Digital Twin & Augmented Reality

Hannover, 26th April 2017

Usage of digital product models for product development, production and service

Marco Liesegang, EY Advisory Service
IoT / I4.0 Team Lead GSA

The better the question. The better the answer.
The better the world works.

Building a better working world

EY Company Overview

A global services organization of 230,000 professionals

- We are a global company consisting business consultants, tax experts, auditors, mergers and acquisitions advisors and lawyers.
- Our services and expertise help companies succeed in their business thus supporting economies across the globe.
- Our main asset is our people. We build highest-performing teams for each customer project who focus on delivering highest-quality results.

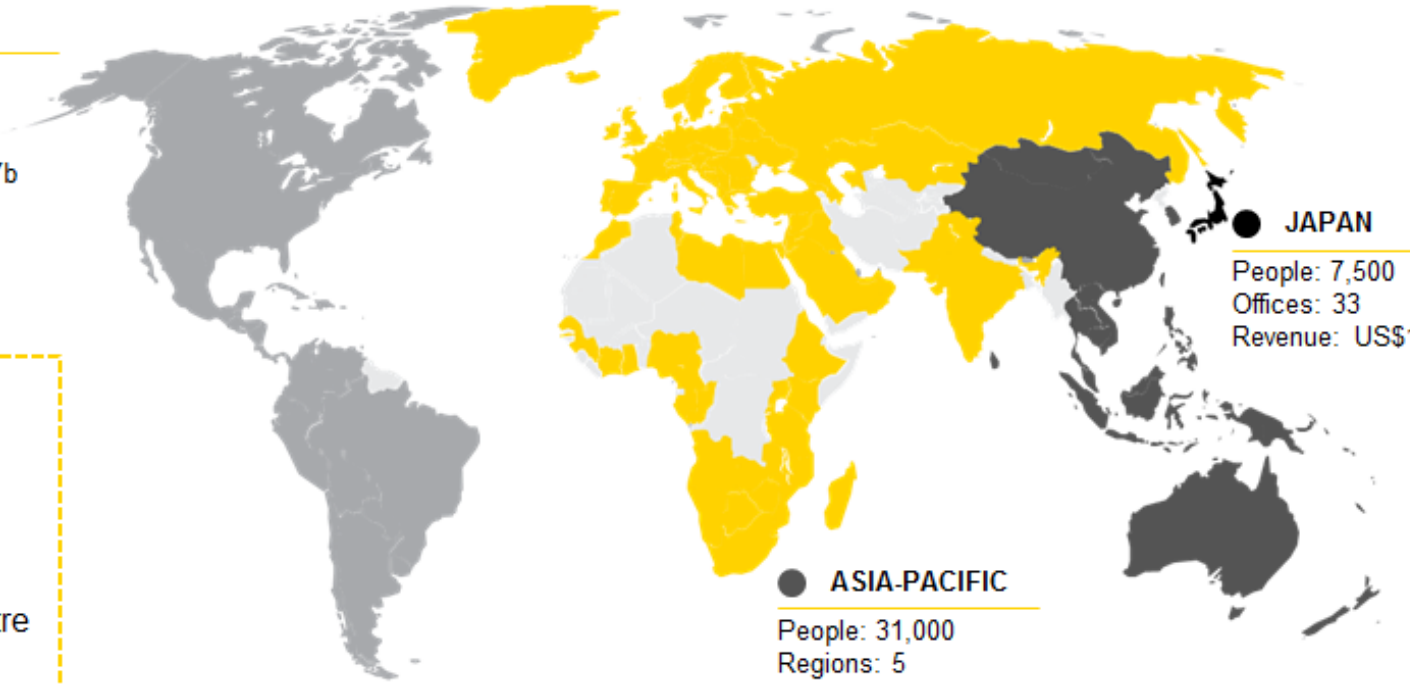
We are **230,000** people based in **700+** offices in over **150** countries. Our global turnover is US$28.7bn

EMEIA

People: 102,000
Regions: 12
Countries: 99
Revenue: US$11.8b

AMERICAS

People: 56,000
Regions: 10
Countries: 30
Revenue: US$12.7b



JAPAN

People: 7,500
Offices: 33
Revenue: US$1b

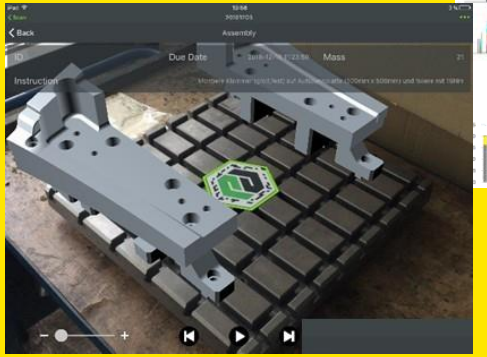
ASIA-PACIFIC

People: 31,000
Regions: 5
Countries: 22
Revenue: US$3.1b

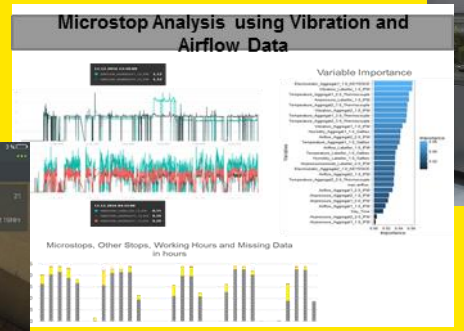
- We have a Global Advisory practice of 50,000 professionals with sector specific skills in Strategy, Supply Chain, Sales & Marketing, Finance, IT, Risk & Cyber Security
- Within Advisory we have a dedicated IoT Centre of Excellence and global network of 200+ IOT experts

I guide you on your digital journey

Industrial Augmented Reality

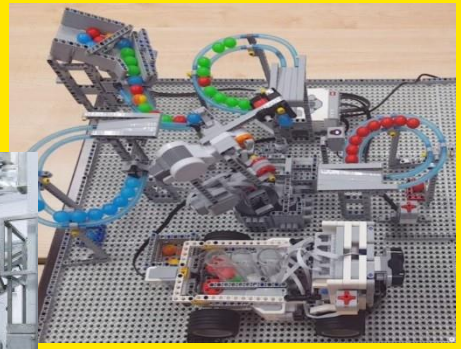


IoT platforms, Data Analytics & Process Optimization



M2M communication & retro-fitting

IoT lab & workshops



Marco Liesegang
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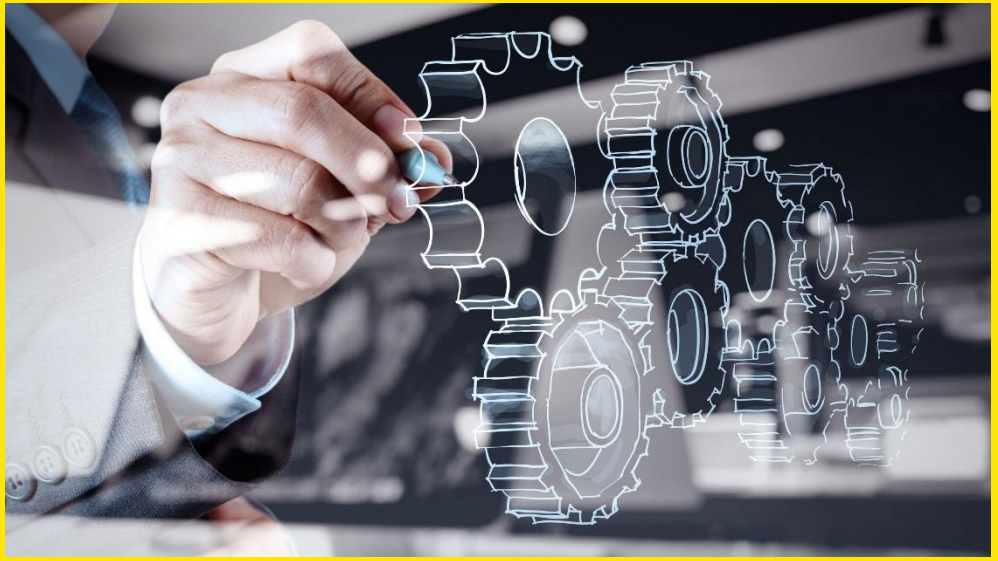
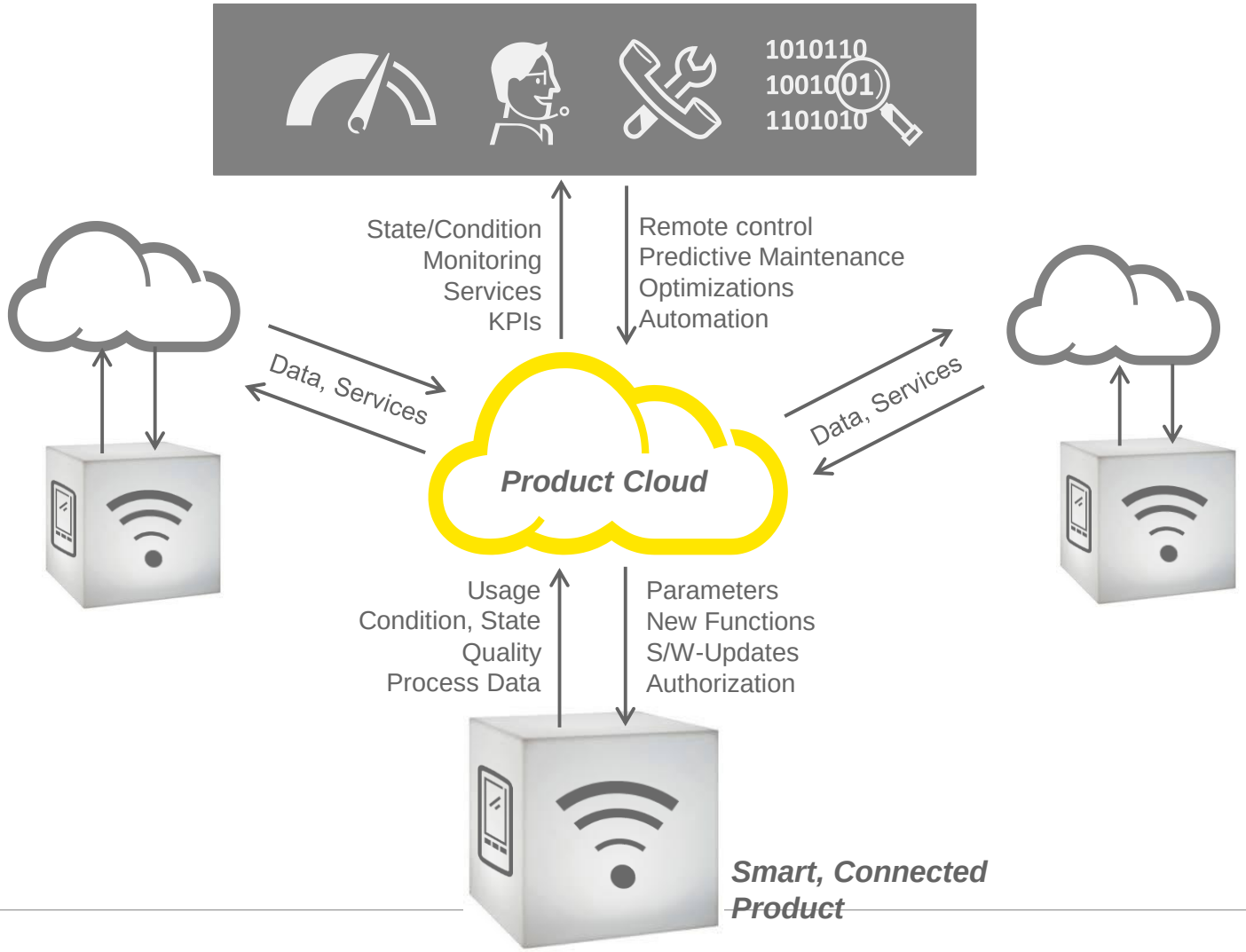
Industrie 4.0 / IoT Lead GSA
EY Advisory Service

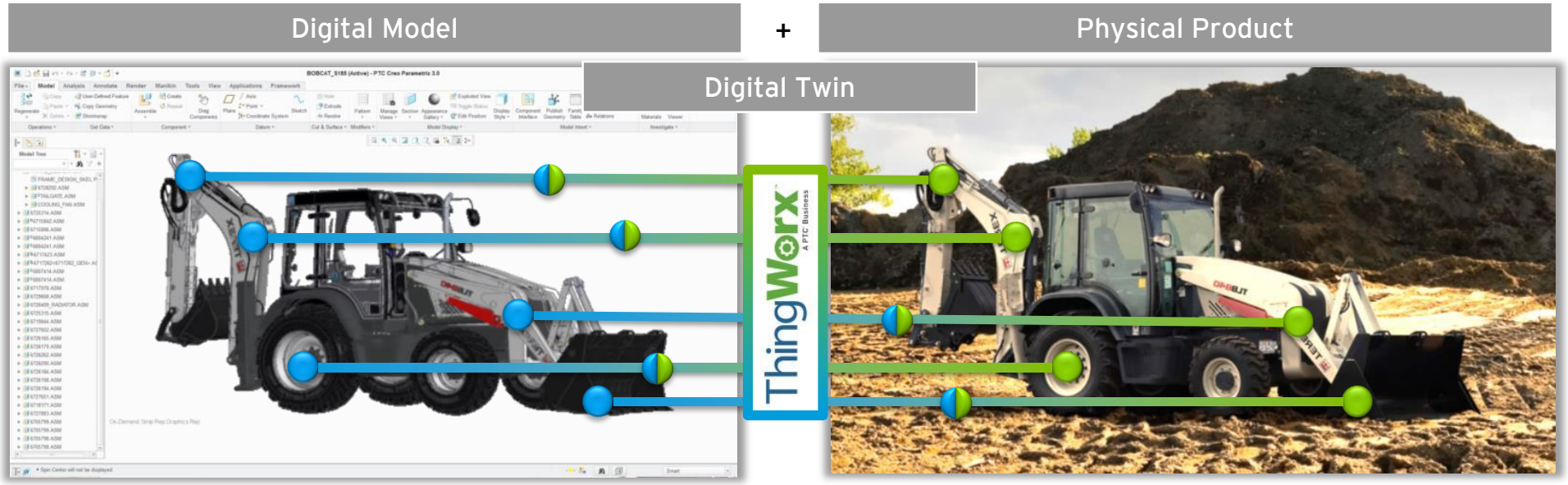
Digital Product



Smart Connected Products + Product Clouds are the foundation of Digital Product Twins

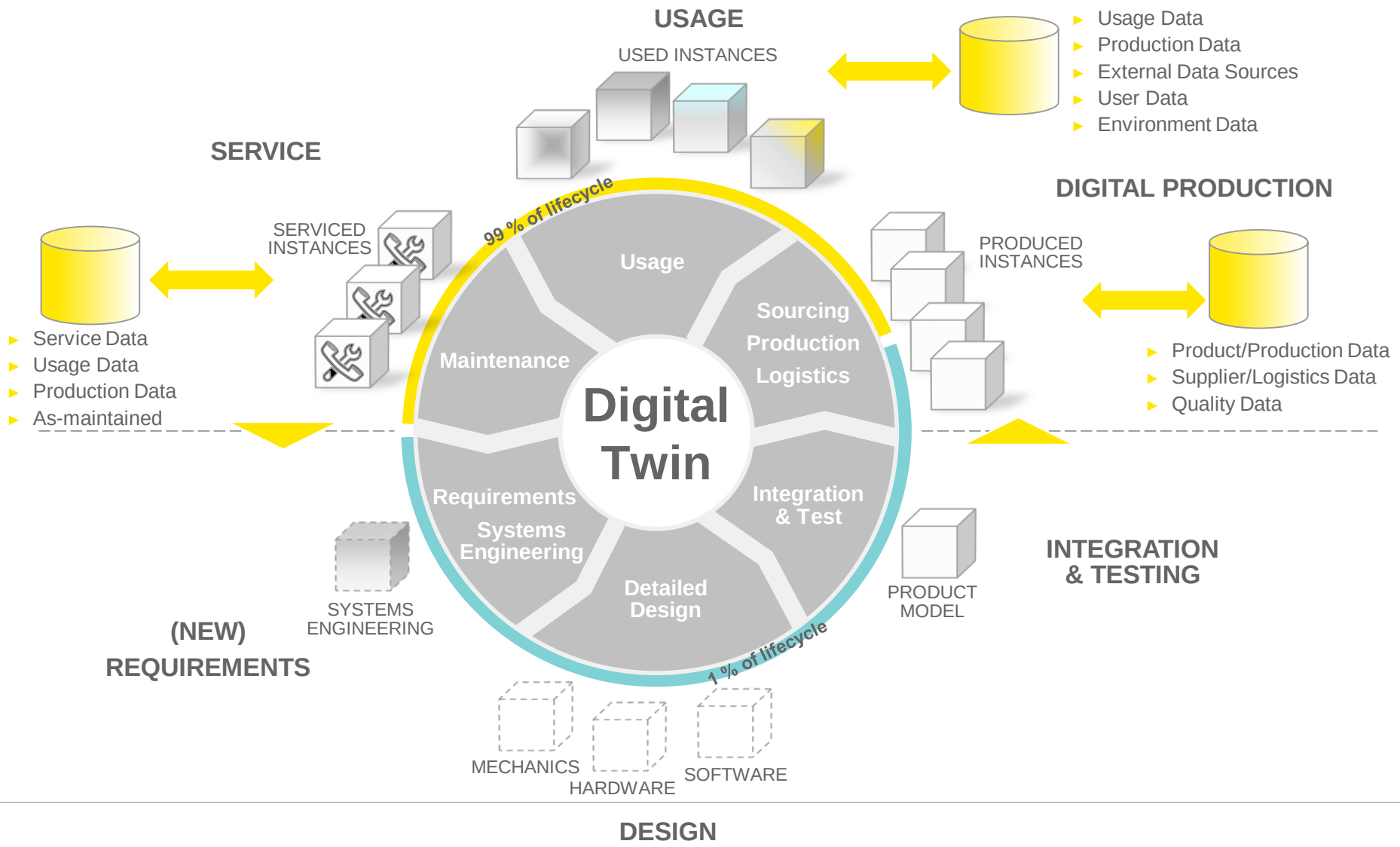


Digital Twin
A connection between the Physical and the Digital World

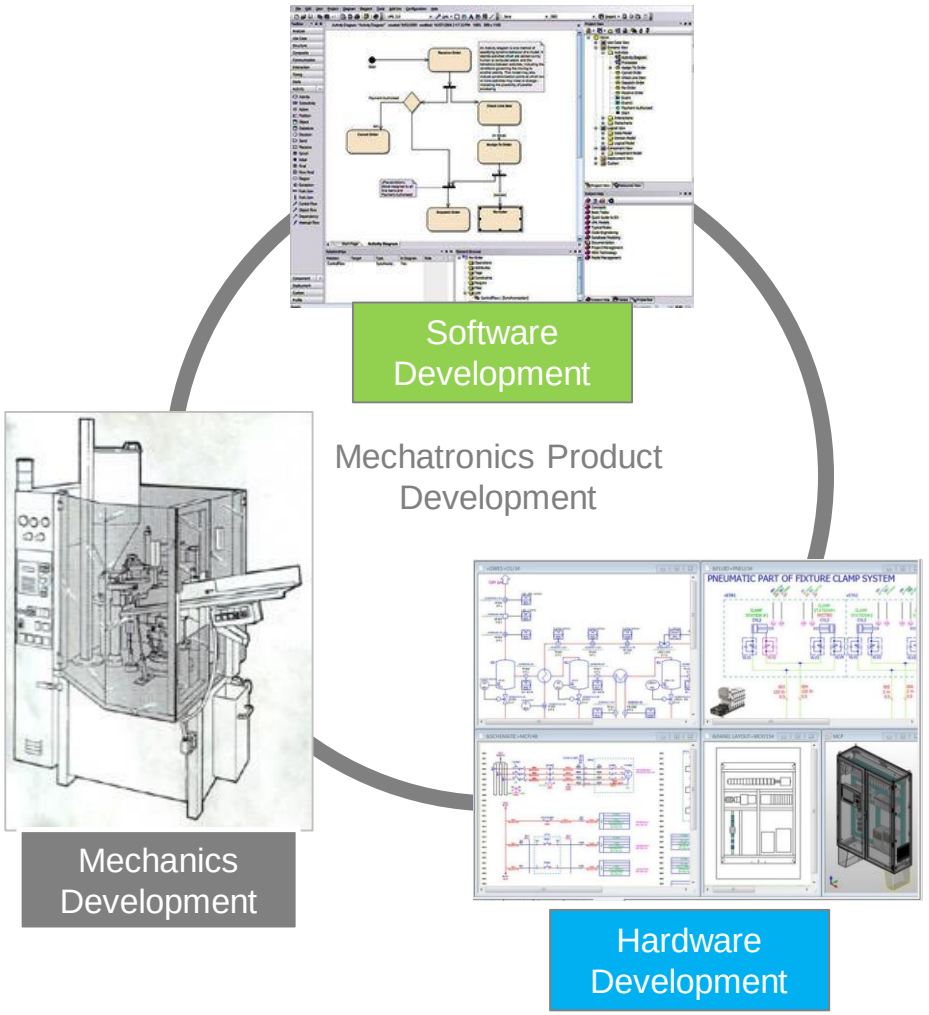


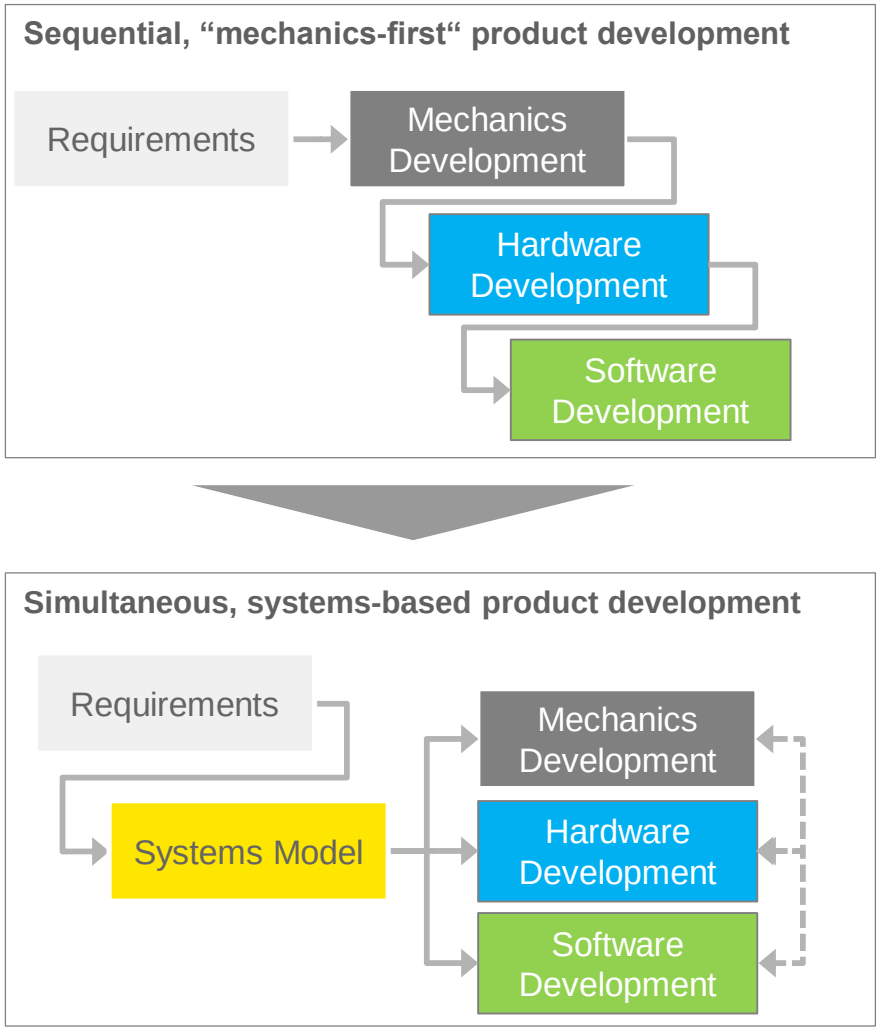
Source: PTC

Digital Product Twin gives insights along the whole product lifecycle

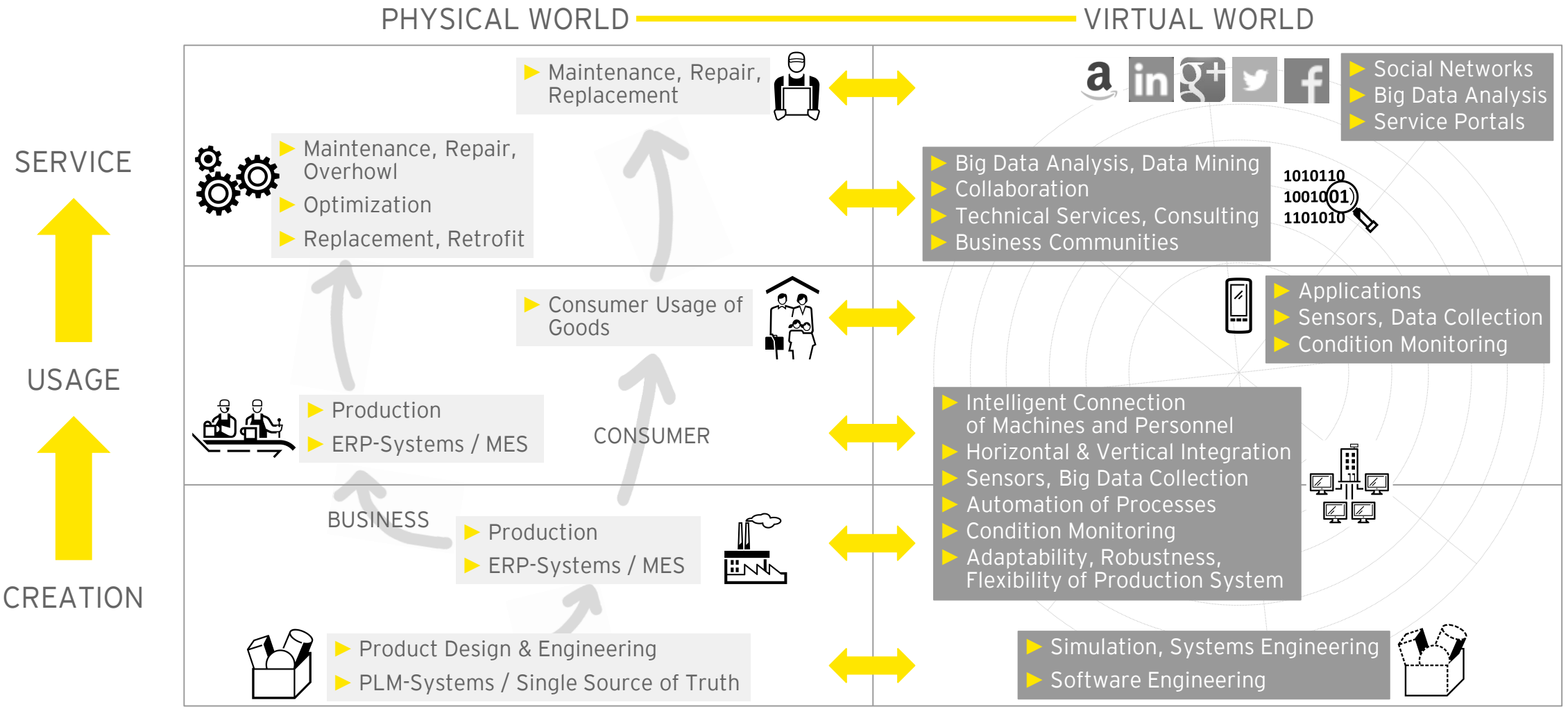


Adjusted Systems-engineering approach for a digital world

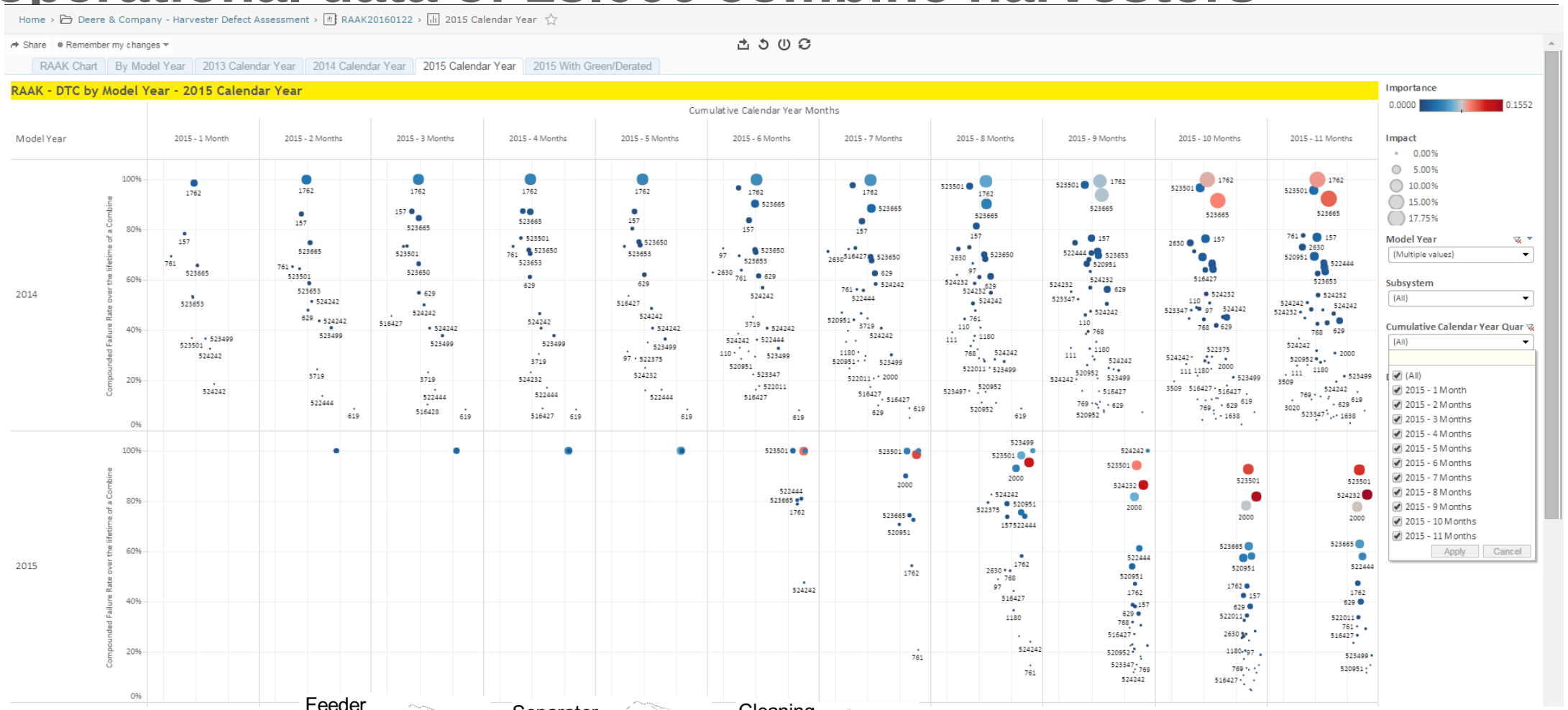


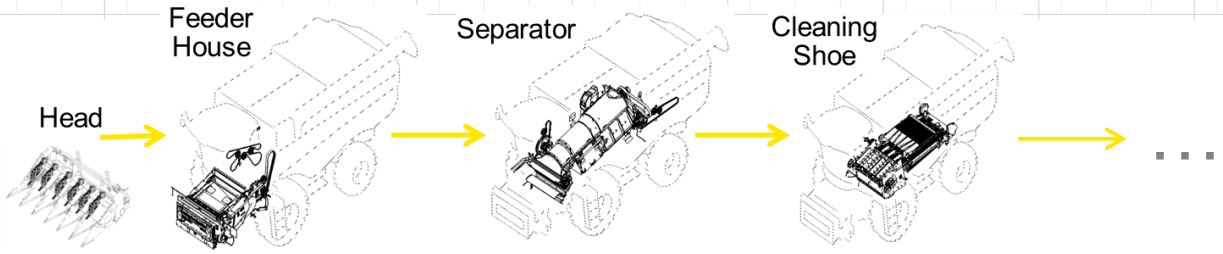


Creation, Usage, and Service of Digital Twins in the Physical and in the Virtual World

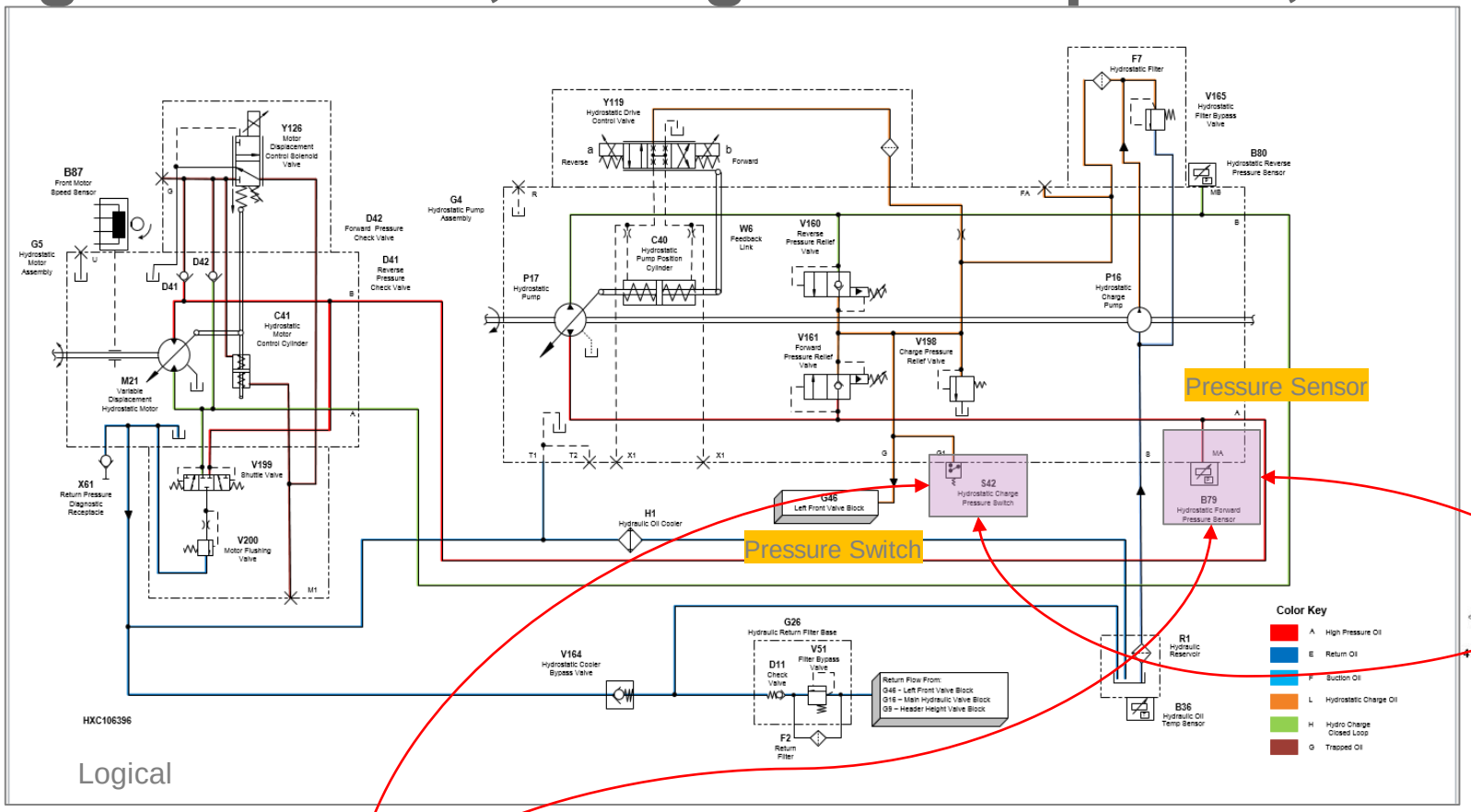


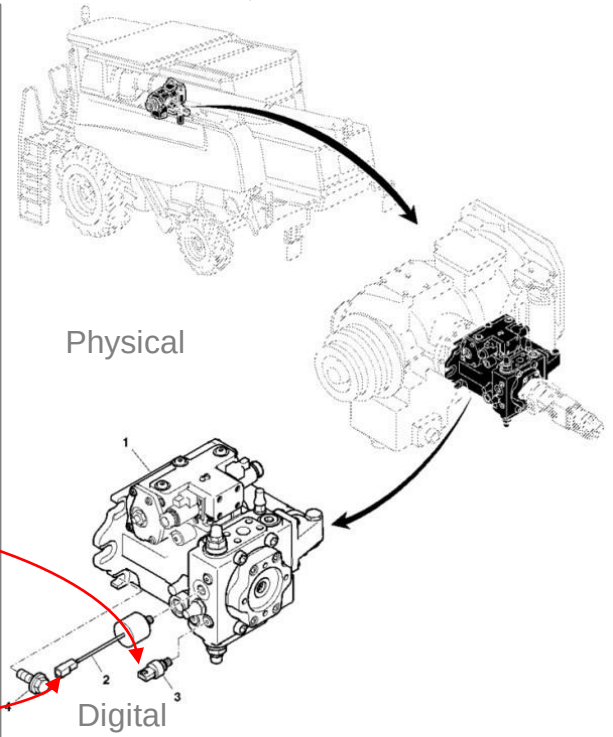
Example: Insights into usage and failure patterns based on operational data of 18.000 combine harvesters



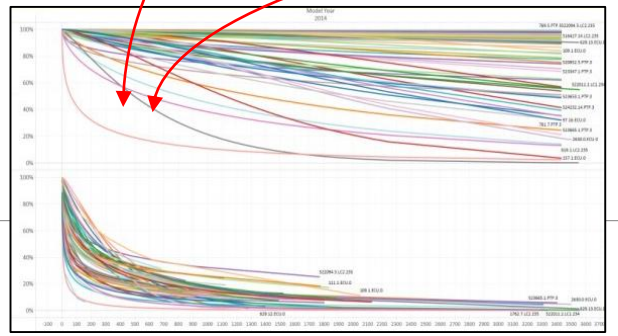


Link insights into usage patterns and failure modes with design decisions, configuration options, test cases, …





Insights



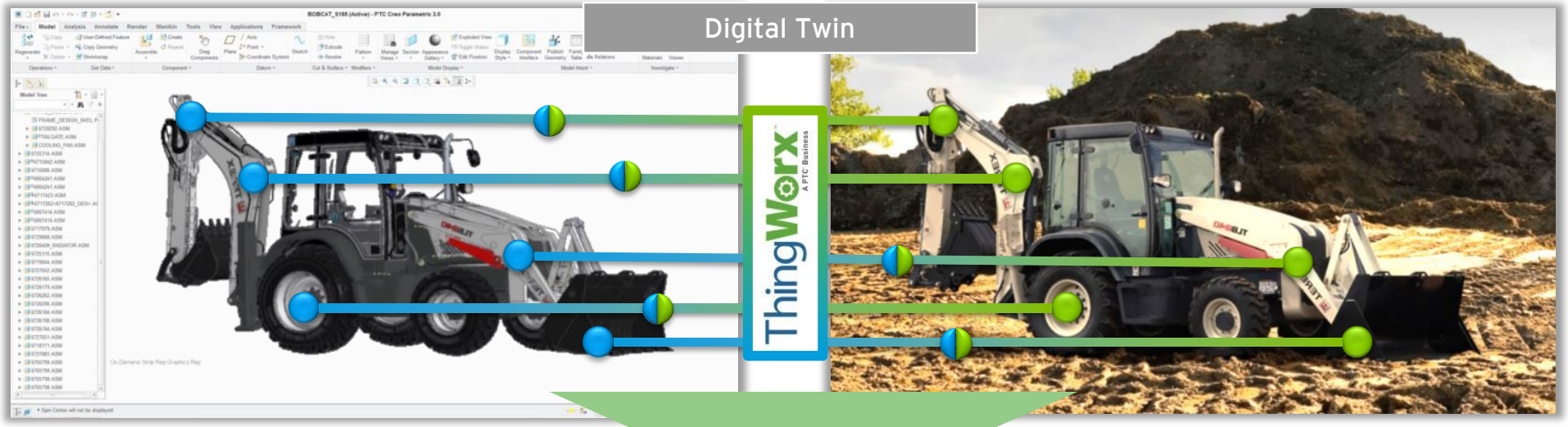
Failure Modes

Augmented Reality

Digital Twin & Augmented Reality

3D Model + Physical Product

Digital Twin



Augmented Reality

- Work instructions in-context (mobile, wearable)
- Real-time state of equipment and quality metrics
- Operational KPIs in-context
- Maintenance/failure codes in-context
- Overview of large number of equipments / products in real-time

Source: PTC

Augmented Reality enhances images of physical objects by additional information to enable new operational processes

Live direct or indirect view of a real-world environment which is then ‘augmented’ by computer generated sensory input

Areas of industrial application include:

- Overlaying live feeds with digital information i.e. highlighting parts to be changed
- Additional viewers through wearer’s eyes i.e. remote service
- Leveraging virtual reality technology for simulations
- Highlighting localization and positioning of objects

Augmented Reality offers context based digital information right were you need it.

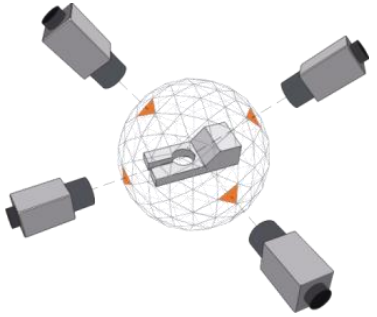
Augmented Reality Technology Classes

1. Augmenting Live Feed

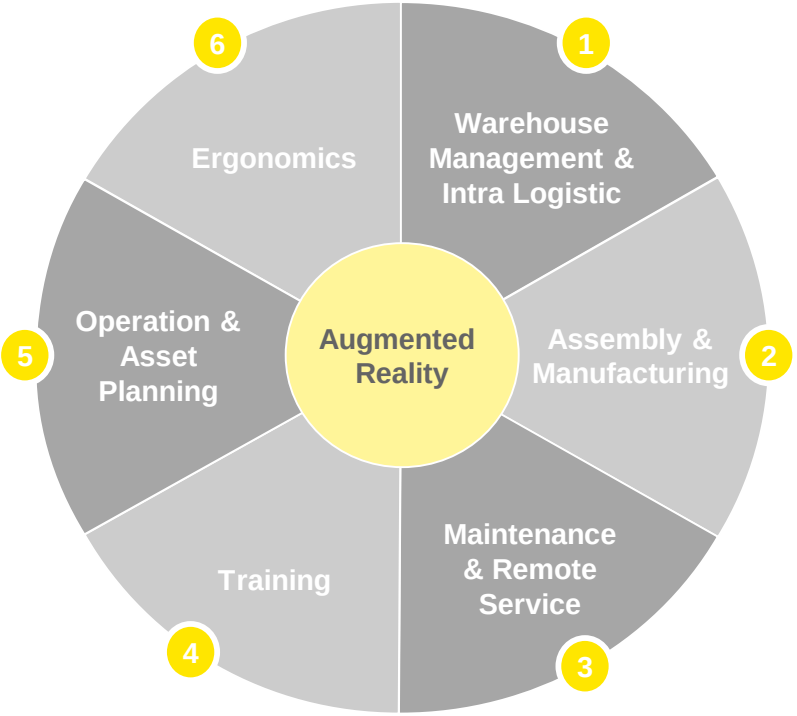
2. Smart Glasses

3. Virtual Reality

4. 3D Positioning Systems



Application Areas of Augmented Reality

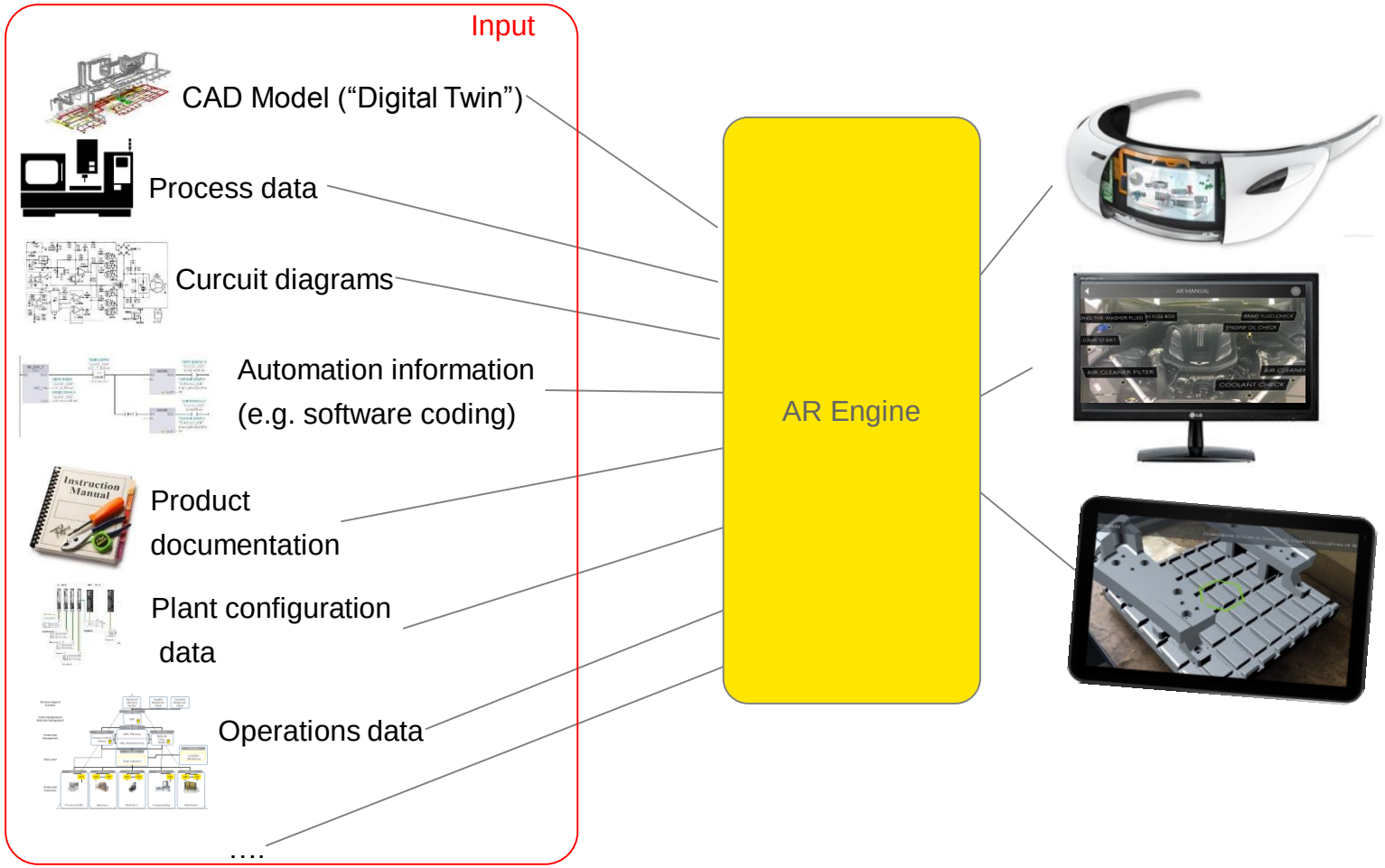


AR technology can be applied to all value chains

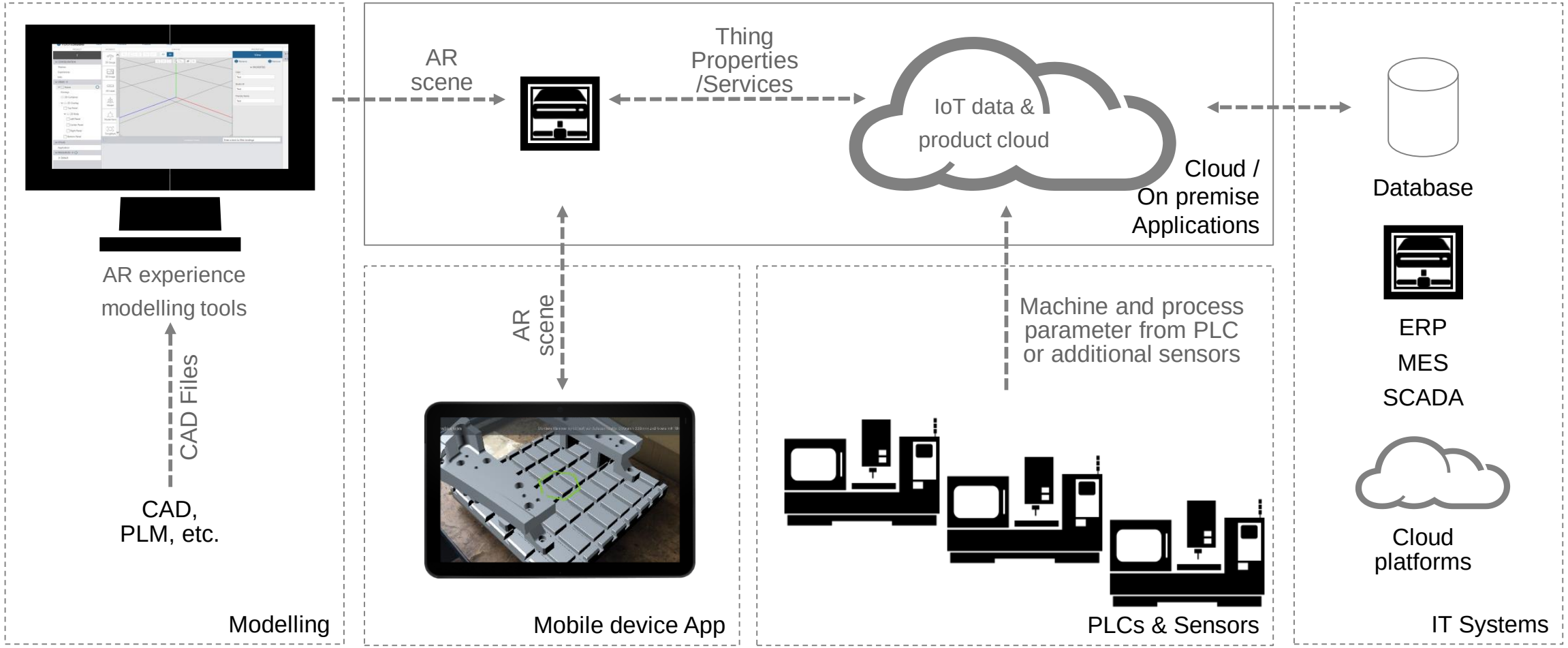
Current AR use state in manufacturing industry

	Supplier perspective		Consumer perspective	
	R&D	**Manufacture**	**Marketing/Sales**	**After Service**
Introduction background	• **Difficulty in Real-size, Mock-Up production** • **Limits on car design information delivery**	• Referencing work guideline **increases possibility of task error and lowers efficiency**	• Impossible to **exhibit every car models** in showroom • **Car detail requiring Needs exists online**	• Increase of customer complaint due to service latency occurred from simple repair request
Application fields	• Test and evaluation with **3D Mock-Up design model** 	• **Detailed procedures for each process steps are displayed on HMD screen** 	• Retrieve vehicle information through **AR Configurator** 	• **Distributes AR repair manual**, customer can deal with simple, inaccessible situations 
Expectation	**"Secured product launching timeliness"** **"Able to make quick design related decisions"**	**"work efficiency enhancement"** **"decreases vehicle error rate"**	**"Can provide detailed vehicle information"** **"improves customer satisfactory"**	**"Can decrease required time and cost"** **"Improves customer satisfactory"**

Various data input as foundation for industrial Augmented Reality applications



Generic IoT & Augmented Reality infrastructure



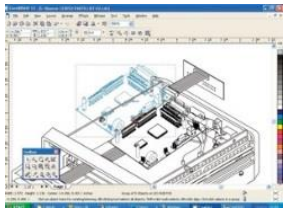
Selected areas of application for Augmented Reality

Product Development

Develop-ment Constructi on

Virtual prototype simulation

Digital manual creation



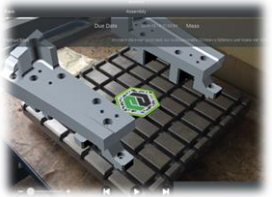
Technical training support

Production

Visualization of asset conditions

Visualisa-tion of hard access equipment

Step-by-step guidance



Quality assurance

Service

Remote Service

Digital manual for service and repair

Diagnosis

Cyber Physical system log

Get in contact with me:

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a better working world for our people, for our clients and for our communities.

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