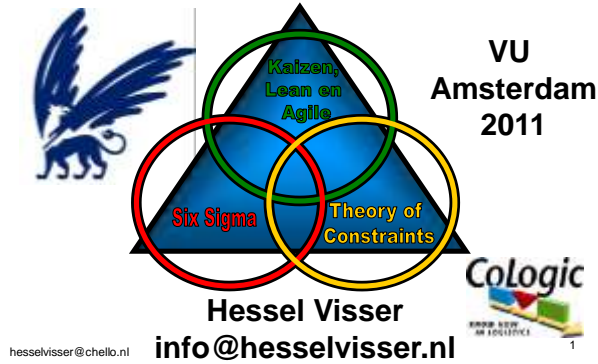


Lean and other Improvement Tools Compared



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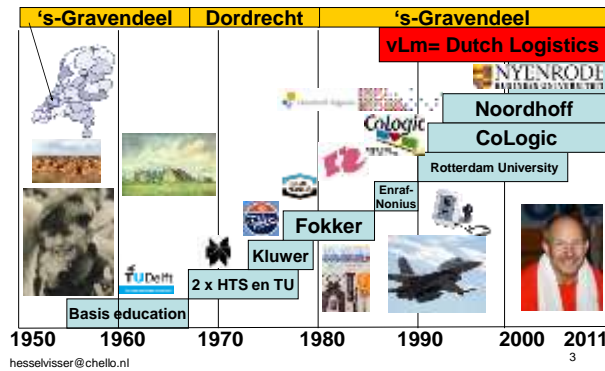
What the customer think.



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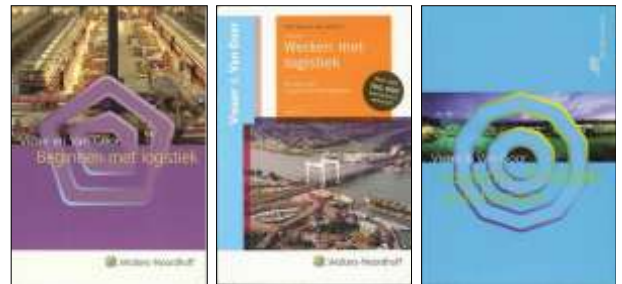
2

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Published Books about Logistics
sold over 120.000 copies



www.logistiek.noordhoff.nl

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4

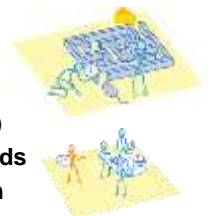
Who are my customers?

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Good Tools are Half the Work



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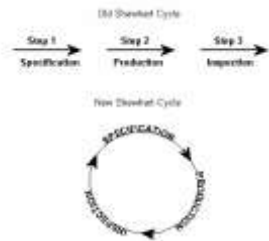
7

BUT: Don't Use Overtooling



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The basics: Shewhart Cycle

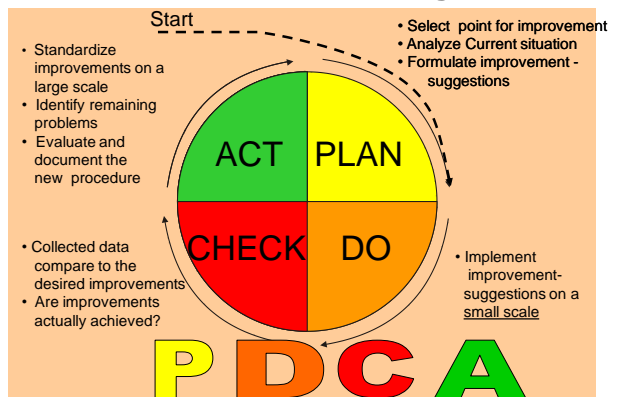


Plan Do Check Act
P D C A

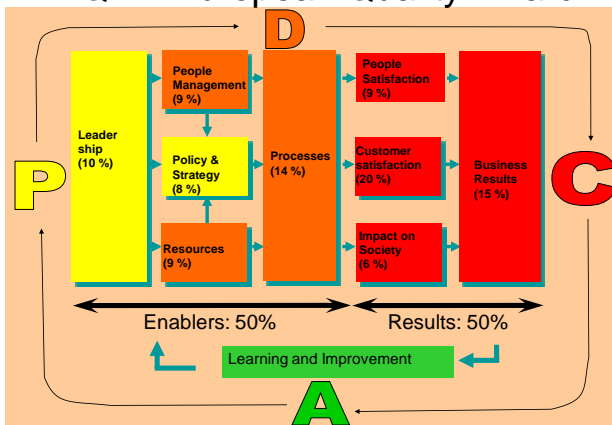
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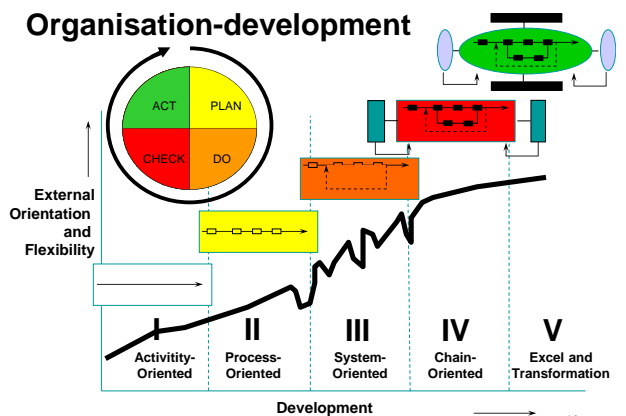
Now known as the Deming-wheel



EFQM - European Quality Award



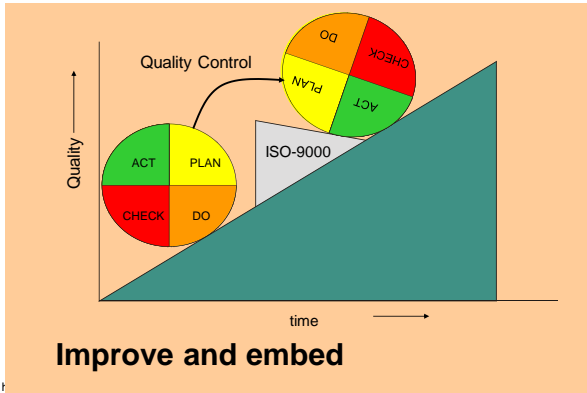
Organisation-development



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The ISO-certificate is only a minimum



Methods and Tools

1. **Kaizen** Masaaki Imai ± 1975
2. **Lean** Womack & Jones ± 1990
3. **Six Sigma** Jack Welch ± 1985
4. **TOC** Eli Goldratt ± 1985



Identification Kaizen, Lean, Agile, Six Sigma, en Theory Of Constraints (TOC)

Kaizen	Lean	Agile	Six Sigma	TOC
<ul style="list-style-type: none"> Continuous Improvement Fast small improvements Simple Do it on the Shop floor Production and Distribution 5S approach <p>IMPROVE IN SMALL STEPS</p>	<ul style="list-style-type: none"> Eliminate waste So as stocks Standardize Short Change over Create flexible flow Kanban Control Production and Distribution TPM Wide approach <p>REMOVE WASTE FROM THE CHAIN</p>	<ul style="list-style-type: none"> Speed Reaction Flexibility Short time to market Unstable customers Unpredictable behavior <p>ALERT REACTION TO CHANGE</p>	<ul style="list-style-type: none"> DMAIC process Complex problems Statistics Variation-analyses Reduction variations Experiments Almost everywhere applicable Depth approach <p>ELIMINATION OF VARIATION</p>	<ul style="list-style-type: none"> Bottle-neck discovery Five steps to eliminate the Bottle-neck Cause and effect analysis Drum-Buffer-Rope Critical path discovery Continuous replanning <p>MAXIMIZING THE OUTPUT</p>

Methods and Tools

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-

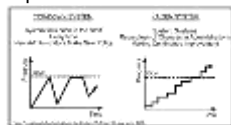
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Kaizen



- Profitable Actions which Satisfy Customers Wishes
- Kai-zen = Step Small = "continuous improvement"
- High speed, small improvements
- Simple process analyses, Watch
- Solve problems on the floor
- Commitment of the employees
- First focus on production and distribution



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Innovation versus Kaizen

Short-term, dramatic
Large steps
Intermittent
Abrupt, volatile
Few champions
Individual ideas & effort
Scrap and rebuild
New inventions/theories
Large investment
Low effort
Technology
Profit

Effect
Pace
Timeframe
Change
Involvement
Approach
Mode
Spark
Investment
Maintenance
Focus
Evaluation

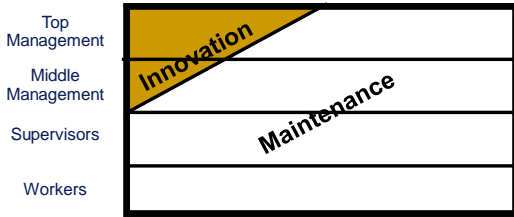
Long-term, undramatic
Small steps
Continuous, incremental
Gradual and consistent
Everyone
Group efforts, systematic
Protect and improve
Established know-how
Low investment
Large maintenance effort
People
Process



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Traditional Western Perceptions of Job Functions

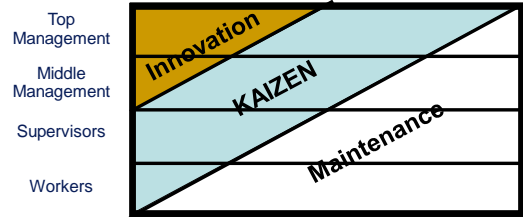


based on Imai 1986

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Japanese Perceptions of Job Functions



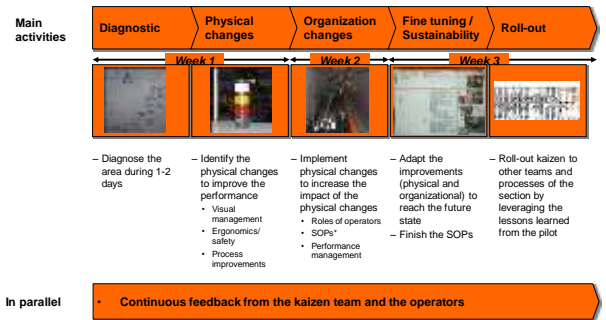
based on Imai 1986

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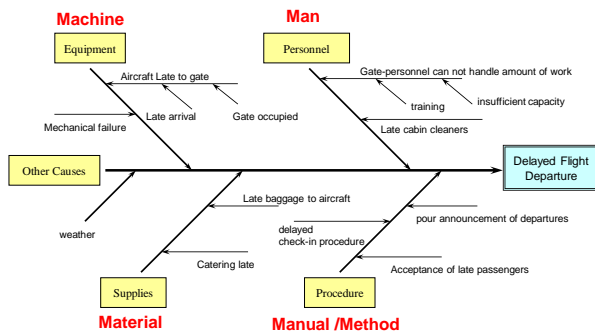
KAIZEN – follows a structured approach



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Cause-and-Effect Diagram



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When Kaizen?

- If it has to be done simple;
- When you need fast results;
- Direct applicable on the shop floor;
- After experience Larger Fast actions can be done by a Kaizen Blitz.

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A lot of things can go wrong, if your people are not fully dedicated to their work.

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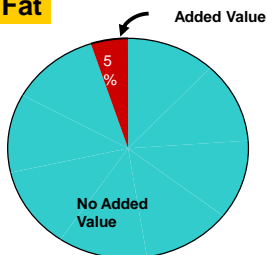


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Lean = Eliminate Waste

Lean= Almost no Fat



Typical: in 95% of the lead time there is **no value** added!!!

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De Vision van "Lean" in the USA

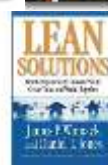
This is best illustrated by the authors James Womack, and Daniel Jones in their popular books.



1990



1996



2006

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The human touch



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Lean at Toyota



Toyota Production Systems (TPS)

- Production approach:
- Produce only what is needed
 - Stop if anything goes wrong
 - Eliminate that does not add value

- Working philosophy
- Respect you employees
 - Complete utilization of all capacities of your employees
 - Put the responsibility and the authority to the employees

- **WHY DOES TOYOTA HAVE (OR HAD) PROBLEMS NOW?**



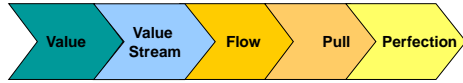
Taiichi Ohno



1912 - 1990
30

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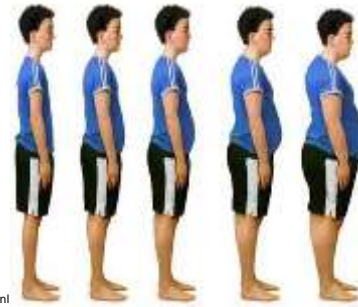
The Five Basic Elements of Lean



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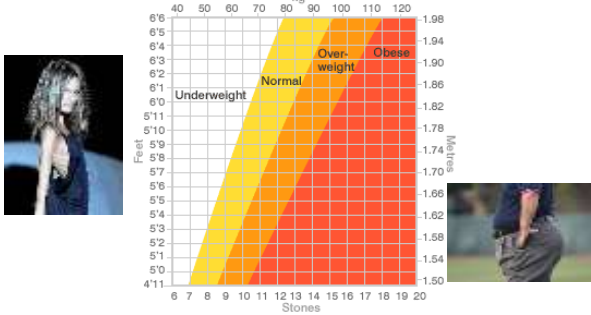
Which person is really lean?



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Lean & Agility: Compare it with the BMI!



Our BMI is getting worse: over 25

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Are they Lean?



Maybe?

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First the goal and then the resources!

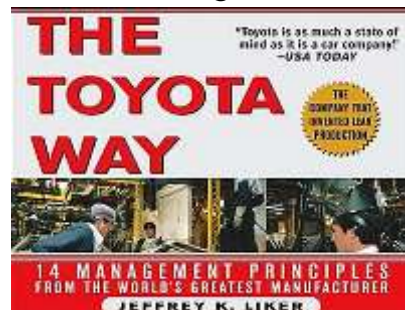


Be agile and just lean enough!

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Start with a good book



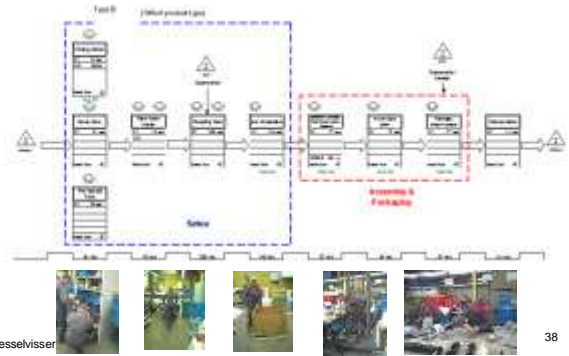
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Make a brown wall paper



Value Stream Map – Packaging Process



Symbols in a Value Stream Map (Visio 2007)

Agile



Definitions Lean and Agile

'The key principle of **lean operations** is relatively straightforward to understand: it means moving towards the **elimination of all waste** in order to develop an operation that is faster and more dependable, produces higher quality products and services and, above all, operates at low cost.' (Slack)

Christopher defines **agility** as "**the ability of an organization to respond** rapidly to changes in demand both in terms of volume and variety. The organization must be "market sensitive" and exploit any opportunities recognised from scanning the environment. Virtual supply chains whereby information technology such as Electronic Data Interchange (EDI) and the Internet are used to share data between supplier and buyers facilitate agile manufacture. **Process integration is essential** whereby the buyers and supplier work in collaboration with each other to have joint product development, common systems and shared information. **Trust is essential in the "extended enterprise"**. The phrases "**Efficient Consumer Response**" in the food industry and "**Quick Response**" in the clothing industry have been used often to describe similar features.

What is the Match between the Demand and Supply Chain with market requirements

		Nature of demand	
		Functional products	Innovative products
Supply chain objectives	Efficient	Mismatch	Agile demand and supply chain management
	Responsive		Mismatch
	Low throughput times High utilization Minimum inventory Low-cost suppliers		Predictable Few changes Low variety Price stable Long lead-times Low margin
	Low cost High utilization Minimum inventory Low-cost suppliers		Unpredictable Many changes High variety Price markdowns Short lead-times High margin

When Agile?



- If you need fast actions in the market;
- If the market is volatile;
- When cost is not the most important factor;
- Often in the beginning of the Product Life Cycle

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When Lean?

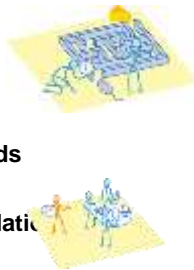
- If you have enough time;
- You got to make people free for this project;
- It costs not too much education;
- Can be done very practically;
- It is a good continuation after Kaizen or Agile.

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Six Sigma

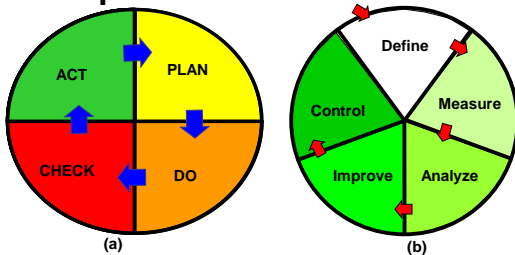
- Be profitable and fulfill the wishes of the customer
- < 3,4 mistake for 1 million activities
- Define, Measure, Analyze, Improve & Control
- Complex questions with a lot of statistics
- Cause effect analyzes
- Reduction variation to zero
- Experiments



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Compare PDCA and DMAIC

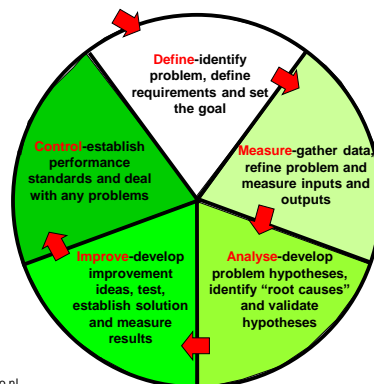


- (a) The Plan-Do-Check-Act, or "Deming" improvement cycle, and
 (b) The define-measure-analyze-improve-control, or DMAIC six sigma improvement cycle

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DMAIC SIX SIGMA

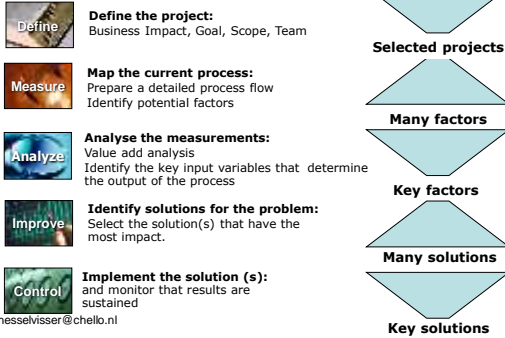


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Project phases in Six Sigma

Key underlying principle is to identify the key factors that determine the output of a process, and control these to make the outputs of the process predictable



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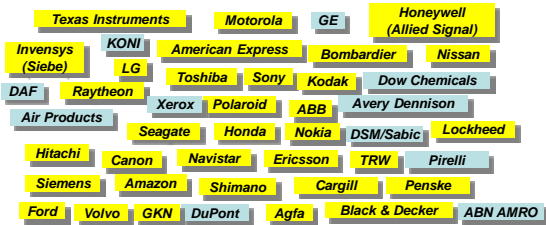
Maximize Your Six Sigma Team's Productivity At Every Level



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Which companies use Six Sigma



Average of the yearly savings on the turnover

2.5%

In the Netherlands

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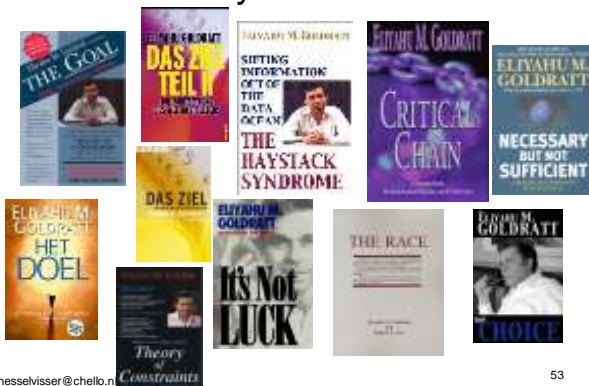
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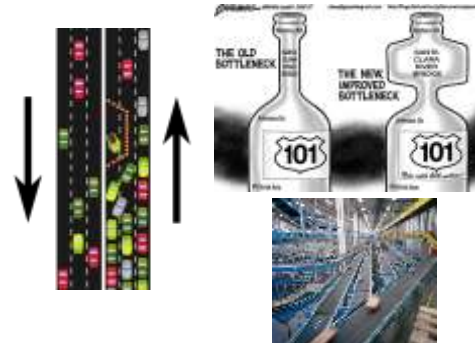
The Books by Eli Goldratt



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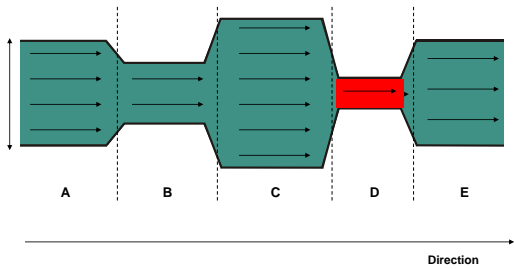
Where do we have bottlenecks?



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TOC



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Application TOC

- Compared with the success of the book “The Goal” you see only a few full implementations;
- Only if every chain understands its importance you can use TOC well;
- It is seen as a complex implementation;
- Embedding cost a lot of attention.

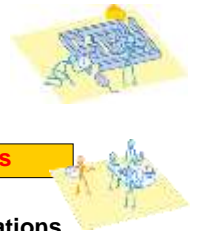
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The integration

Program	Six Sigma	Lean thinking	Theory of constraints
Theory	Reduce variation	Remove waste	Manage constraints
Application guidelines	1. Define. 2. Measure. 3. Analyze. 4. Improve. 5. Control.	1. Identify value. 2. Identify value stream. 3. Flow. 4. Pull. 5. Perfection.	1. Identify constraint. 2. Exploit constraint. 3. Subordinate processes. 4. Elevate constraint. 5. Repeat cycle.
Focus	Problem focused	Flow focused	Systems constraints

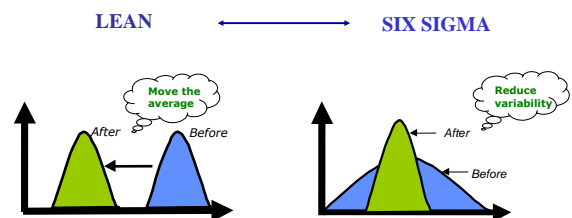
All have a five stage model

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- Lean Six Sigma is a **proven, generic, highly structured, focussed** approach to problem solving

- **Lean** is focussed at reducing waste in work processes
- **Six Sigma** is focussed at improving on Customer requirements and reducing variability



Accelerate and make narrow

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Lean Six Sigma tools

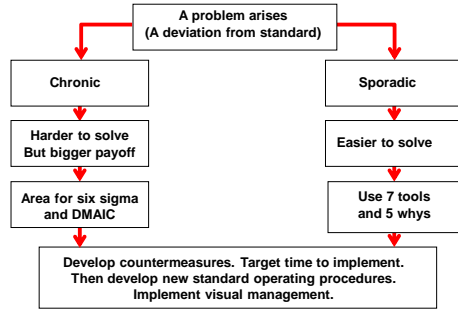
Lean Tools
Six Sigma Tools

Define	Measure	Analyze	Improve	Control
<ul style="list-style-type: none"> Identify Key Problem Complete Charter Develop SIPOC Map Map Business Process Map Value Stream Gather Voice of the Customer & Voice of the Business Develop CCR's & CBR's Finalize Project Focus 	<ul style="list-style-type: none"> Identify Key Input, Process and Output Metrics Develop Operational Definitions Develop Data Collection Plan Validate Measurement System Collect Baseline Data Determine Process Performance Capability Validate Business Opportunity 	<ul style="list-style-type: none"> Propose Critical X's Prioritize Critical X's Conduct Root Cause Analysis on Critical X's Validate Critical X's Estimate the Impact of Each X on Y Quantify the Opportunity Prioritize Root Causes 	<ul style="list-style-type: none"> Develop Potential Solutions Develop Evaluation Criteria & Select Best Solution Evaluate Solution for Risk Optimize Solution Develop To-Be Process Map(s) and High-Level Implementation Plan Develop Pilot Plan & Pilot Solution 	<ul style="list-style-type: none"> Implement Process, Changes and Controls Develop SOP's, Training Plan & Process Control System Monitor & Stabilize Process Transition Project to Process Owner Identify Project Replication Opportunities Calculate Financial Benefits
<ul style="list-style-type: none"> Project Selection Tools PIP Management Process Value Stream Map Various Financial Analysis Charter Form Multi-Generational Plan Stakeholder Analysis Communication Plan SIPOC Map High-Level Process Map Non-Value Added Analysis VOC and Kano Analysis Lean QFD RACI and Quad Charts 	<ul style="list-style-type: none"> Operational Definitions Data Collection Plan Pareto Chart Histogram Box Plot Statistical Sampling Measurement System Analysis Setup Reduction Generic Pull Kaizen Control Charts Process Capability, Cp & Cpk 	<ul style="list-style-type: none"> Detailed Process Maps Statistical process analysis Coefficients of variation analysis Design of experiments Non Value-Added Analysis Hypothesis Testing Confidence Intervals Pareto Charts C&E Matrix Fishbone Diagrams Brainstorming Simple & Multiple Regression ANOVA 	<ul style="list-style-type: none"> Brainstorming Benchmarking Process Improvement Techniques Line Balancing Process Flow Improvement Constraint Identification Replenishment Pull Sales & Operations Planning Poka-Yoke FMEA Solution Selection Matrix To-Be Process Maps Piloting and Simulation 	<ul style="list-style-type: none"> Control Charts Standard Operating Procedures (SOP's) Training Plan Communication Plan Implementation Plan Visual Process Control Mistake-Proofing Process Control Plans Project Commissioning Project Replication Plan-Do-Check-Act Cycle

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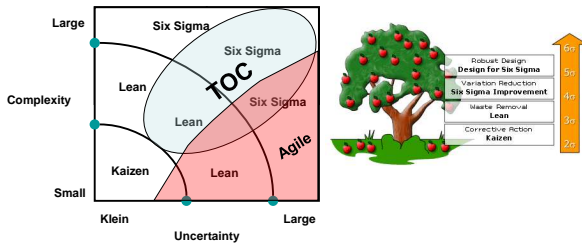
Six Sigma or/and Lean



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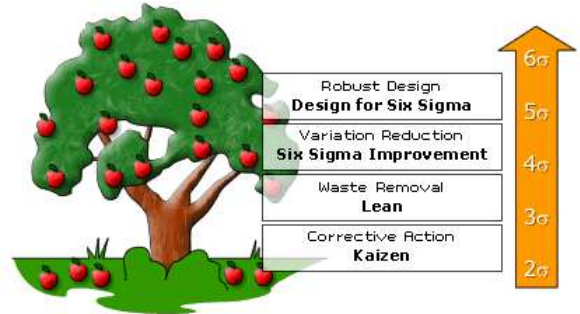
Criteria for Kaizen, Lean or Six Sigma



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Roadmap

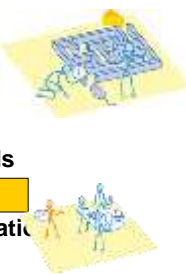


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How is your office?



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Is it Artwork or a Distribution centre?



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Would this work?



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Cost savings by outsourcing



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Lean house



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How many Lean Houses are there?



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Excercise

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What does 5 S mean?



1. Sort
2. Set in order
3. Shine
4. Standardize
5. Sustain



1. Selecteren
2. Schikken
3. Schoonmaken
4. Standaardiseren
5. Stimuleren



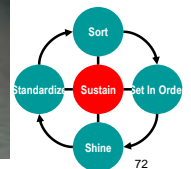
1. Seiri
2. Seiton
3. Seiso
4. Seiketsu
5. Shitsuke



1. Selektieren
2. Sortieren
3. Saubern
4. Standardisieren
5. Stimulieren



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Seiri / Sort / Scheiden/ Selektieren

- What do you really need?
- Throw away all unnecessary things!



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Clean desk?



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Even in the office you can work in a smarter way



5S in the office
Clean desk

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The 8 wastes at the shop floor

- | | |
|-------------------------|--------------------------------|
| 1 OVERPRODUCTION | 5 INAPPROP. PROCESSING |
| 2 TRANSPORT | 6 UNNECESSARY MOTIONS |
| 3 DEFECTS | 7 UNNECESSARY INVENTORY |
| 4 WAITING | 8 HUMAN POTENTIAL |

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The 8 wastes in the Office

- | | |
|--|--|
| 1 OVER DOCUMENTING
<i>Sales order, BOM, tools list, etc.</i> | 5 OVER PROCESSING
<i>Wrong forms, wrong copies</i> |
| 2 TRANSPORT
<i>Getting signatures, distributing copies</i> | 6 UNNECESSARY MOTIONS
<i>Signature approvals, folders, copies...</i> |
| 3 CORRECTION
<i>Filing errors, transposition mistakes</i> | 7 FILE ARCHIVES
<i>Documentation systems</i> |
| 4 WAITING
<i>Documents queuing, idle time</i> | 8 HUMAN POTENTIAL
<i>Problem solving skills of people</i> |

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What is easier to pick?



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**What do I need when?
What does the material cost?**

**It can be done like this!
Costs: almost zero**

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How it can be changed?

From marginal results to top results!

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Before you have to walk to long



In one week realized

Walking distances halved

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Make pictures

- What is the old situation?
- How does it look afterwards?



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Use actual and readable KPI's



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Sandvik European Distribution Center Schiedam Netherlands



100.000 part numbers
400.000 locations
€ 1.500.000.000 turnover/year
25.000 order lines each day
200 people
<50 errors on 1.000.000 activities
=99,99%

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The Team Incoming Goods



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The packaging area now



Old versus new

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The Case Vector / SEW



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LEAN MANUFACTURING

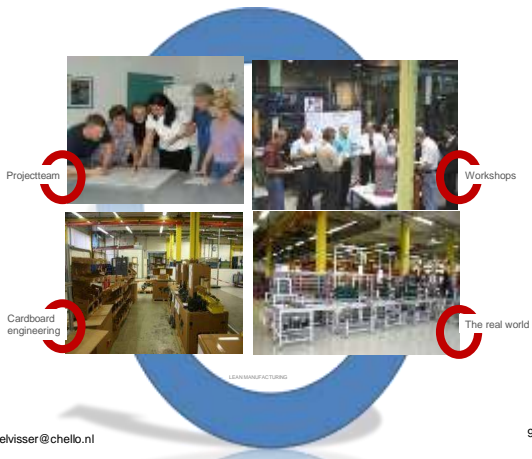
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The people on the floor create their own work space



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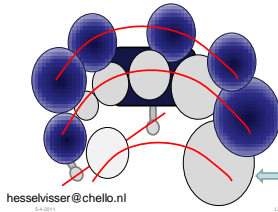
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Lean and Agile: All is available



A quick view at Ceva Eindhoven



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Lessons Learned

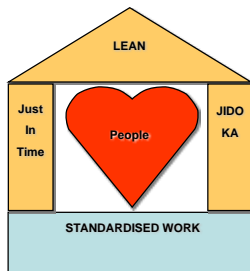
1. Consult and publicise widely in the preparation phase;
2. Read a good book before you start;
3. Visit other companies with all kind of personalities;
4. Take pictures or/ and make a movie;
5. Start simple and show a wall of fame;
6. Take time to effectively Kaizen each section:
 - Don't just copy / paste and assume;
 - Make changes visual;
 - Make sure they 'own it' <especially change>;
7. Communicate, Communicate, Communicate !
8. Keep people on board. This enables the leadership element to concentrate on development, appear to be where the biggest discernable gains are.
9. Measure and audit the process continuously;
10. Go back to the floor and keep in touch.

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Build your own lean house



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