based on principles of TPS, he named it «LEAN»
→ Formally introduced in Statistics Norway in 2012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

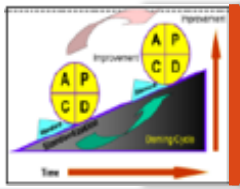
Tasks should flow through processes with fewest possible stops, bottlenecks, responsibility swaps, fixing or error corrections

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

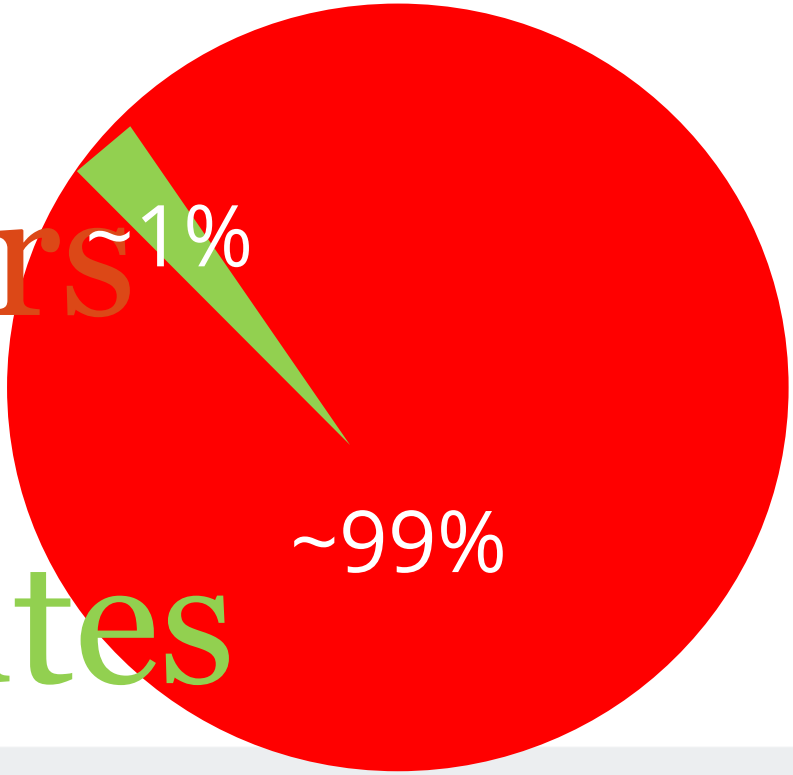
Transport	Unnecessary movements of products, files, dossiers, etc.
Inventory	Finished goods or half products (also contents of mailbox, physical dossiers, files, etc.)
Motion	Unnecessary movements of the employee, like getting tools and materials, switching apps, etc.
Waiting	Waiting time between activities (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 of repairing)
Skills	Not using capacity and knowledge of employees

2 min. ½ min. ¼ min. ¼ min.

A B

2 hours

3 minutes



2 min. ½ min. ¼ min. ¼ min.

A B

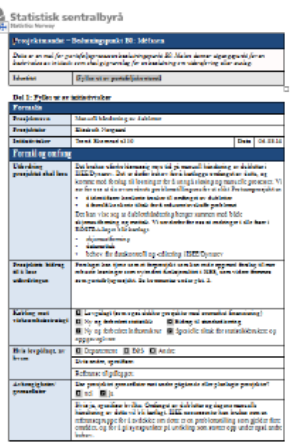
PROCESS TIME

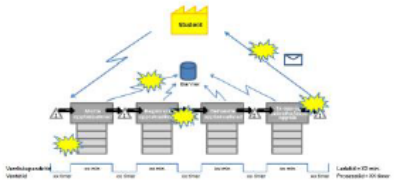
50% ↓

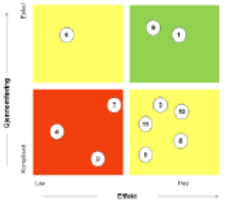
PRODUCTIVITY

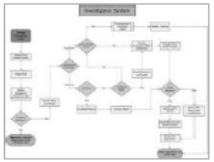
20% ↑

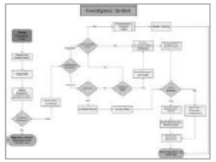
Lean offers a set of facilitating tools and techniques



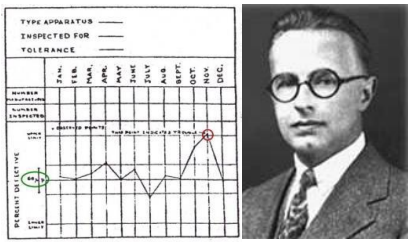


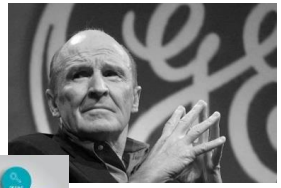






History of Six Sigma and Lean Six Sigma





1920 — 1980 — 2000 — 2017

Quality and Statistics | **Six Sigma** | **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
- 6σ = 3 defects per million
- Data driven

Jack Welsh 1988, General Electric
- Six Sigma company-wide
- DMAIC as project structure
- Belt structure
- Focus op 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

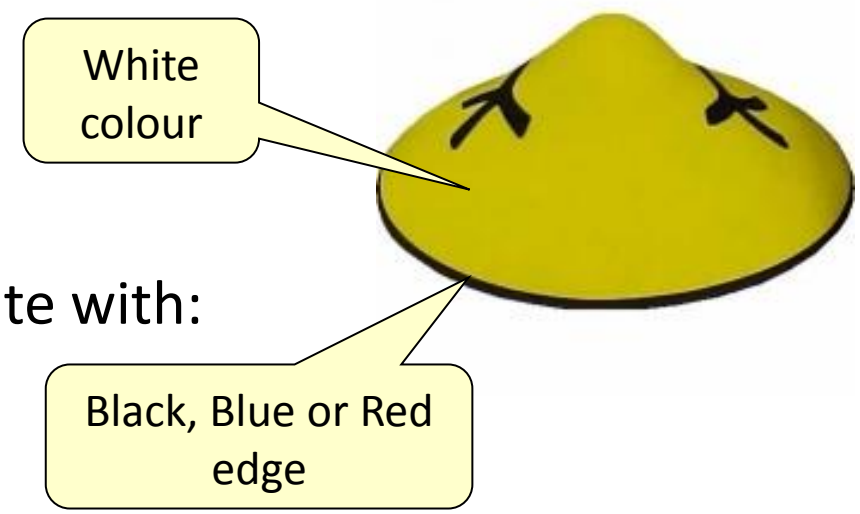
2000: adoption by Healthcare, Finance, Supply Chain
2010: adoption by Government

Lean game

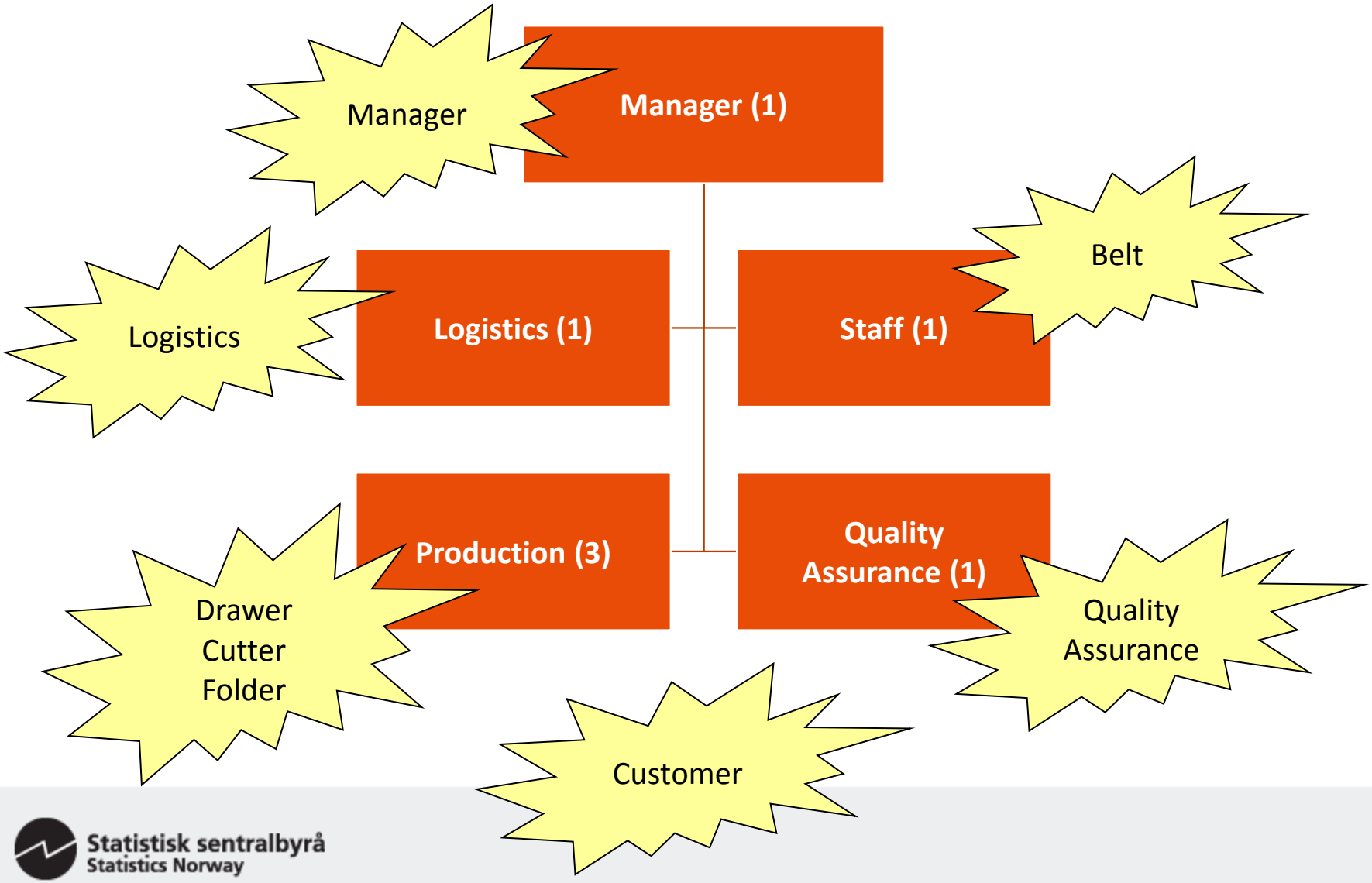
Chinese hats

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