

Product Creation Through Lean Approaches

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**LESS 2010
18.10.2010**

Agenda

- **Introduction Siemens & I IA AS**
- **Lean @ Siemens in general**
- **Lean @ Siemens I IA AS**

Organizational setup of Siemens AG

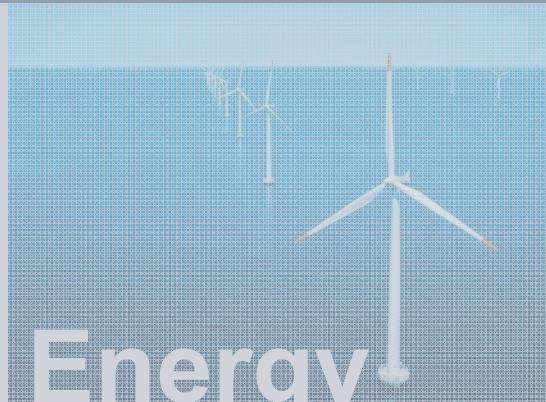
Sectors



Industry

Divisions

- Industry Automation
- Drive Technologies
- Building Technologies
- Lighting (OSRAM)
- Industry Solutions
- Mobility



Energy

Divisions

- Fossil Power Generation
- Renewable Energy
- Oil & Gas
- Energy Service
- Power Transmission
- Power Distribution



Healthcare

Divisions

- Imaging & IT
- Workflow & Solutions
- Diagnostics

Industry Sector

Organizational setup & key figures FY09

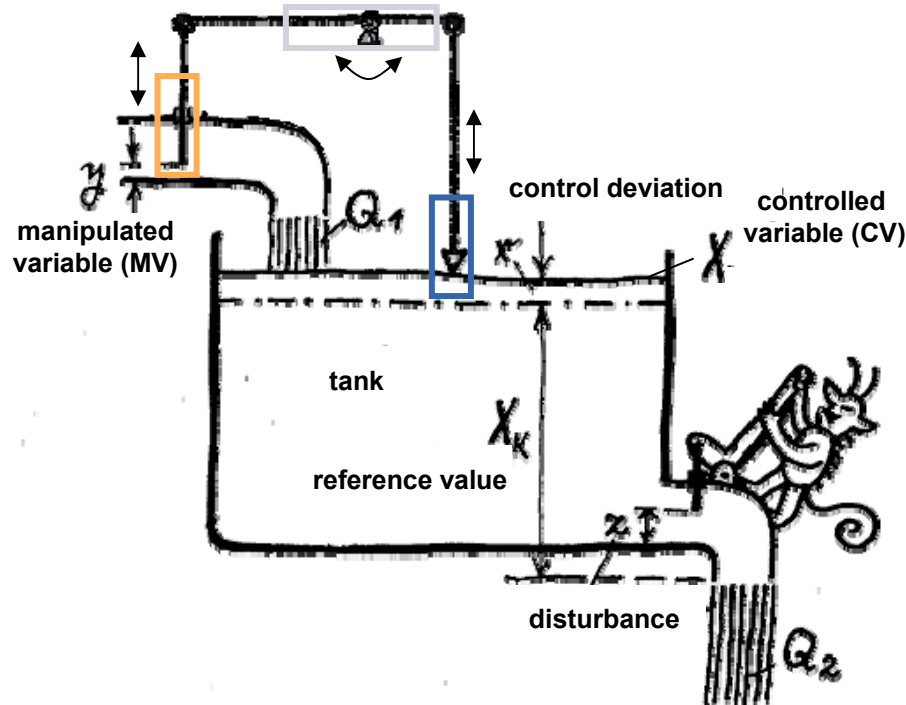


CEO: Prof. Dr. Siegfried Russwurm Siemens Industry CFO: Dr. Ralf P. Thomas					
New orders ¹⁾ : ~€33.3bn		Revenue: ~€35bn		Profit: ~ €2.7bn	
Employees ²⁾ : ~207,000					
Industry Automation	Drive Technologies	Building Technologies	OSRAM	Industry Solutions	Mobility
CEO: Anton S. Huber CFO: Miguel-Angel Lopez	CEO: Klaus Helmrich CFO: Thomas Rathmann	CEO: Dr. Johannes Milde CFO: Heribert Stumpff	CEO: Martin Goetzeler CFO: Thomas Schaffer	CEO: Jens Michael Wegmann CFO: Wolfgang Hermann	CEO: Dr. Hans-Jörg Grundmann CFO: Michael Schulz-Drost
<ul style="list-style-type: none"> Industrial Automation Systems (AS) Siemens PLM Software Sensors and Communication Control Components and Systems Engineering 	<ul style="list-style-type: none"> Large Drives Motion Control Systems Mechanical Drives Inside e-Car 	<ul style="list-style-type: none"> HVAC-P Products Electrical Installation Technology Security Systems Building Automation & Control Fire Safety & Security Products 	<ul style="list-style-type: none"> General Lighting Automotive Lighting Electronics & Controls Luminaires Display/Optics Opto Semiconductors LED Systems 	<ul style="list-style-type: none"> Metals Technologies Water Technologies Industrial Technologies Manufacturing Services 	<ul style="list-style-type: none"> Rolling Stock Infrastructure Networks Infrastructure Logistics Turnkey Systems Traffic Solutions ELIN EBG Traction

Automation includes sensors, actuators & control logic






Basic principle: Mechanical example



Key components

Only three elements ...

- Sensors 
- Actuators 
- Control logic 

**Our
business
@ AS**

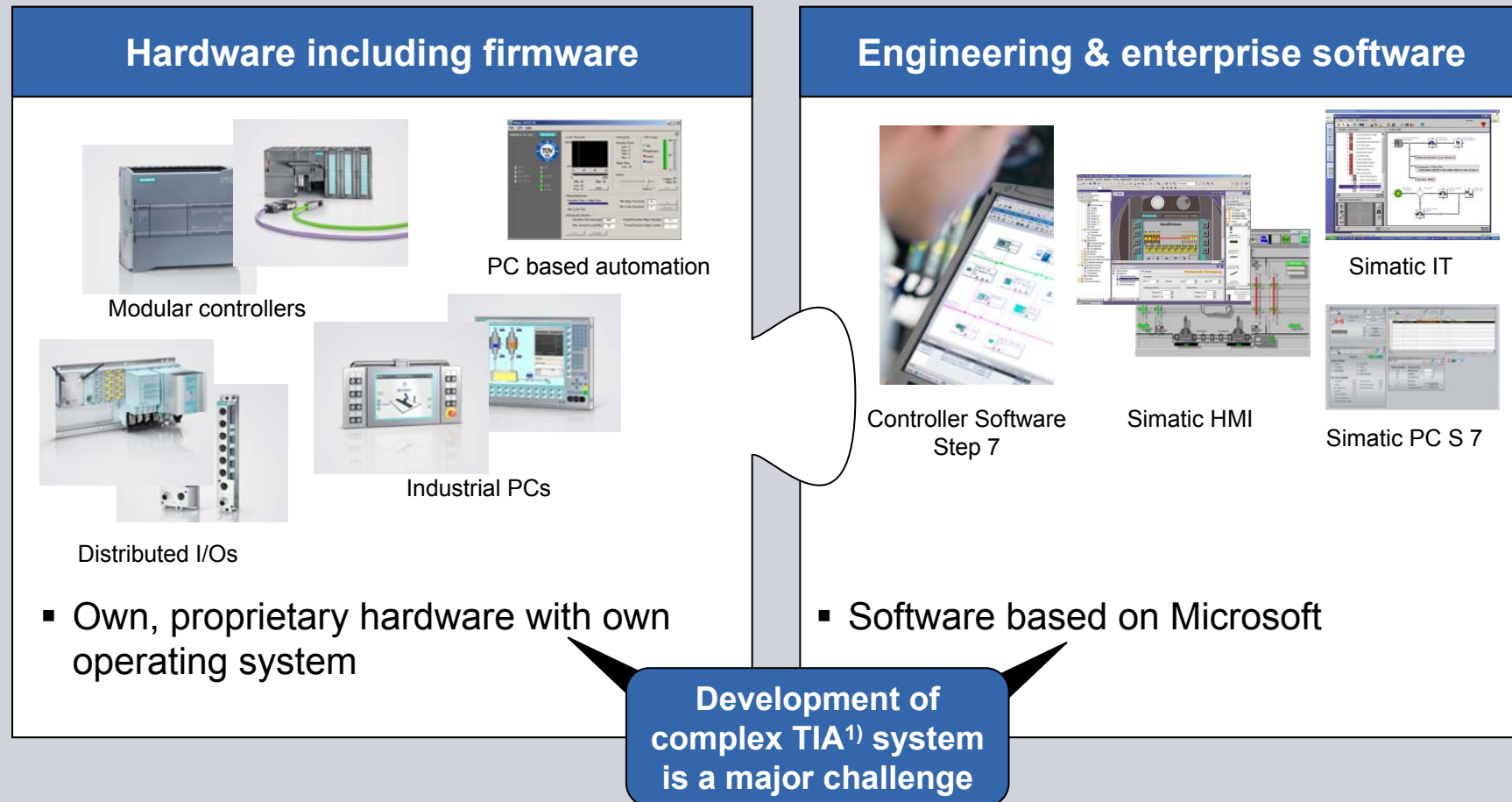
And not to forget ...

- Process to be controlled

AS is # 1 in Industry Automation with a business model comparable to (Apple)!

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Hardware & firmware products are closely linked to engineering & enterprise SW



1) Totally Integrated Automation
Source: Team I IA AS – PLM optimization

Agenda

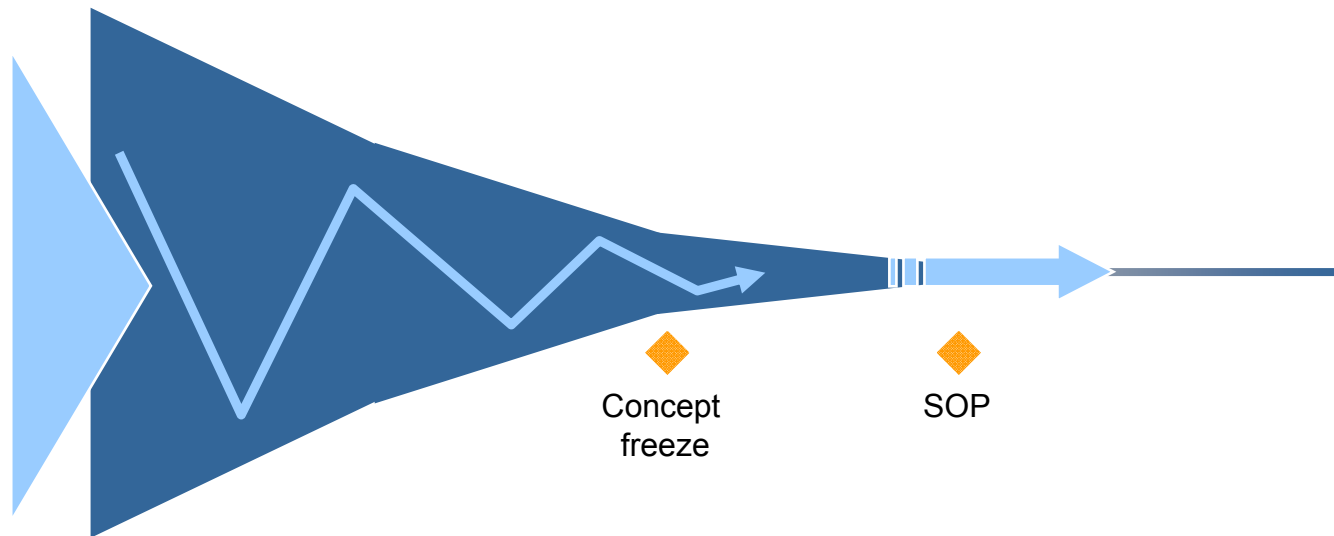
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Lean in Development and Engineering

One cannot simply transfer the concept...

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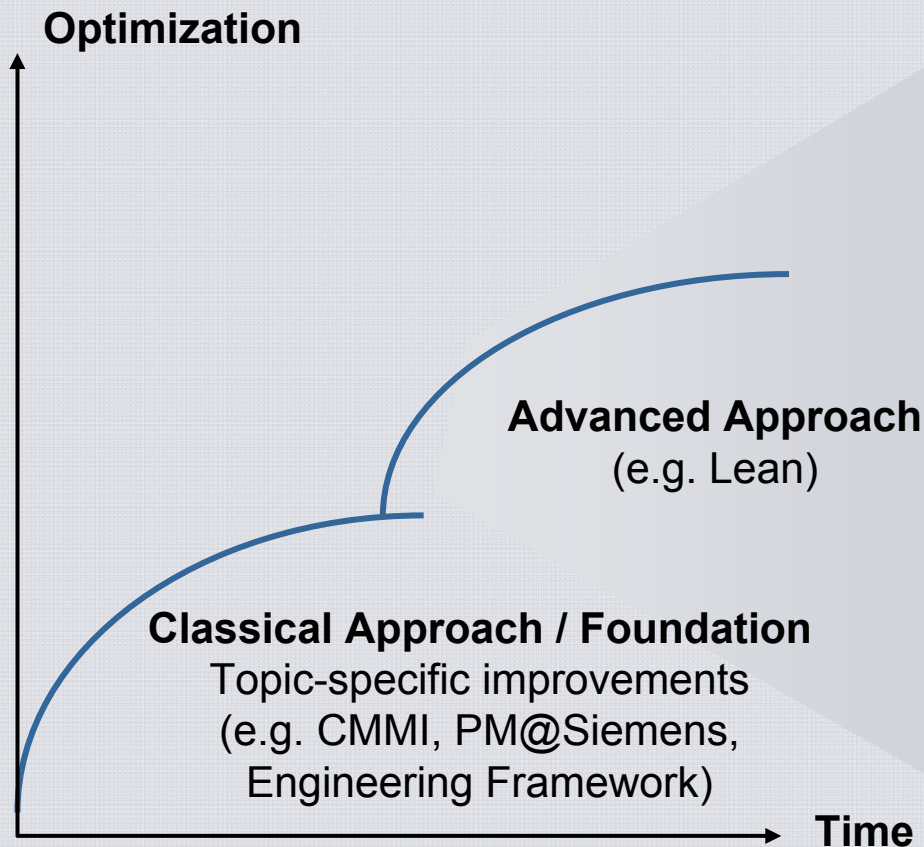
From R&D via Engineering to Manufacturing – the Cone of Uncertainty



Examples for relevant differences in Development & Engineering vs. Manufacturing & Production

- ❑ Higher variability, less repetitive tasks, more uncertainties and need for feedback loops
- ❑ Information and increasingly precise decisions not physical objects flow through the system
- ❑ “Stations” in the system are people, not so easy to change

The Lean Approach versus “Classical” Improvements in Development and Engineering



Holistic View

- A modern approach needs a holistic view on the value chain throughout the **entire lifecycle** and **across organizational structures** as well as the integration of **partners and** built on top of a **solid foundation**.
- A cross-functional approach generates **new perspectives for optimization**.
- **Strong connection** of principles and methods **to the employees**.
- Sustainability needs a sustainable **culture change**.

Action Areas for Lean in Development and Engineering



Categories	Action Areas					
Guiding Principles & Strategy	Challenging Vision & Guiding Principles	Lean Implementation Strategy				
Product Life Cycle Management	Portfolio & Innovation Management	Front Loading	Synchronous Execution	Reliable Processes	Platforming / Modularization	Early Supplier Integration
Supply Chain Management	Collaboration with Supply Chain	Design for Supply Chain	Launch Management			
Customer Relationship Management	Requirements Engineering	Chief Engineer System				
Targeting & Performance Management	Visual Controls	Lean Policy Deployment				
People & Continuous Improvement	Continuous Improvement of Value Add	Encouraging / Supportive Leadership	Incentive for Employee Participation	Corporate Responsibility and Value System		
	Continuous Learning and Build-Up of Expertise	Active Change Management & Communication	Administration Alignment			

Structure based on SPS
(Siemens Production System)

Selection of currently used Methods and Tools for a Transition to Lean

Target Analysis & Definition
(Pre Screening / Quick Scan)

Information Stream Analysis /
Design

Lifecycle Cost
(LCC)

Customer Value designed to
Core Limits (ABDC™)

Requirements Engineering

Change Management
Lean Thinking

Design Space
Exploration (DSE)

Process Structure Matrix
(DSM)

Visualization

Platforming
MPSD®

Process FMEA &
Risk Management SIRA®

KPI System

Integrated Concurrent
Engineering (ICE)

Agile &
Scrum

Standardization

Design for Assembly

Integration Flow Management
(IFM)

Global Networks

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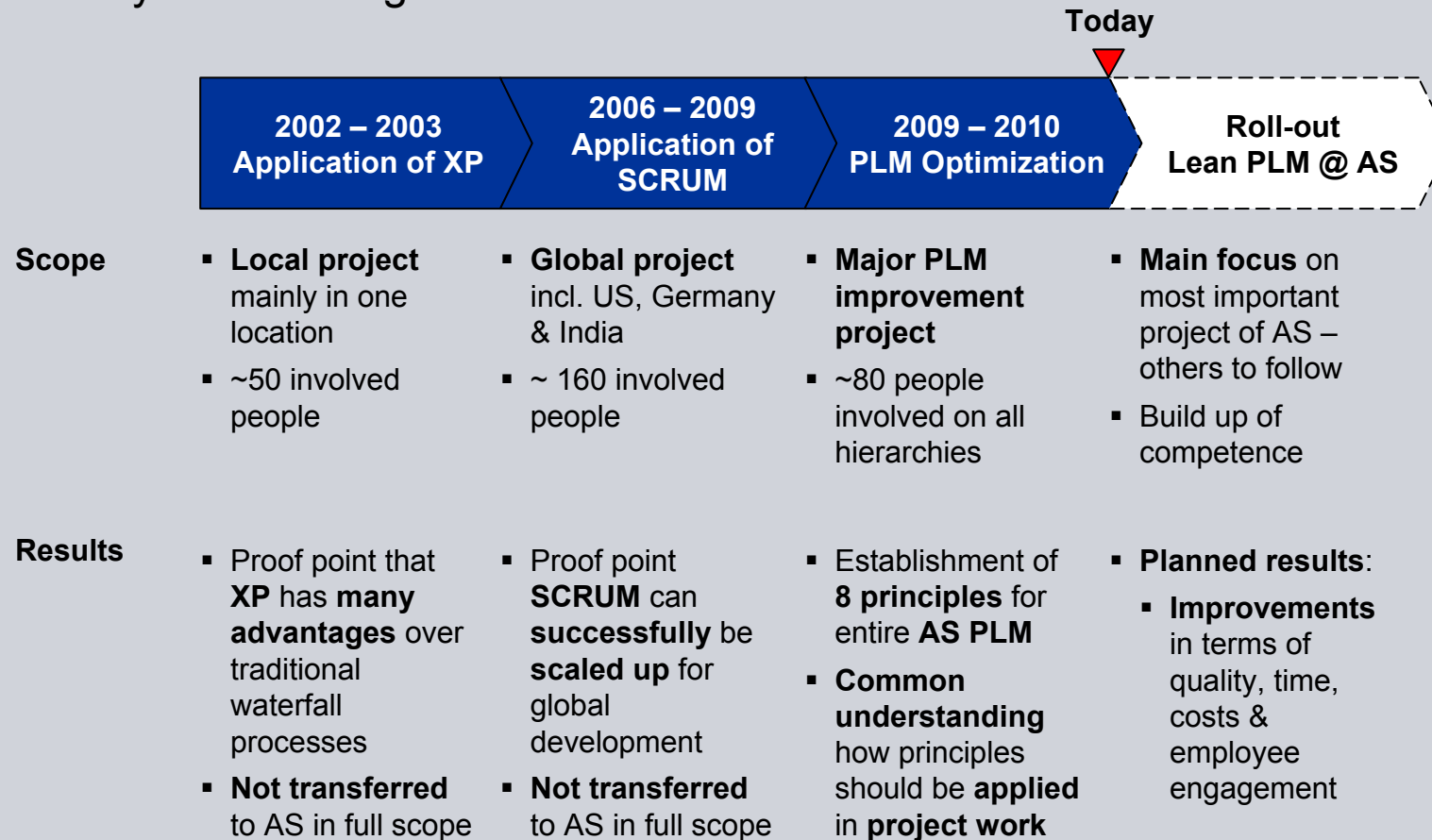
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Lean & agile has a long history within AS – yet so far we didn't have a full scale roll-out!

History of lean & agile within I IA AS



Project PLM Optimization was initiated with strong focus on value increase and guiding principles!

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Value increase & principles

- Moving forward** on major projects
- Empowered employees**
 - o concentrated on essential tasks
- Clear principles** guiding our PLM

Our target: Customer focus

Planning phase

- Shorten the planning phase
- Identify highest achievable customer value

Realization phase

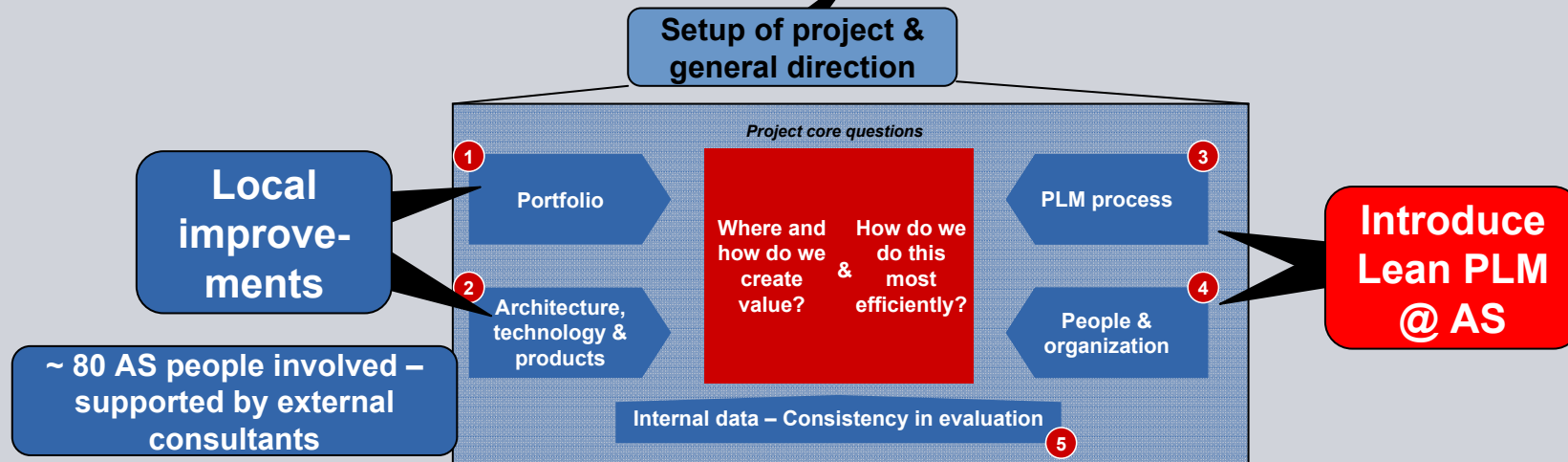
- Realize according to customer value
- Create customer value with short lead times
- Be able to ship SW products anytime

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Major project was initiated to identify improvement potential for our business unit!



Activity	2009		2010									
	Nov.	Dez.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept.	
Analysis of root causes & definition of measures												
▪ Analysis		[Bar]										
▪ Definition of measures			[Bar]									
Implementation of measures												
▪ Measures with initial impact in FY 09/10			[Bar]									
▪ Measures with impact after FY 09/10								[Bar]				
Important milestones												
Regular SteCo (Steering Committee) Meetings												
	▲	▲		▲			▲		▲			▲
	Kick-off	1 st SteCo		2 nd SteCo			3 rd SteCo		4 th SteCo			5 th SteCo
	11/11/09	17/12/10		22/02/10			03/05/10		08/07/10			



Source: Team I IA AS – PLM optimization

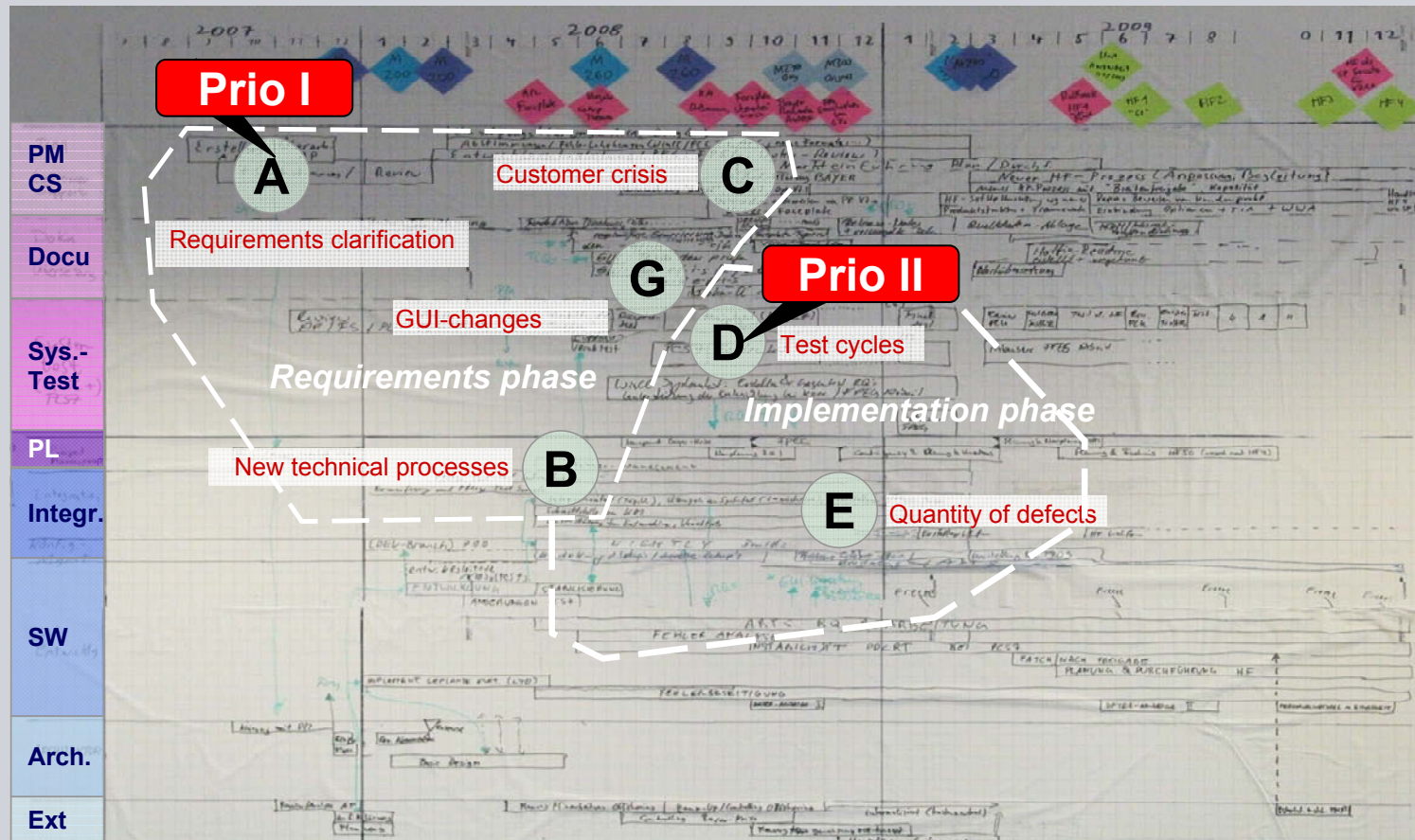
We developed our 8 principles for Lean PLM @ AS and discussed them in many workshops!

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8 principles for Lean PLM @ AS

- 1 Focus on value
 - Know your customer and **create customer value; eliminate waste**
- 2 Build quality in
 - **Build quality** in, **not test it** later; -→flow
 - When a defect is found, **stop the line, find the cause, and fix it!**
- 3 Create knowledge
 - Encourage **systematic learning**
- 4 Decide at right time
 - Irreversible decisions at the **last possible moment-→pull**
 - **Ensure** systematically that **decisions do happen** at that moment
- 5 Deliver fast
 - **Organize work & empower people** to have fast & flexible processes
 - **Continuous flow** → limit work demand to capacity (pull)
- 6 Respect people
 - Find an entrepreneurial **leader** and an expert **technical workforce**
 - **Managers** respect the people & **provide support**
- 7 Optimize the whole
 - **Optimize the whole** “concept to cash” chain, **not local silos**
- 8 Keep on improving
 - Improvements in a **continuous cycle** of plan, do, check, act

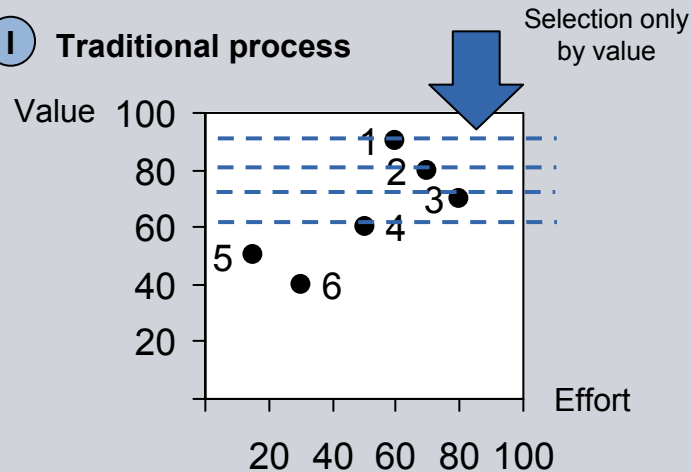
We used value stream mapping to identify problems:
 1) Focus on value and 2) build quality in



Requirements Process – Potential for a Value-driven Requirements Prioritization

I Focus on value

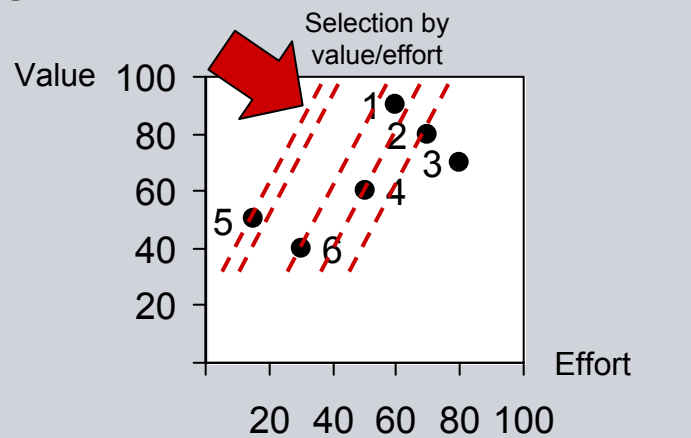
I Traditional process



Results

Feature	Value	Effort
1	90	60
2	80	70
3	70	80
4	60	50
Σ	300	260

II Value driven process



Results

Feature	Value	Effort
5	50	15
1	90	60
6	40	30
4	60	50
2	80	70
Σ	320	225

Comparison

This example:

Even more value generated with less effort

- 260 Effort (Traditional)
- 225 Effort (Value driven)

Real life example:

Method used on real life examples -> 5% effort can be saved

~ 5% more value feasible

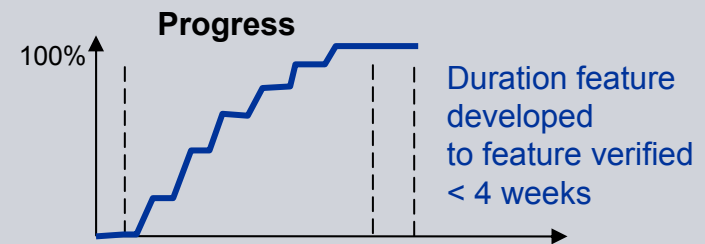
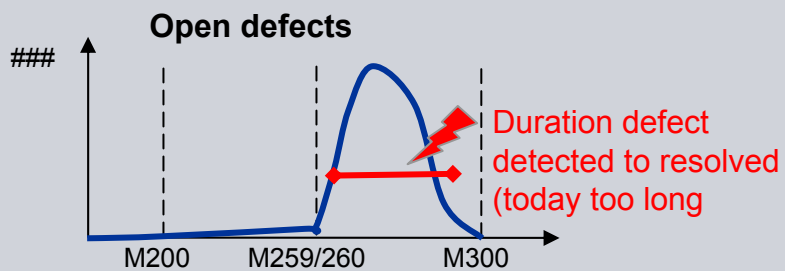
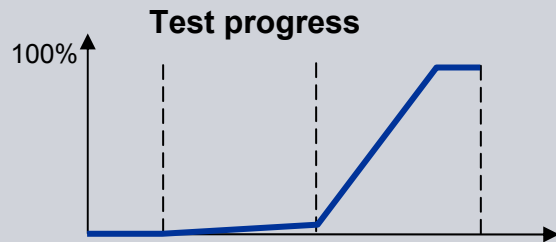
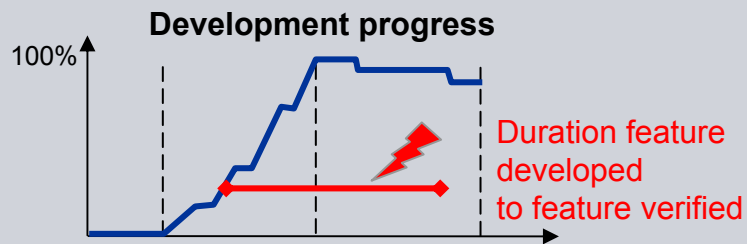
Focus on value
Decide at right time

Realization Process – Current versus Future State

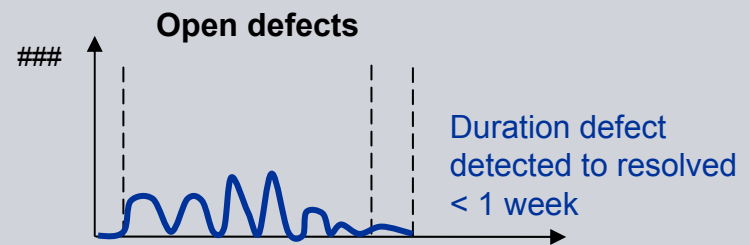
Feature-Driven Testing



II Build quality in



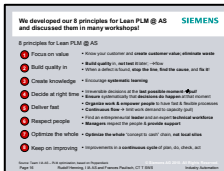
Build quality in



We have 4 key learnings as advice for you!

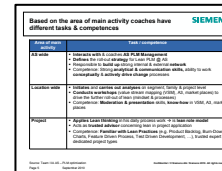
Our key learnings

Establish a common language & value system



- Clear guiding **principles & wording** was key to define future vision
- Recommendation: **Use known frameworks from literature & make your own**

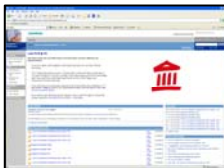
Create a dedicated, cross-functional rollout team



- **Use interdisciplinary teams** (product, project & people management)
- **Assign different levels** of main activity (overall, location, project)

4 Key learnings

Provide communication platforms – real & virtual



- **Use different means of communication** – ideally interactive ones
- **Ask for feedback & adapt** as needed

Be fast & encourage learning



- **Live values** in the lean roll-out
 - Be fast
 - Ask for feedback
 - Adapt

Discussion