

SMART FACTORY

Pressekonferenz Hannover Messe 2020 – Zürich

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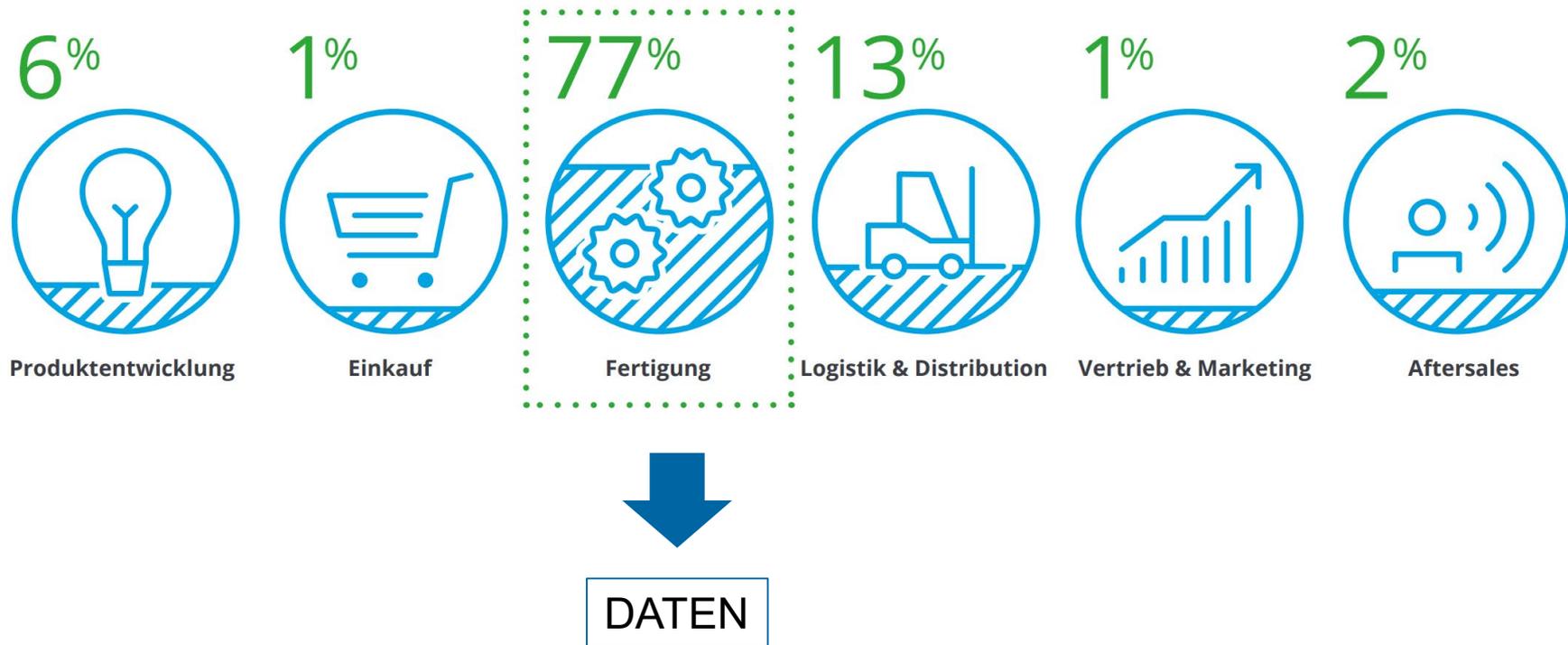


HSR

HOCHSCHULE FÜR TECHNIK
RAPPERSWIL

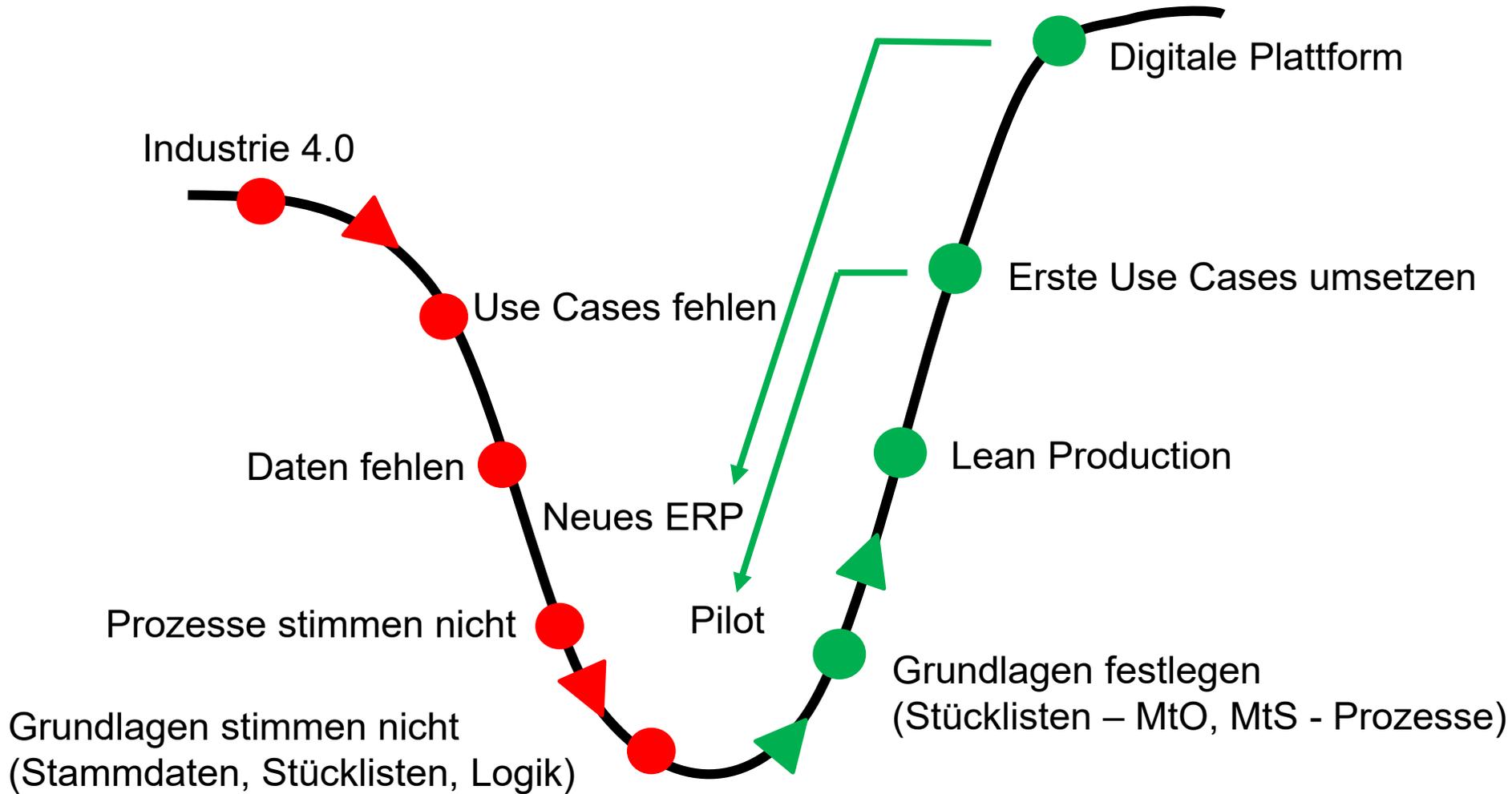
FHO Fachhochschule Ostschweiz

Anwendungsbereich Industrie 4.0 heute

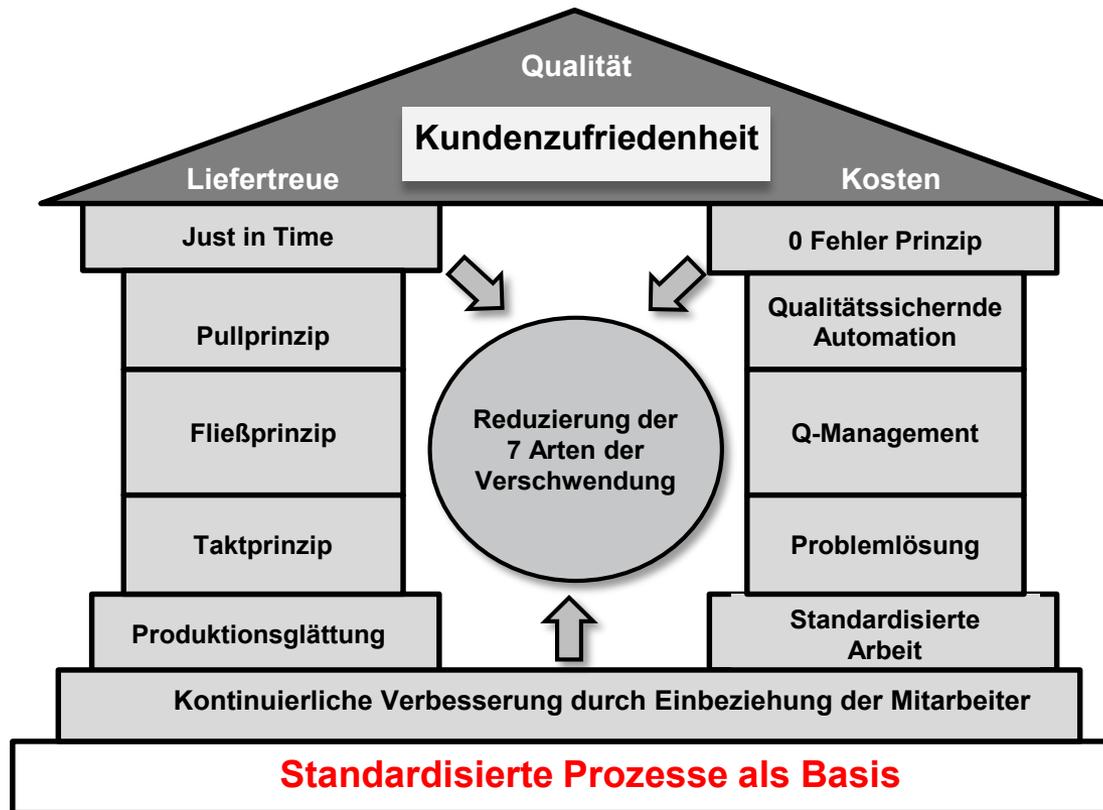


Deloitte, 2016

Erfahrung aus > 50 Projekten

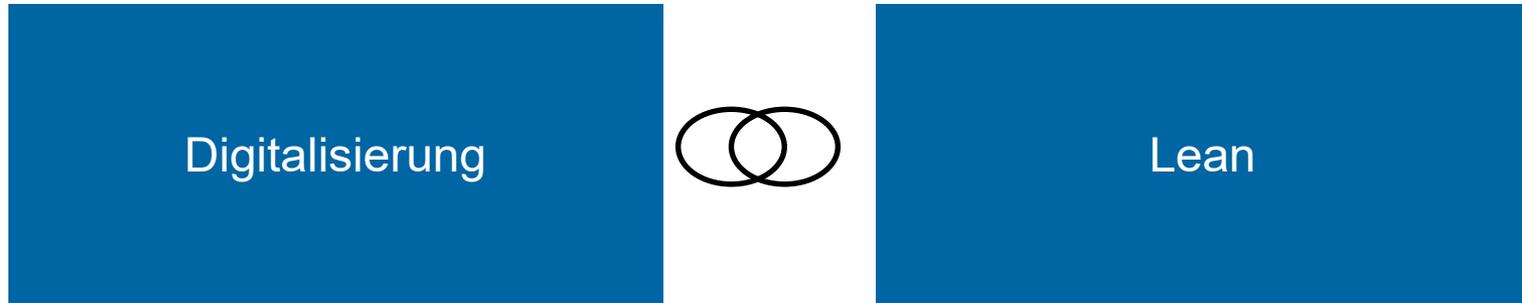


Was ist Lean? Konzept seit 1960 Alt, aber so aktuell wie nie



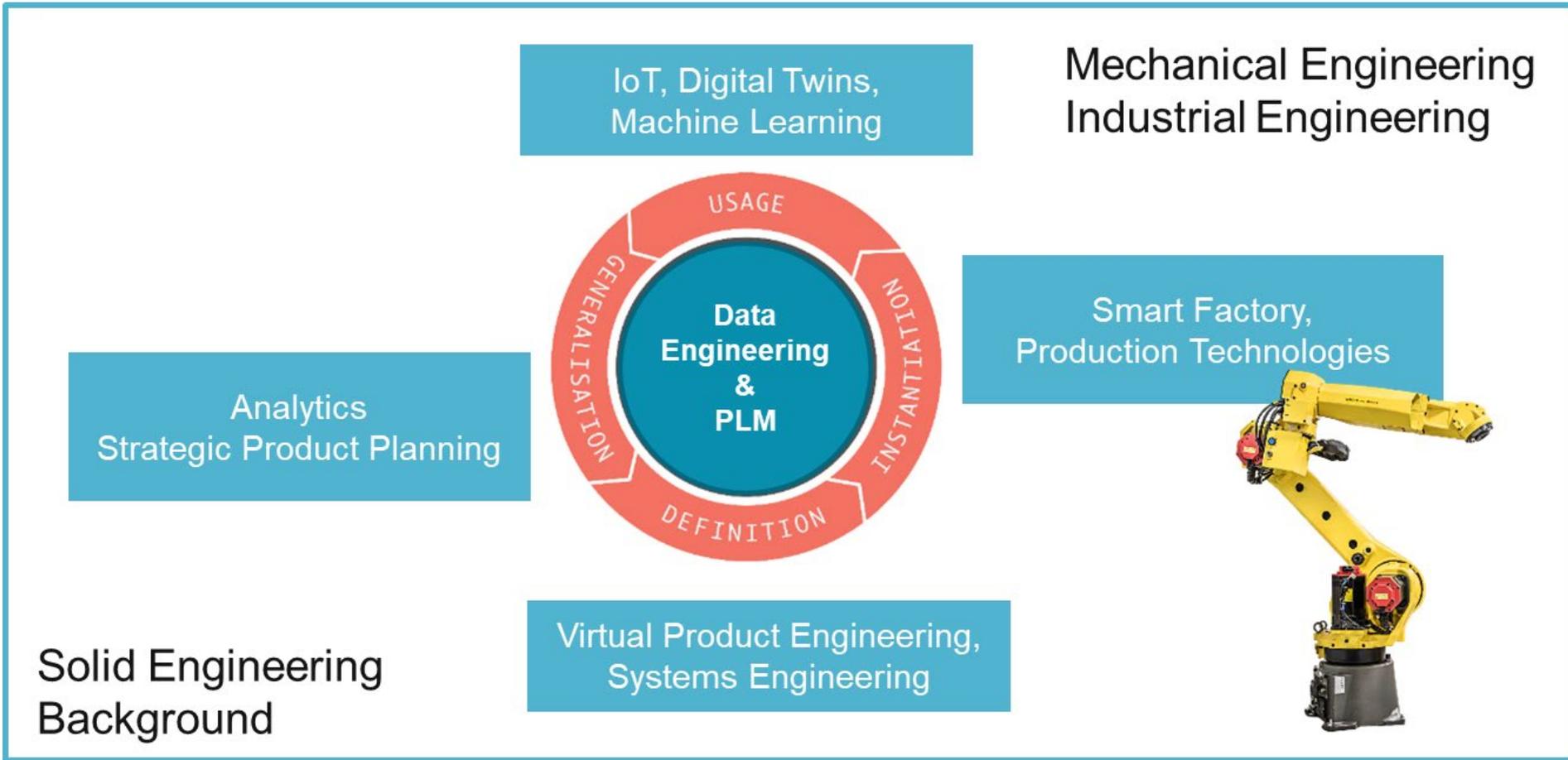
Quelle: In Anlehnung an Taiichi Ohno: Das Toyota-Produktionssystem

Digitalisierung und Lean passen zusammen und bedingen sogar einander



- Digitalisierung & Lean passen zusammen
 - Basis sind stabile Prozesse
- Kunde steht im Zentrum bei Lean... dies vergisst man gerne bei grossen Digitalisierungsprojekten (interner Fokus)
- Mit Daten bessere Entscheidung bei Lean Veränderungen

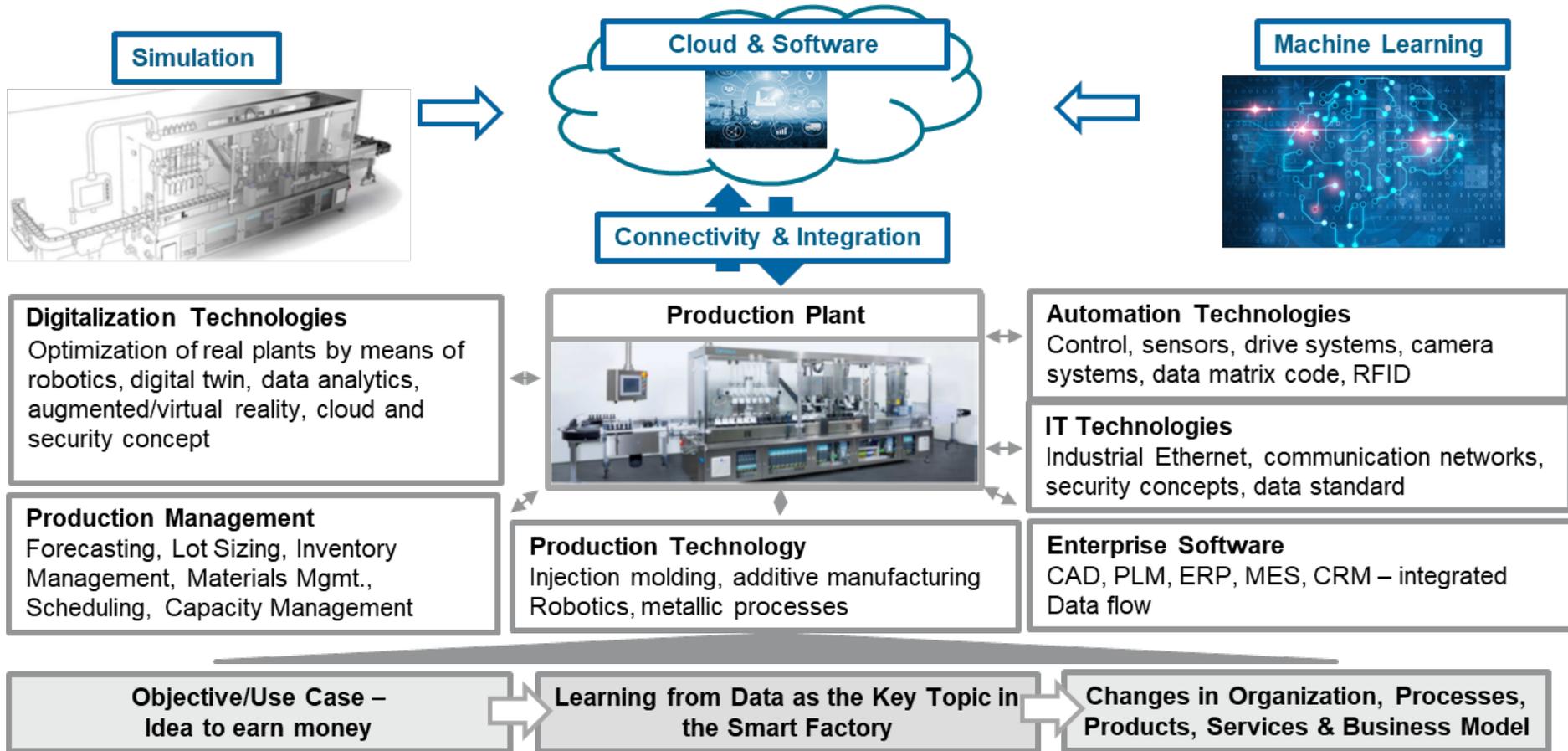
Datenfluss in der Fabrik Zentral



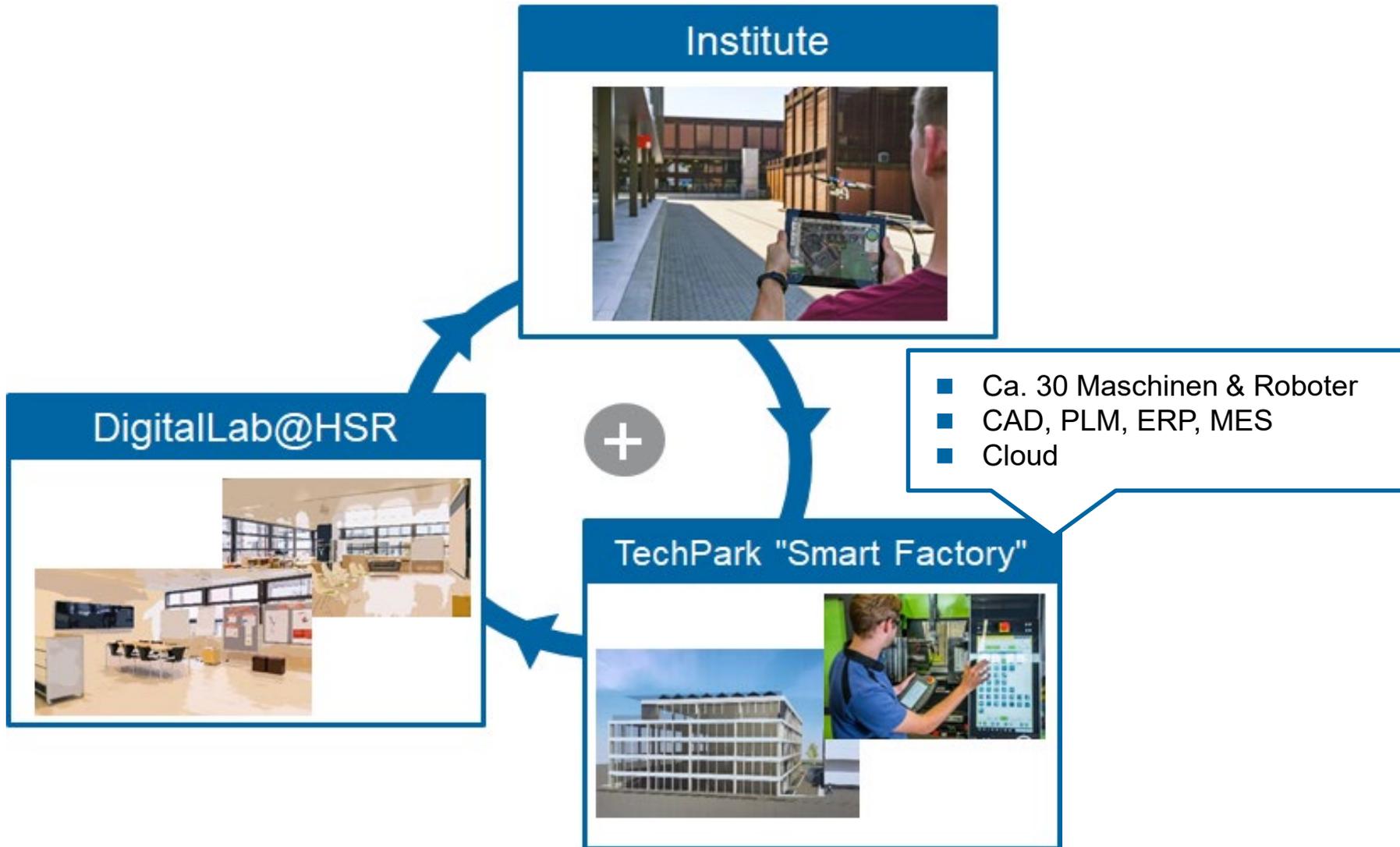


smart factory [smɑ:t 'fæk.tə:i] Future state of a fully connected manufacturing system, mainly operating without human force by generating, transferring, receiving and processing necessary data to conduct all required tasks for producing all kinds of goods.

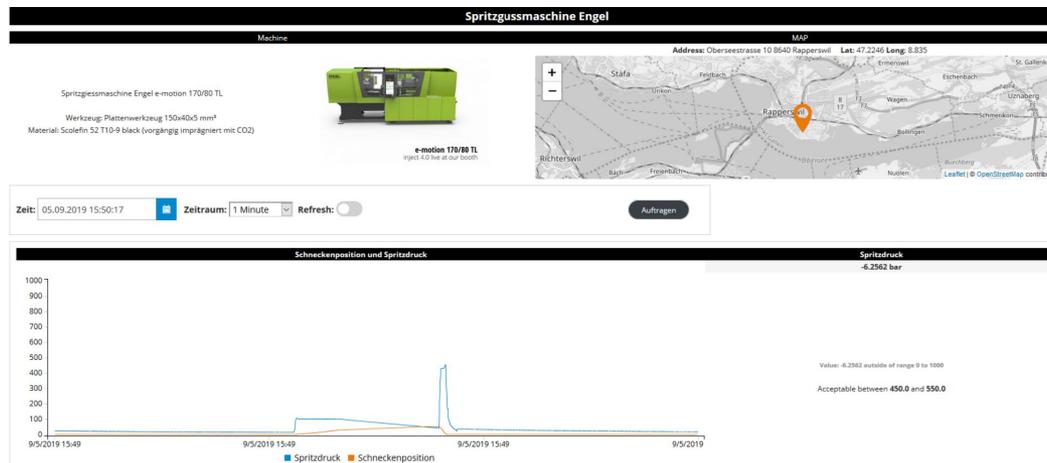
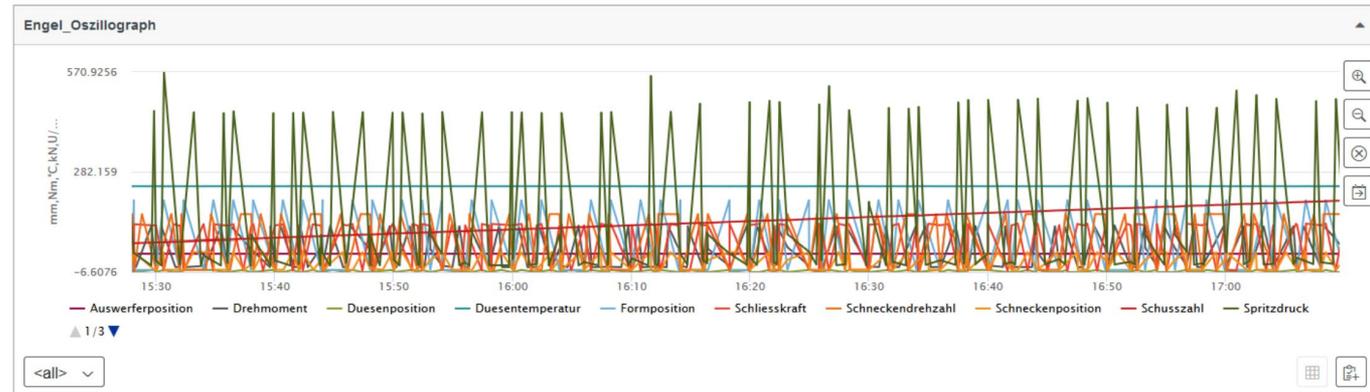
Bau einer Smarten Fabrik braucht viele Kompetenzen



Wir Implementieren auf 5000m2 eine Smarte Fabrik an der HSR



Grosser Challenge: Daten aus der Maschine zu speichern

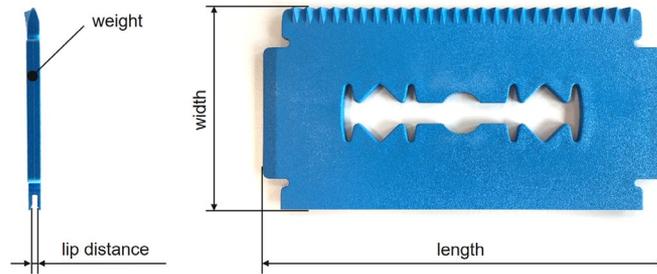


- Umgehen mit Datenmengen
- Hohe Sample Raten oft nötig um zu lernen aus Daten
- Speicherung – wann – wo – wieviel?

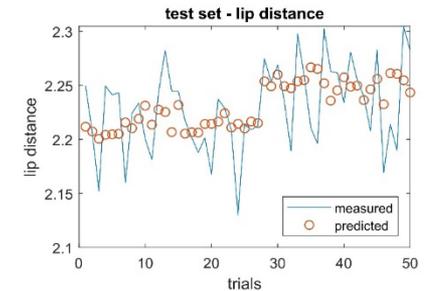
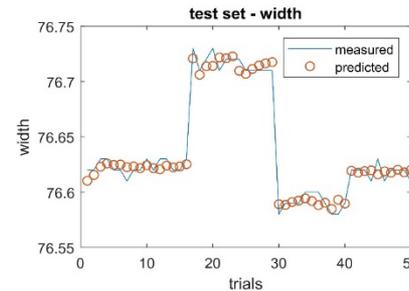
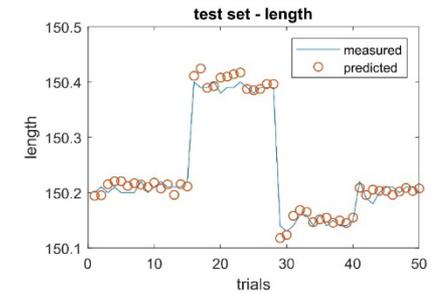
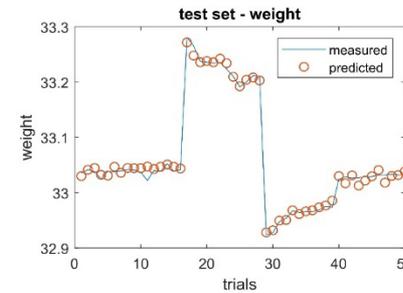
Use Case 1: "Quality prediction based on machine sensor data"

Results:

- Very good prediction of quality data of NEW parts, only based on internal machine data



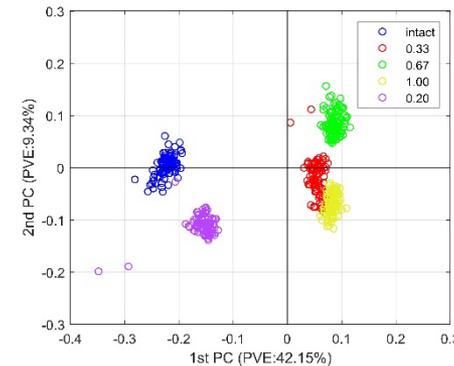
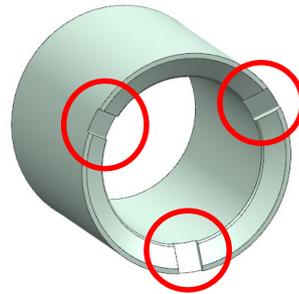
	STD-Error σ	$CV = \frac{\sigma}{\mu}$ in %
weight	0.009 g	0.03%
length	0.017 mm	0.02%
width	0.014 mm	0.02%
lip distance	0.032 mm	1.38%



Use Case 2: "Preventive & Predictive maintenance concept for key component"

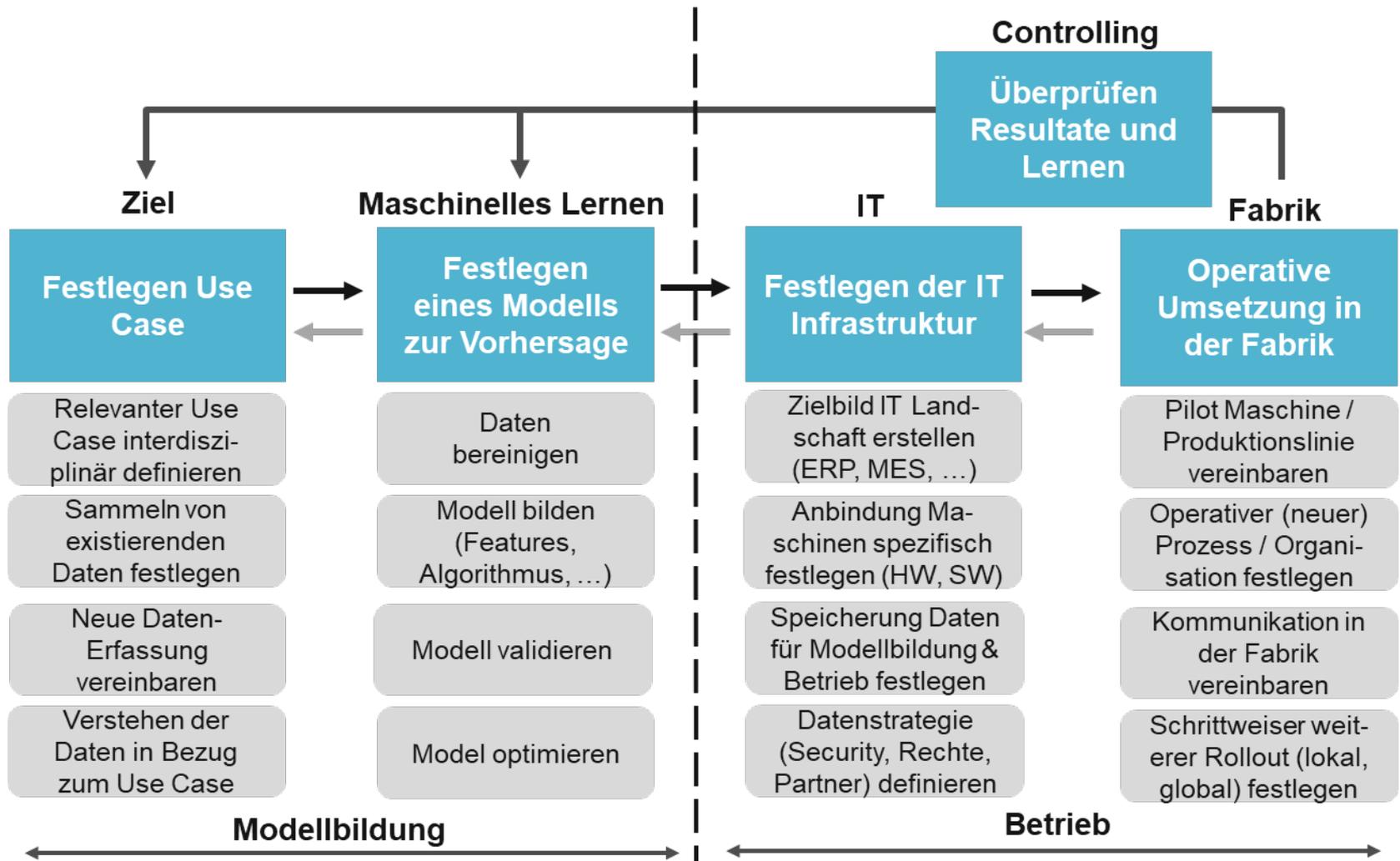
Results:

- In order to simulate the wear of non-return valve, several non-return valves were machined, meaning a quantifiable damage was artificially introduced.



- The classification of the various damages with a principle component analysis is shown in the figure on the right. The first principle component score seems to be a good indicator for the height or the progress of the damage on the non-return valve, probably the damage can even be reliably estimated.

Vorgehenskonzept für Lernen aus Daten



Quelle: Digitalisierung in der Fabrik umsetzen, KunststoffXtra, Roman Hänggi et al 12/2019

- **Basis muss stimmen – Daten & Prozesse & Lean**
- **Use Case First**
- **Schrittweises Vorgehen – erste Resultate realisieren**
- **Es braucht Zeit und hohe Frustrationstoleranz**
- **IT Struktur 2nd – noch nicht perfekt vom ersten Tag**