



Near Future Technologies - Potentiale von Technologien der "nahen Zukunft" erkennen

Technologischer Wandel besteht seit jeher – doch in den letzten Jahrzehnten entwickelte er sich besonders dynamisch. Die Experten der FH OST präsentieren, welche spannenden Technologien die Marktreife in den kommenden Jahren erreichen.

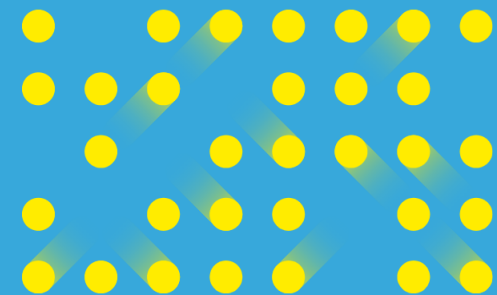
Träger

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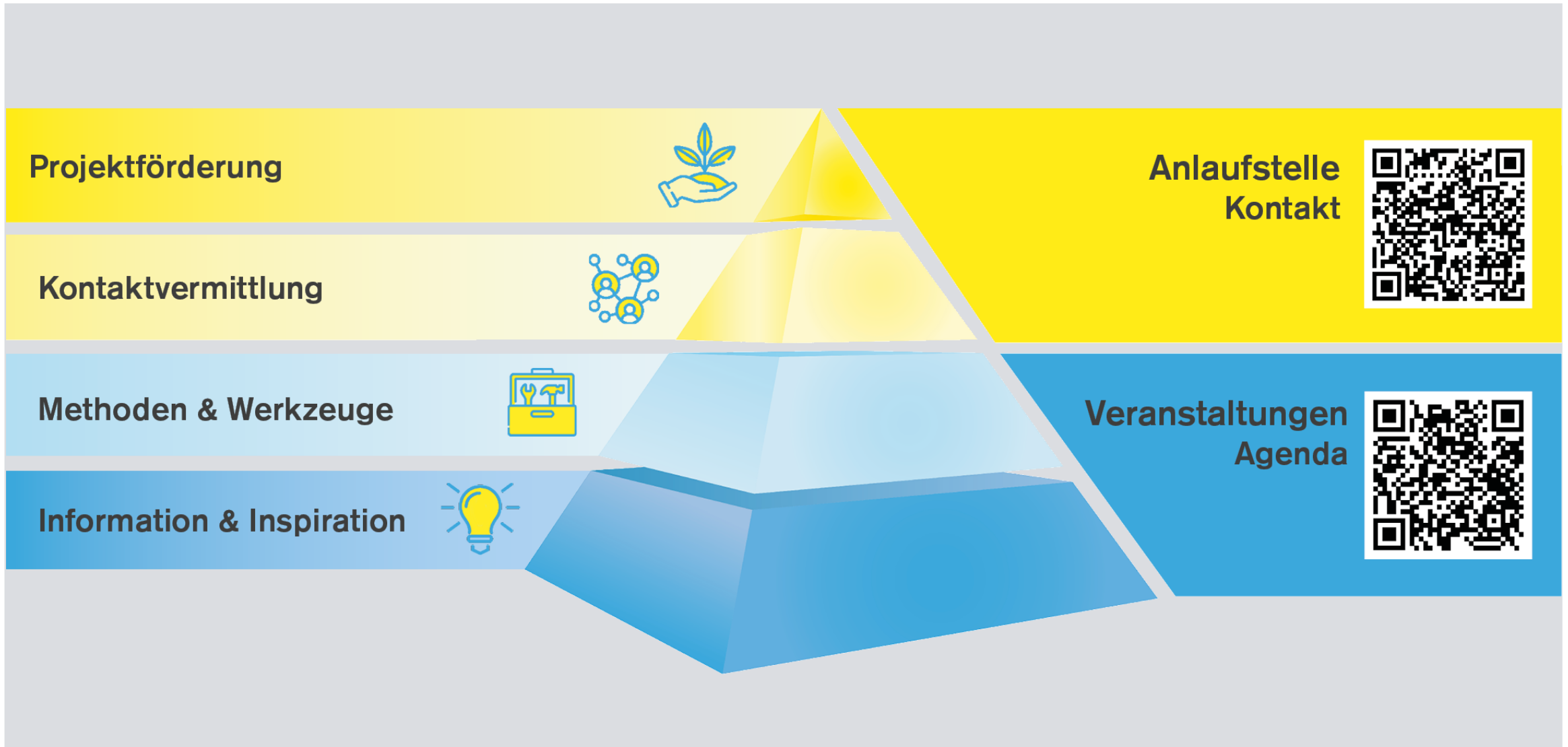


THURGAUER TECHNOLOGIE FORUM

IHR UNABHÄNGIGER SPARRINGPARTNER
FÜR TECHNOLOGIE- & INNOVATIONSFRAGEN



BEDÜRFNISORIENTIERTES ANGEBOT IN VIER STUFEN



PRAXISBEISPIEL: MEIER SCHREINEREI AG

Ein Beispiel der konkreten Unterstützung durch die Anlaufstelle des Thurgauer Technologieforums

- Teilnahme an **TTF-Impuls-Veranstaltung** im Coworking Weinfelden, inspiriert durch Vorstellung des PoE-Angebots (30.8.21)
- Proaktive **Kontaktaufnahme** bei der Anlaufstelle
- **PoE-Erstgespräch**, Identifikation von Unterstützungsbedarf (28.9.21)
- Firmenbeispiel für **TTF-Innovationswerkstatt** bei Macardo Distillery (4.11.21)
- **INOS-Coaching** (Phase 1, Opportunitäten) Dez. 21-Feb. 22
- **INOS-Coaching** (Phase 3, Prototyp), beantragt
- Innosuisse **Innovationscheck**, Antrag in Arbeit durch FH Biel und weiteren TG Partner



«Das Thurgauer Technologieforum hat uns einen Coach vermittelt, der mit uns sehr rasch eine neue, greifbare Strategie entwickelt und wertvolle Kontakte vermittelt hat. [...] Anfänglich waren wir gegenüber einem externen Berater skeptisch. Doch die Projektförderung des Thurgauer Technologieforums und die schnellen, umsetzbaren Resultate haben uns vollständig überzeugt.»
Katja Meier, Geschäftsführerin und Inhaberin

IHRE ANSPRECHPARTNER



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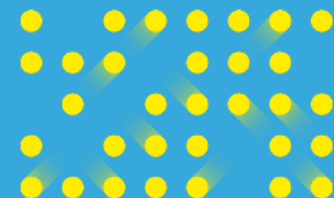
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Near Future Technologies – was meint ChatGPT?

Andreas:

«Prioritize the 5 most relevant upcoming technologies of the next 5 years»

ChatGPT:

«As an AI language model, I can identify several upcoming technologies that have the potential to significantly impact various industries in the next 5 years. Here are the 5 most relevant that I believe will play a vital role:

1. Artificial Intelligence and Machine Learning: ...»



Stefan Grätzer

Professor, Leiter

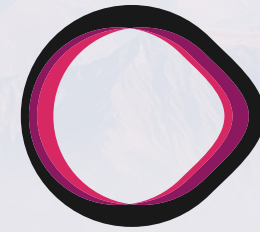
Kompetenzbereich Industrielle

Automation



Adrian Rüedy

**Co-Founder & CEO at Smart
Factory Navigator AG &
Project Manager Industrial
Engineering at OST**



OST

Ostschweizer
Fachhochschule

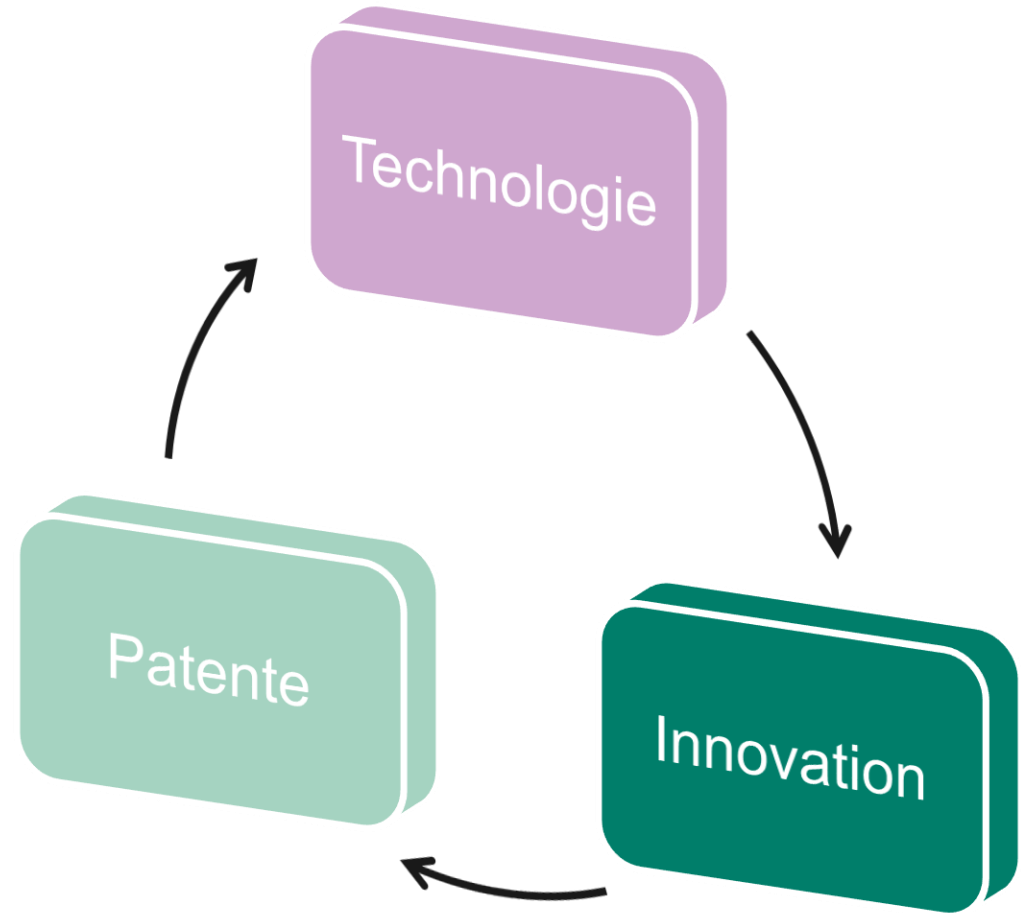
**Near Future Technologies
Potentiale von Technologien der "nahen Zukunft" erkennen
Thurgauer Technologieforum**

Stefan Grätzer

21. Februar 2023

Departement Technik / Maschinentchnik | Innovation

Technologie / Innovation / Patente



Megatrends der 90er

- Mooresches Gesetz
- Miniaturisierung
- Digitalisierung
 - A PC at every desk (80er)
 - Internet for all (90)
W-LAN (Standard '99)
- Mobile Kommunikation



Technologie

- Technologie ist die Wissenschaft bezüglich der Technik
- Wissenschaft umfasst verschiedene Fachgebiete
- In Fachgebieten wird geforscht, neues Wissen entsteht
- Produkt umfasst verschiedene Sachsysteme



Bildquelle: sony.com

Technologie



Kopfhörer

Bedienfeld

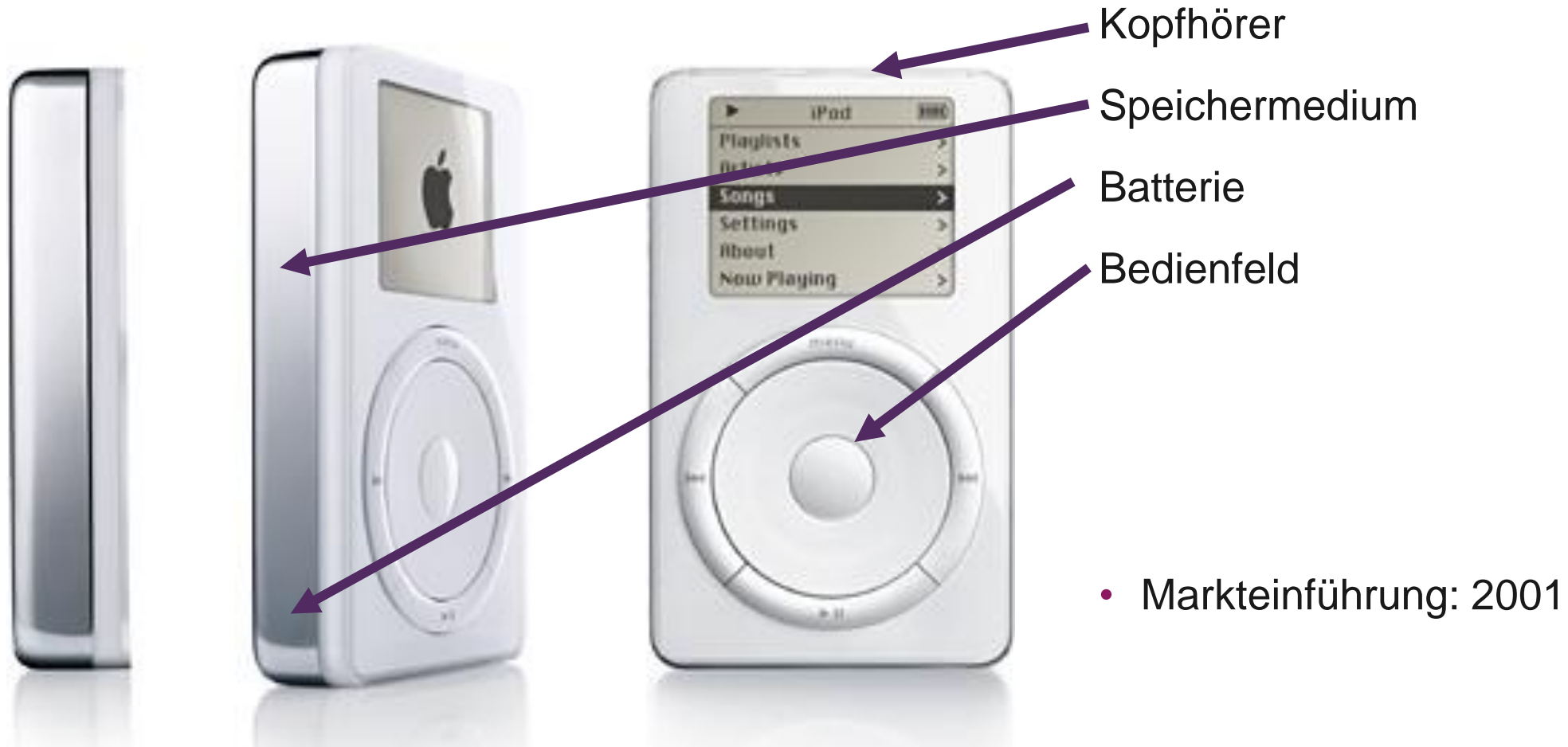
Speichermedium

Batterie

Markteinführung 1979

Bildquelle: sony.com

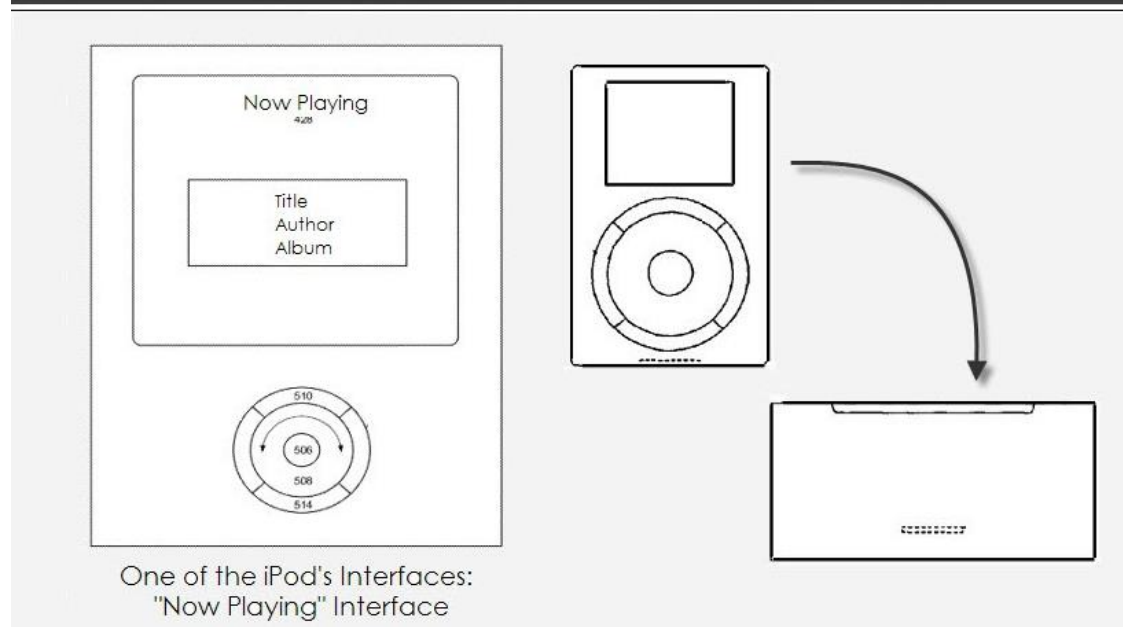
Einsatz neuer Technologien



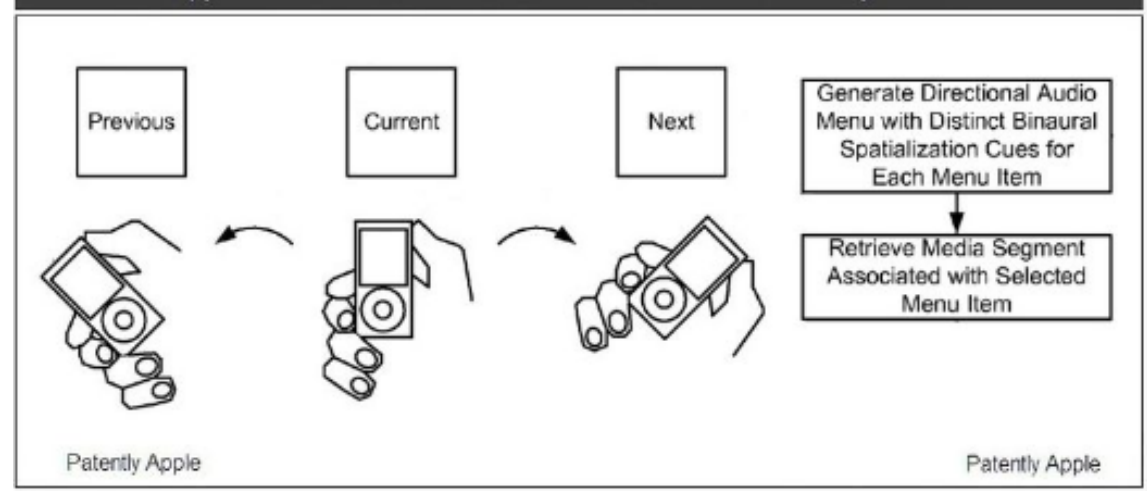
Bildquelle: apple.com

Patent

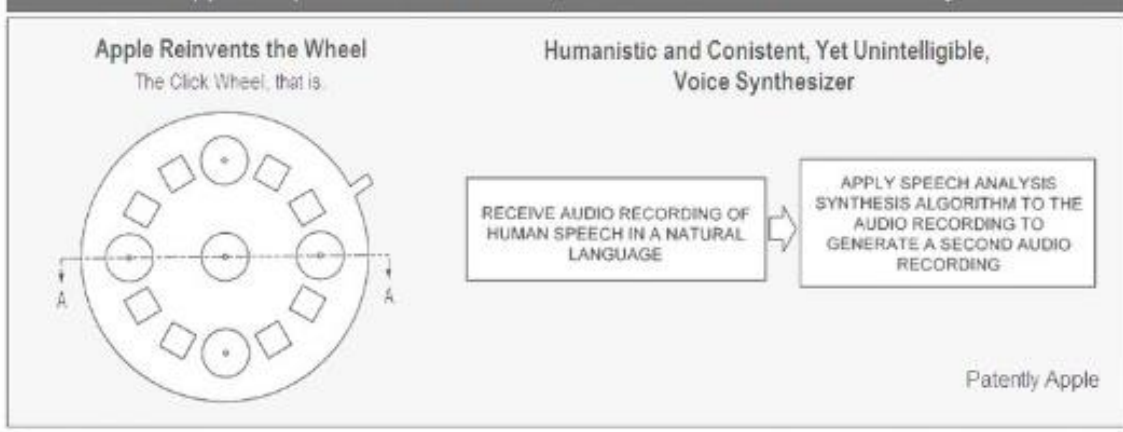
Apple Wins Major iPod User Interface & Systems Patents



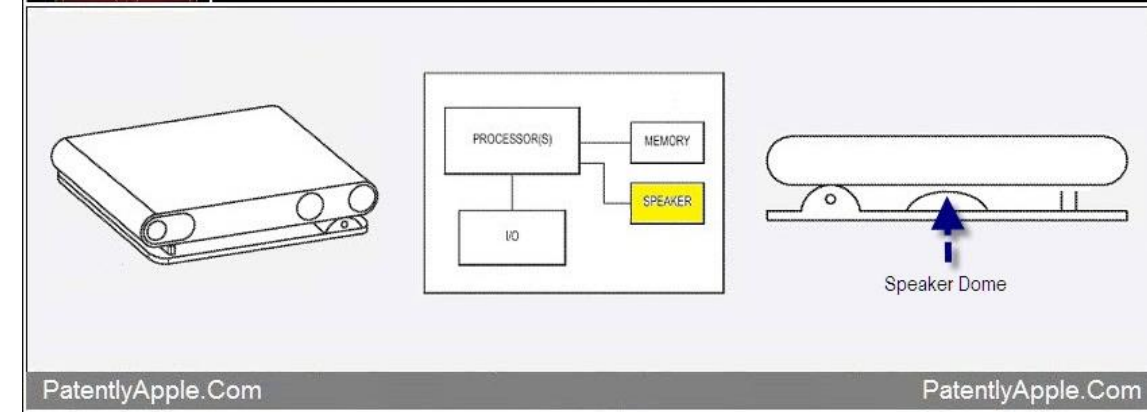
Apple Reveals a Directional Audio Interface & an Invisible Spatial Arc



Apple Simplifies the Click Wheel, On-Screen Controls & Gets Goofy



What's next for the iPod Shuffle/Nano? A Speaker Clip of Course

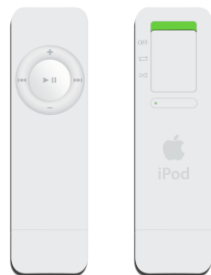


Technologiemanagement

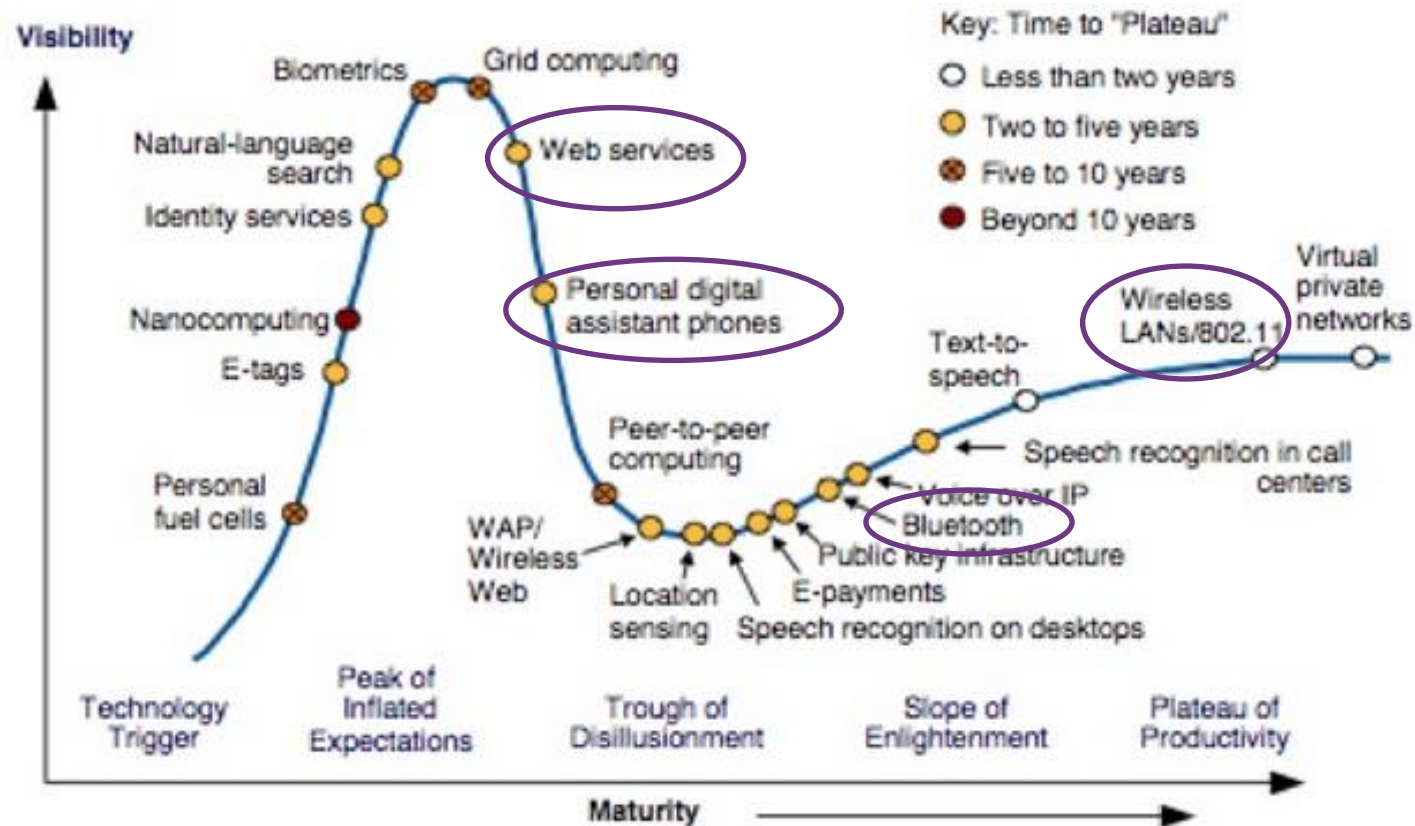


Generation	1/ 2001	2/2002	3/2003	4/2004	5/2005	6/2006
Bedienfeld	Scrollrad	Touchpad	Touchpad	Click Wheel	Click Wheel	Click Wheel
Bildschirm	160x128 b/w	160x128 b/w	160x128 b/w	220 × 176 16 Bit	320 × 240 16 Bit	320 × 240 16 Bit
Speicher [GB]	5	20	40	60	60	160
Akkulaufzeit [h]	10	10	8	15	20	40

Technologieroadmap in der Retrospektive / Produktsortiment



Gartner Emerging Technologies Hype Cycle 2002



The first media players capable of livestreaming over the Internet were developed in the **early 1990s**. Some of the earliest events to be livestreamed were music concerts and a baseball game, the latter being broadcast with RealPlayer, a media player developed by RealNetworks, Inc.

<https://www.britannica.com>

Disruption



One-Device

Cloud-Computing



Gegründet 2006

Ursprung Schweden

Umsatz 9.7 Mrd. Euro ('21)

Die Freiheit, meine Musik dabeizuhaben



Bildquelle: samsung.com

Eine unternehmerische Definition von Innovation

- Innovation ist eine neue oder geänderte Dienstleistung oder Produkt.
- Innovation realisiert Wert.
- Der Wert der Innovation muss mindestens auf der Kosten- oder der Ertragsseite wirksam werden.
- Der Nutzer ist bereit die Veränderung zu akzeptieren.



Quelle: patents.google.com Search Term: Home Automation Internet



Home Automation



Interface

- Computer
- Tablet
- Handy
- ...

Rechner

- Arduino
- Raspberry
- Cloud-Computing
- Edge Devices
- ...

Netzwerk

- Ethernet
- Single Pair Ethernet
- WLAN
- Bluetooth
- ZigBee
- KNX
- ...

Geräte

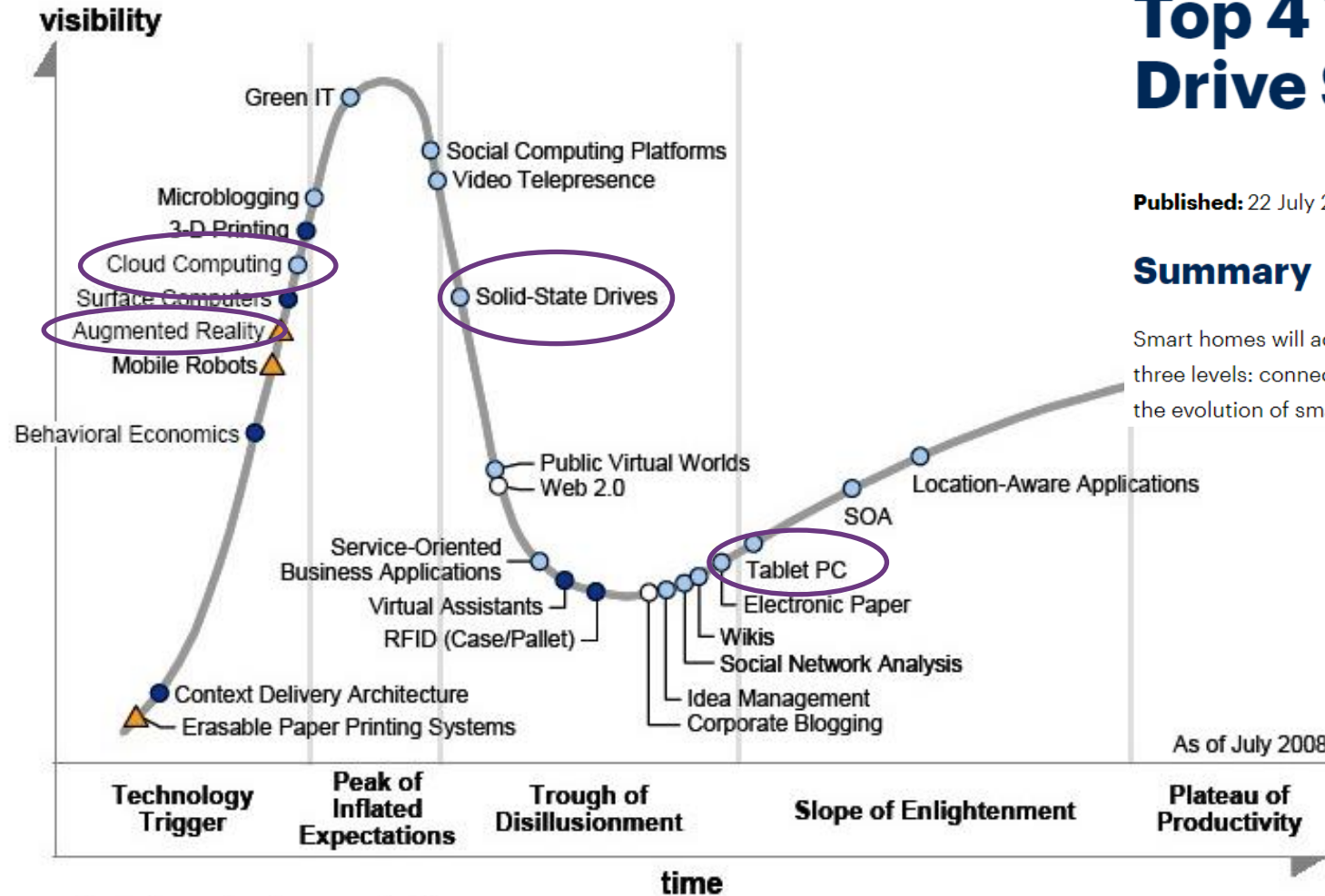
- Weisswaren
- Küchenmaschinen
- Licht
- HLK
- ...

Innovation ist selten eine Frage des «ob», vielmehr ist es eine Frage des «wann»



- Veränderungsgeschwindigkeit
- Kundennutzen und -akzeptanz

Gartner Emerging Technologies Hype Cycle 2008



Top 4 Technologies That Will Drive Smarter Homes

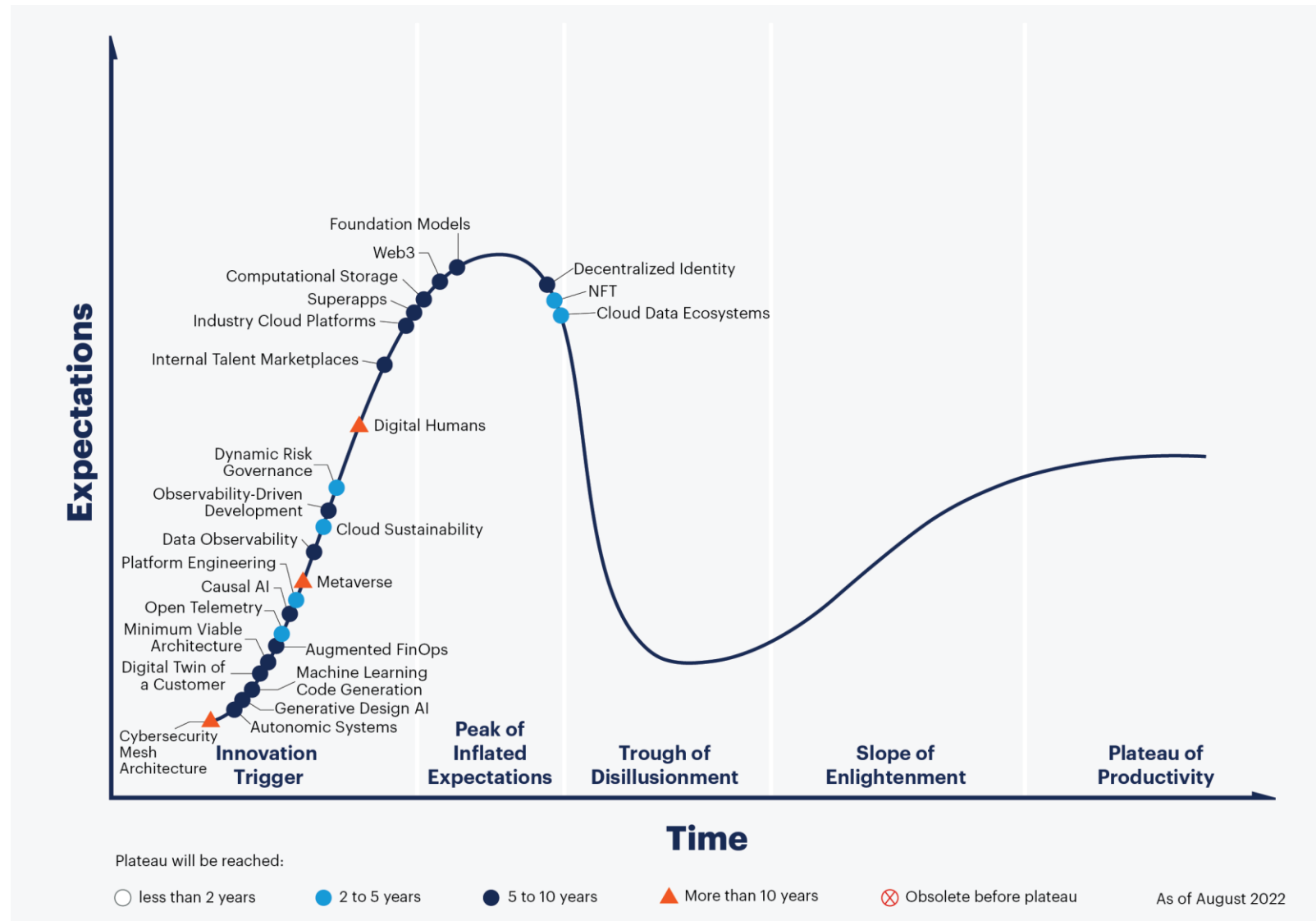
Published: 22 July 2021

Summary

Smart homes will accelerate the digitalization in the home to provide better user experience by three levels: connected, automation and intelligent interaction. The top four technologies driving the evolution of smarter homes are connectivity, sensors, edge device AI, and native user interface.

- (1) Connectivity
- (2) Sensors
- (3) Edge Devices
- (4) Native User Interface

Gartner Emerging Technologies Hype Cycle 2022



A foundation model is a large **artificial intelligence model trained** on a vast quantity of **unlabeled data** at scale resulting in a model that can be adapted to a wide range of **downstream tasks**. Foundation models have helped bring about a major transformation in how AI systems are built since their introduction in 2018.

[Wikipedia](https://en.wikipedia.org/wiki/Foundation_model)

ChatGPT

What are near future technologies?

- AI und ML
- Edge Computing
- 5G Network
- VR and AR
- Quantum Computing
- Blockchain
- Autonomous Vehicles



what are the near future technologies?



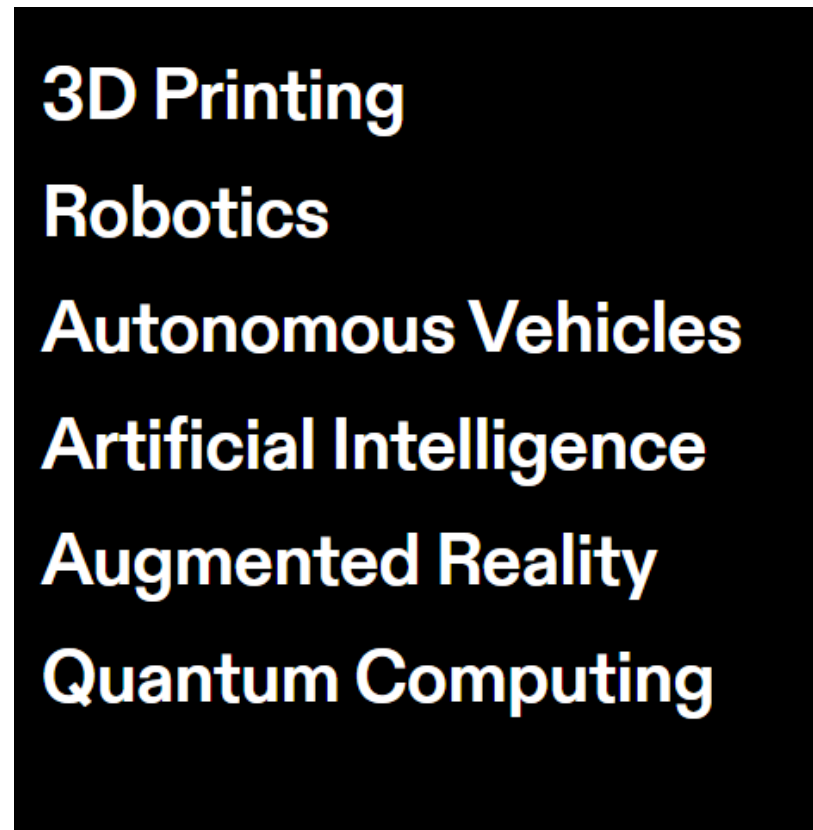
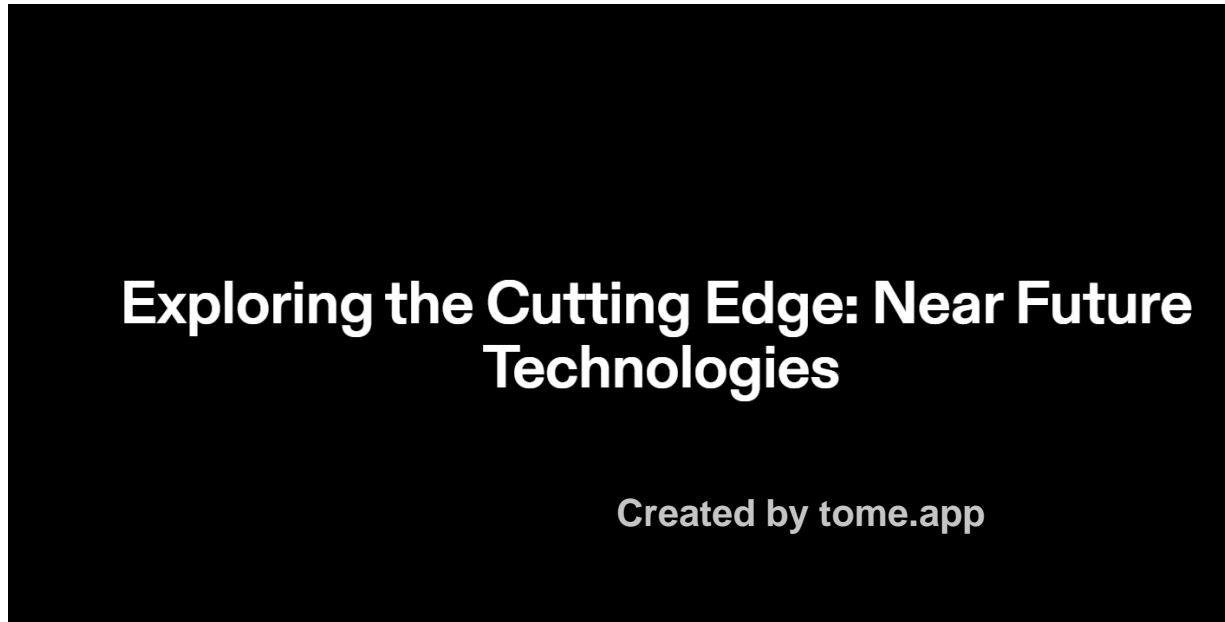
Here are some of the near future technologies that are expected to make a significant impact in the coming years:

1. Artificial Intelligence (AI) and Machine Learning (ML) - These technologies are becoming increasingly sophisticated and are expected to be integrated into more and more devices, systems and applications.
2. Edge computing - Edge computing refers to the processing of data on devices close to the source of the data, rather than sending it to a centralized data center or cloud.
3. 5G networks - 5G is the next generation of mobile networks, offering faster speeds and greater capacity, which will enable new technologies such as autonomous vehicles and the Internet of Things (IoT).
4. Virtual and Augmented Reality (VR and AR) - These technologies are becoming more accessible and are being used in a variety of industries, such as entertainment, education, and healthcare.
5. Quantum Computing - Quantum computers have the potential to revolutionize fields such as cryptography, finance, and scientific simulation.
6. Blockchain - Blockchain is a secure, decentralized ledger technology that can be used for a variety of applications, including cryptocurrencies, supply chain management, and secure data storage.
7. Autonomous vehicles - Self-driving cars and other autonomous vehicles are expected to become increasingly common in the coming years, leading to a significant shift in the transportation industry.

These are just a few examples of the near future technologies that are expected to have a major impact in the near future. However, it's worth noting that the pace of technological development is always changing, and new breakthroughs and innovations can emerge at any time.

Tome

Create a presentation with the topic Near Future Technologies

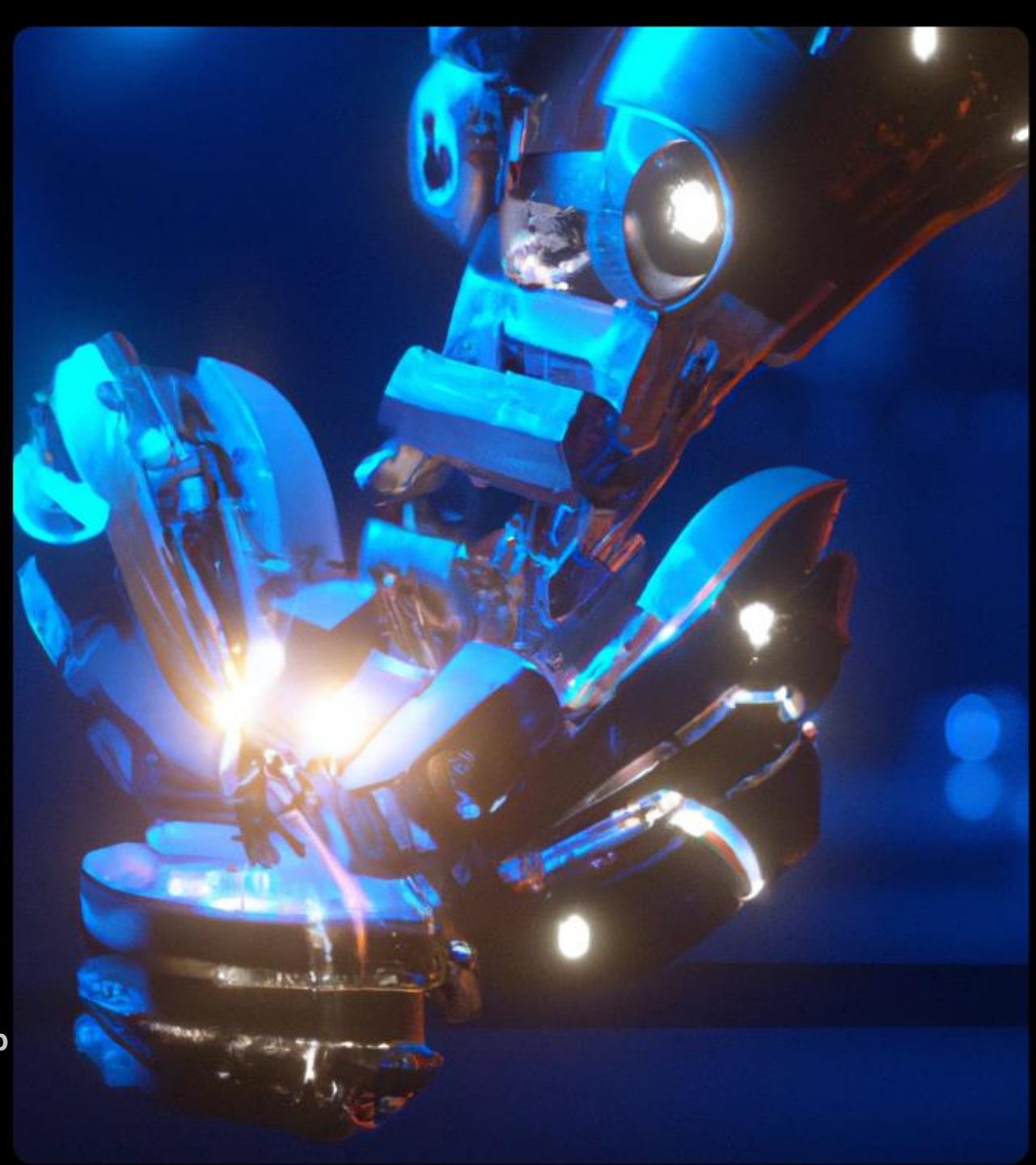


3D Printing

3D printing technology is revolutionizing the way we create, design and manufacture products. With 3D printing, materials such as plastics, metals, ceramics, and even living tissue can be printed layer by layer to create complex structures and parts. This technology is being used in a variety of industries, from automotive to aerospace, to create parts that are lighter, stronger, and more precise than ever before.

The near future of 3D printing will involve the use of advanced materials and software to create parts that are stronger and more precise than ever before. This technology will be used to create custom medical implants, prosthetics, and other medical devices, as well as parts for machines and vehicles. The possibilities are endless.

Created by [tome.app](#)



Robotics

Robotics is the field of engineering that deals with the design, construction, and operation of robots. Robots are machines that can be programmed to perform tasks that would be difficult or impossible for humans to do. Robotics technology is used in a variety of industries, from manufacturing to healthcare, to automate processes and improve efficiency.

The near future of robotics will involve the development of more advanced robots that are able to think and act independently. These robots will be used in a variety of applications, from home assistance to medical care. They will be able to interact with humans in a more natural way, and will be able to learn from their environment and adapt to changing conditions.

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Autonomous Vehicles

Autonomous vehicles are vehicles that are able to drive themselves without the need for a human driver. This technology is being developed in order to make transportation safer, more efficient, and more convenient. Autonomous vehicles use sensors, cameras, and artificial intelligence to detect and respond to their environment.

The near future of autonomous vehicles will involve the development of more advanced technologies that will allow vehicles to drive themselves with greater precision and safety. Autonomous vehicles will be used for a variety of purposes, from delivery services to public transportation. This technology has the potential to revolutionize the way we travel.

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Artificial Intelligence

Artificial intelligence (AI) is the ability of a computer or machine to think and learn. AI is used in a variety of fields, from healthcare to finance, to automate processes and make decisions. AI technology is becoming increasingly advanced, and is being used to create systems that can think, learn, and act independently.

The near future of AI will involve the development of more advanced systems that are able to think and act more like humans. AI will be used to automate processes, make decisions, and even interact with humans in a more natural way. This technology has the potential to revolutionize the way we work and live.

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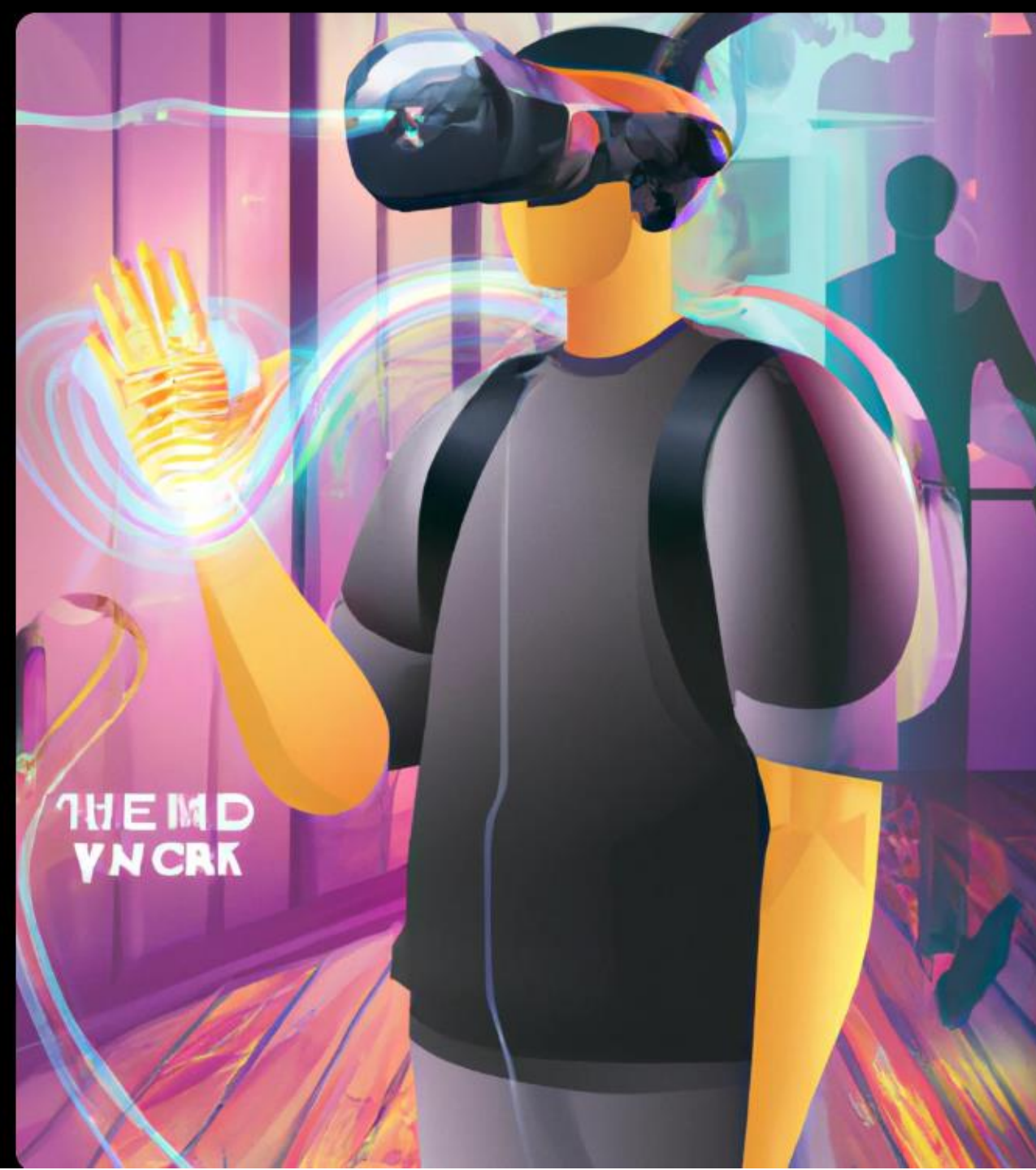


Augmented Reality

Augmented reality (AR) is the technology that allows users to view and interact with digital images and objects in the real world. AR is used in a variety of applications, from gaming to education, to create immersive and interactive experiences. AR technology is becoming increasingly advanced, and is being used to create more realistic and engaging experiences.

The near future of AR will involve the development of more advanced technologies that will allow users to interact with digital objects in more natural and realistic ways. AR will be used to create virtual worlds, and will be used to enhance education, gaming, and a variety of other applications. This technology has the potential to revolutionize the way we interact with the world around us.

Created by [tome.app](#)



Quantum Computing

Quantum computing is the use of quantum mechanics to perform calculations and solve problems. Quantum computers are able to process and store data in a way that is much faster and more powerful than traditional computers. This technology is being used in a variety of fields, from healthcare to finance, to create more efficient and powerful solutions.

The near future of quantum computing will involve the development of more advanced technologies that will allow quantum computers to process and store data at even faster speeds. This technology will be used to solve complex problems and create new solutions that would be impossible with traditional computers. The possibilities are endless.

Created by [tome.app](#)



DALL.E



... [↓](#) [Share](#) [Save](#) ▾

“robot washing cloth in a river”

 **Stefan** × DALL-E
Human & AI

DALL.E



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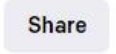

“robot cleaning cloth in a river like women did ”



Stefan × DALL-E
Human & AI

DALL.E



...   

“women washing cloth in a river.
replace women by robots”



Stefan × DALL-E
Human & AI

DALL.E



...  Share 

“robots washing cloth in a river.”

 Stefan × DALL-E
Human & AI

DALL.E



... [↓](#) [Share](#) [Save](#) ▾

“robots washing cloth in a river.”

 **Stefan × DALL-E**
Human & AI

Google Suche: «Washing Cloth in a River» und «River»



Bridges and Balloons
How to wash your clothes in a river |



Flickr
Woman washing clothes in a river in ...



Wikimedia Commons
File:Laundry in the river.jpg ...



Outdoor Revival
How to hand wash your clothes - Outdoor ...



Bridges and Balloons



OFFSET



Shutterstock



Pirfair



Forest Preserve District of Will County
River vs. stream vs. creek ...



The Guardian
River pollution goes unchecked as ...



The Nature Conservancy
The Duck River | The Nature Conservancy



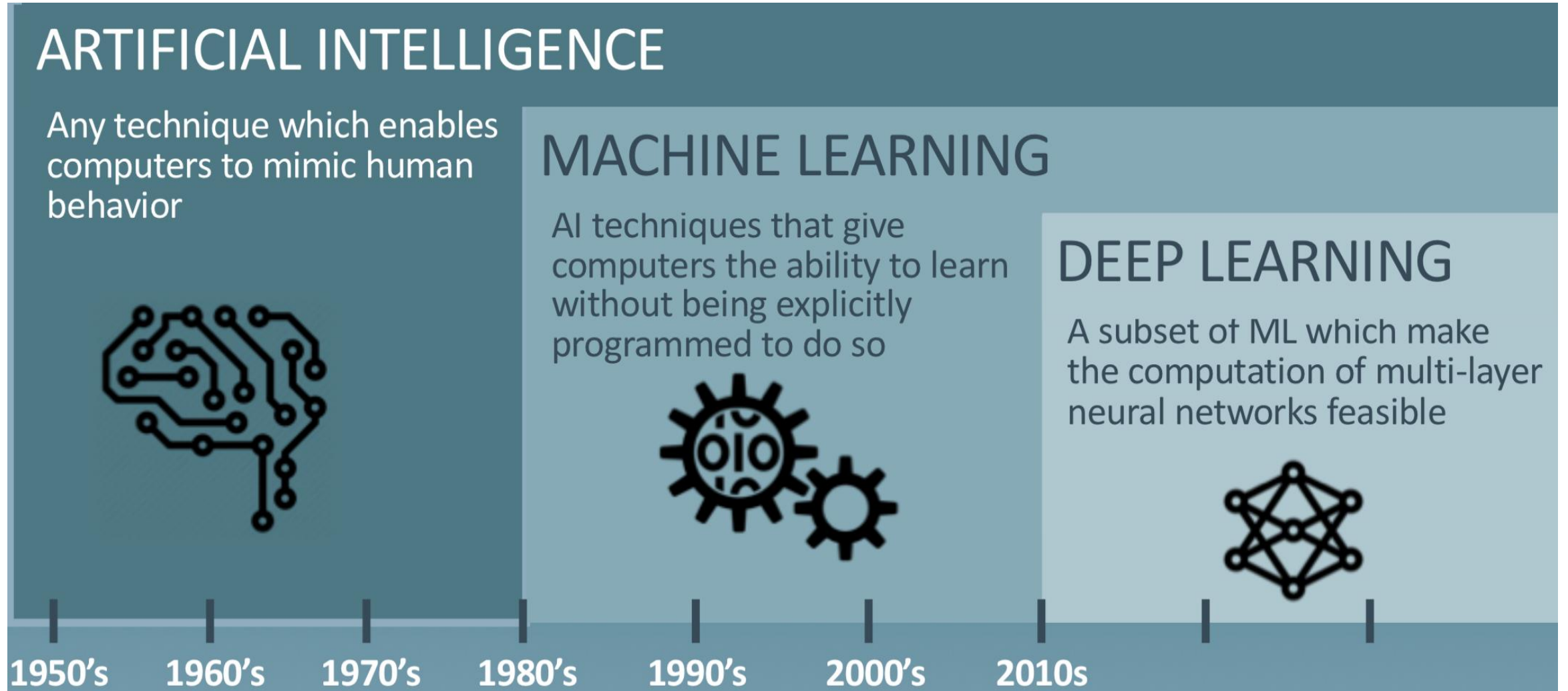
Twinkl
What is the River Source? | Answered ...

Midjourney

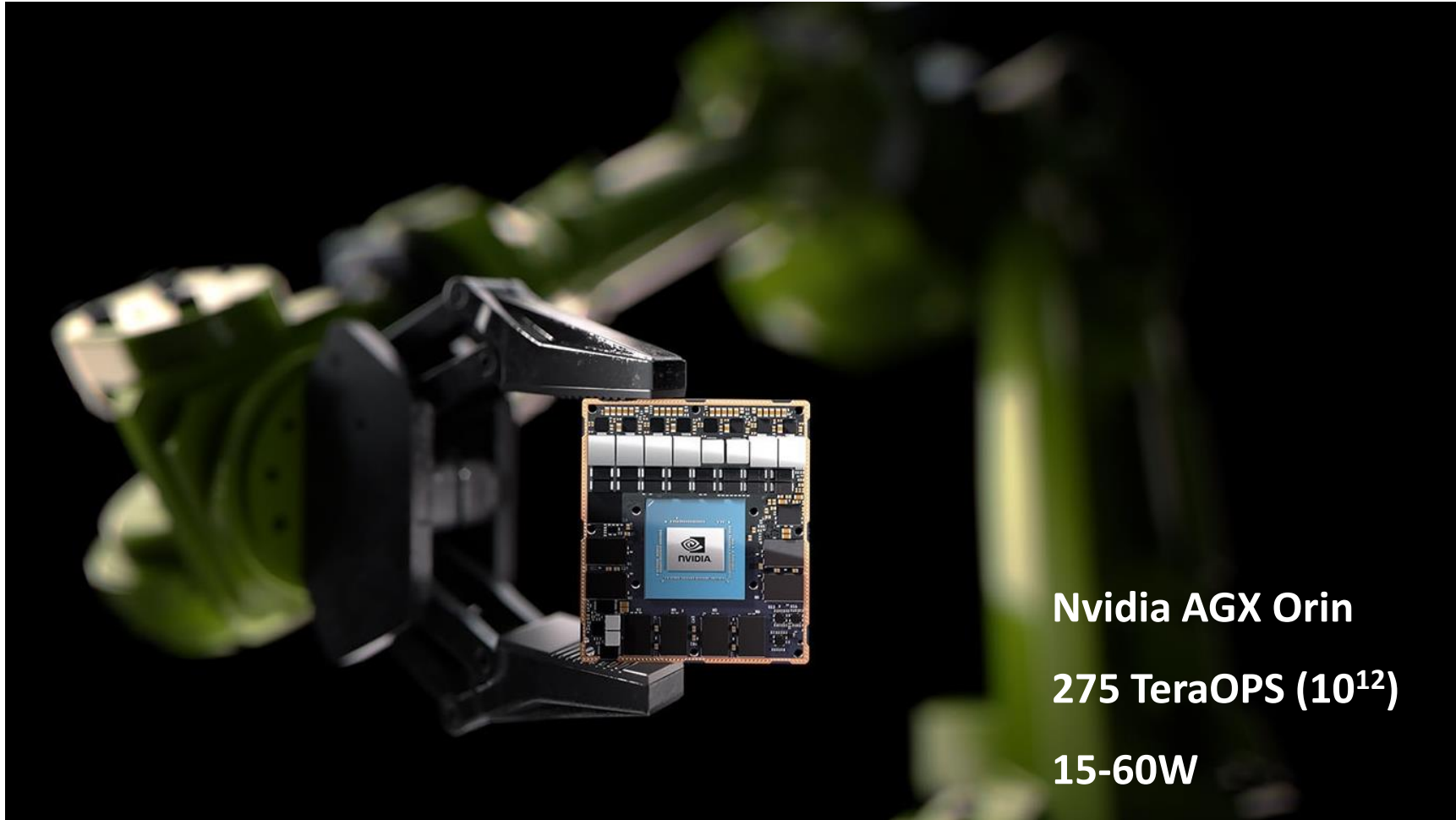


Robot cleaning cloth in a distopic future





Enabler



Nvidia AGX Orin
275 TeraOPS (10^{12})
15-60W

Bildquelle: [nvidia.com](https://www.nvidia.com)

Nebeneffekte

- AI benötigt neue leistungsfähige Hardware
- Strukturen der IT verändern sich
- Megatrends wie Cloud und Cloud-Computing werden realisiert



Disabler

MIT
Technology
Review



The Algorithm

By Melissa Heikkilä • 02.13.23

Last week was the week chatbot-powered search engines were supposed to arrive. The big idea is that these AI bots would upend our experience of searching the web by generating chatty answers to our questions, instead of just returning lists of links as searches do now. Only ... things really did not go according to plan.

Approximately two seconds after Microsoft let people poke around with its new ChatGPT-powered Bing search engine, people started finding that it responded to some questions with incorrect or nonsensical answers, such as conspiracy theories. Google had an embarrassing moment when scientists spotted a factual error in the company's own advertisement for its chatbot Bard, which subsequently wiped \$100 million off its share price.

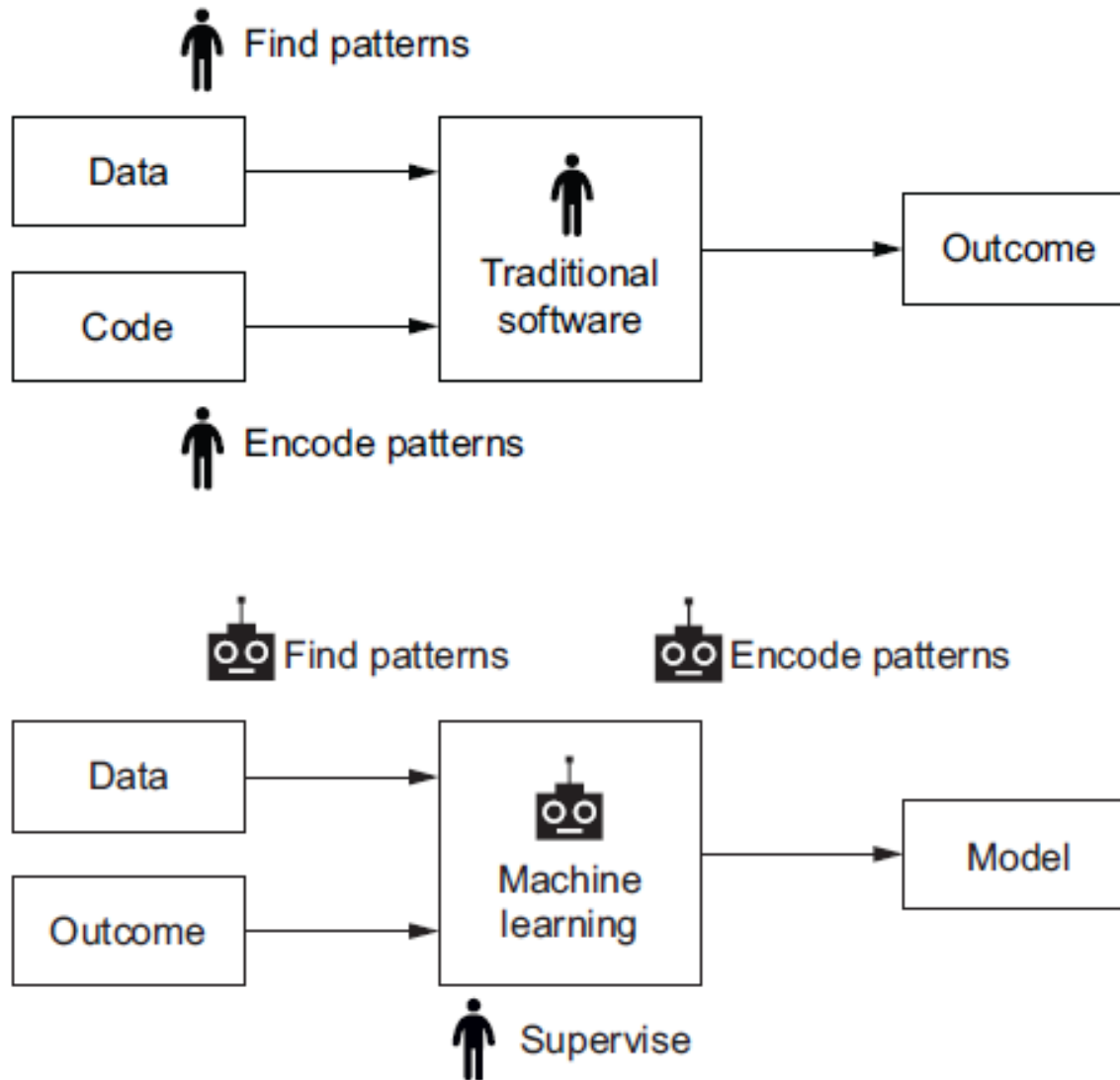
What makes all of this all the more shocking is that it came as a surprise to precisely no one who has been paying attention to AI language models.



Bildquelle: MIT Technology Review

Here's the problem: the technology is simply not ready to be used like this at this scale.
AI language models are **notorious bullshitters**, often presenting falsehoods as facts.

Machine Learning



- Anwendungsfälle finden
- Einsatzmöglichkeiten abschätzen
- Ausprobieren / Lernen
- Grenzen kennenlernen
- Optimieren oder verwerfen

Bildquelle: Machine Learning Bookcamp by Alexey Grigorev

Industrielle Anwendung



Bildquelle: keyence.com

Ultimate Flexibility for Mistake and Error Proofing in Manufacturing

Artificial intelligence specializing in go vs no go detection allows for automatic configuration of imaging and detection settings. The built-in camera, lens, and illumination eliminate the need to select these devices, so anyone can quickly perform highly stable detection.

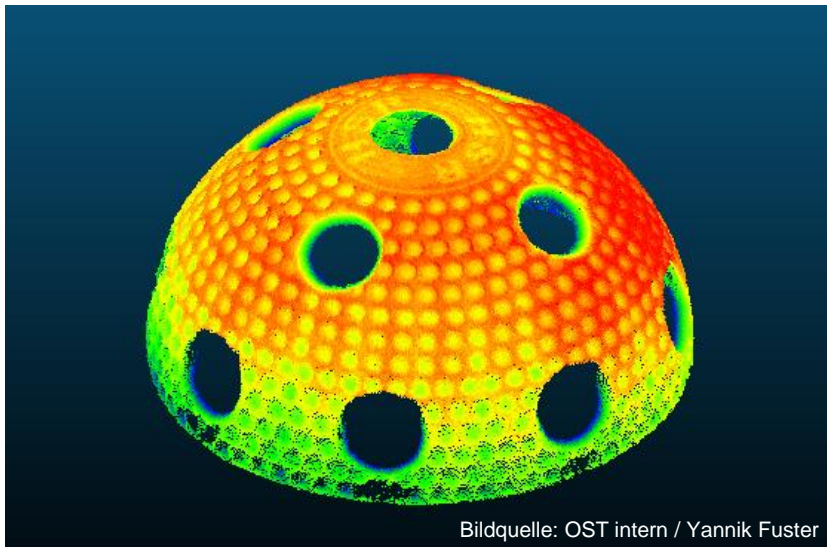
- AI-based imaging and detection for easy usability
- Smart camera and compact model for use anywhere

Aktuell interessante Technologien

Deep Learning zur Prozessstabilisierung

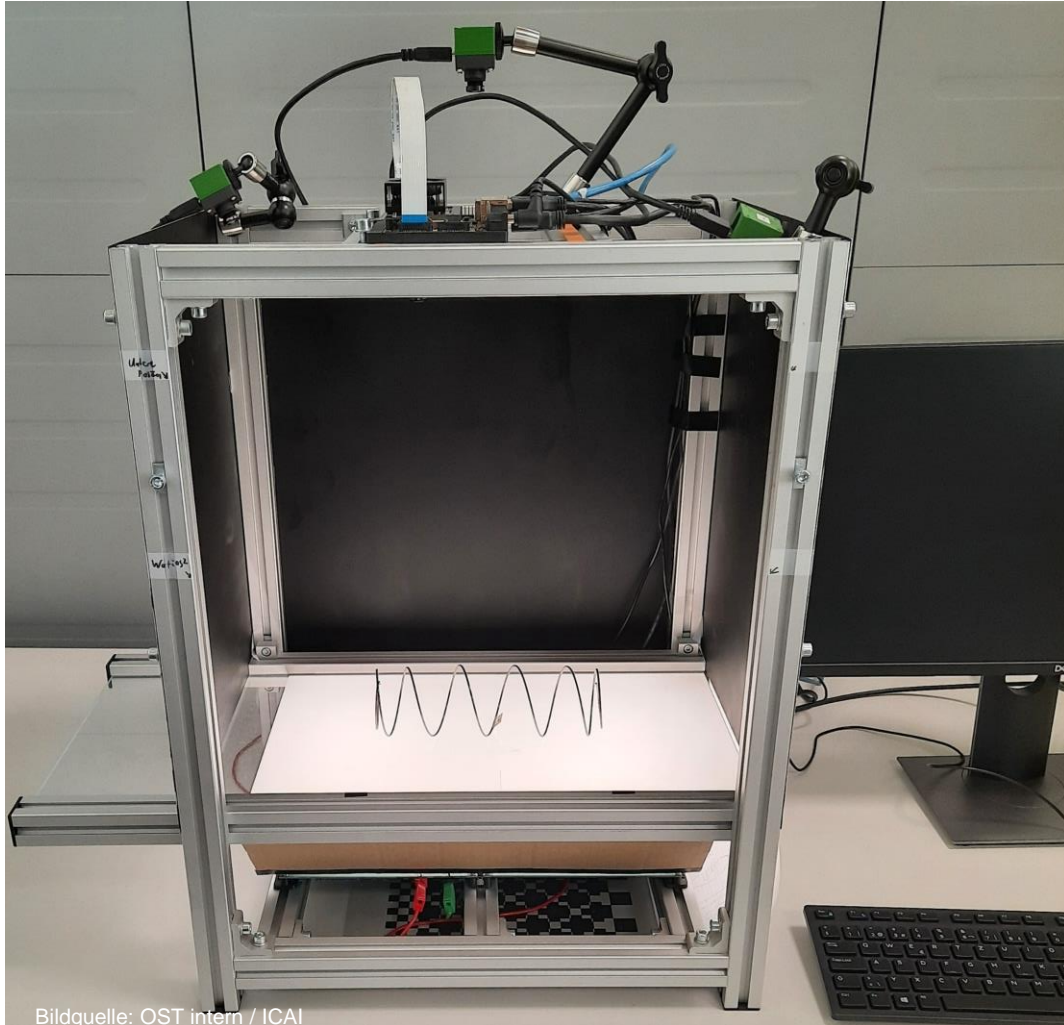
Autonome Prozess Optimierung

- Vernetzung von Spritzgussmaschine und 3D-Scanner.
- LIDAR-Messtechnologie
- Spitzgusstechnologie

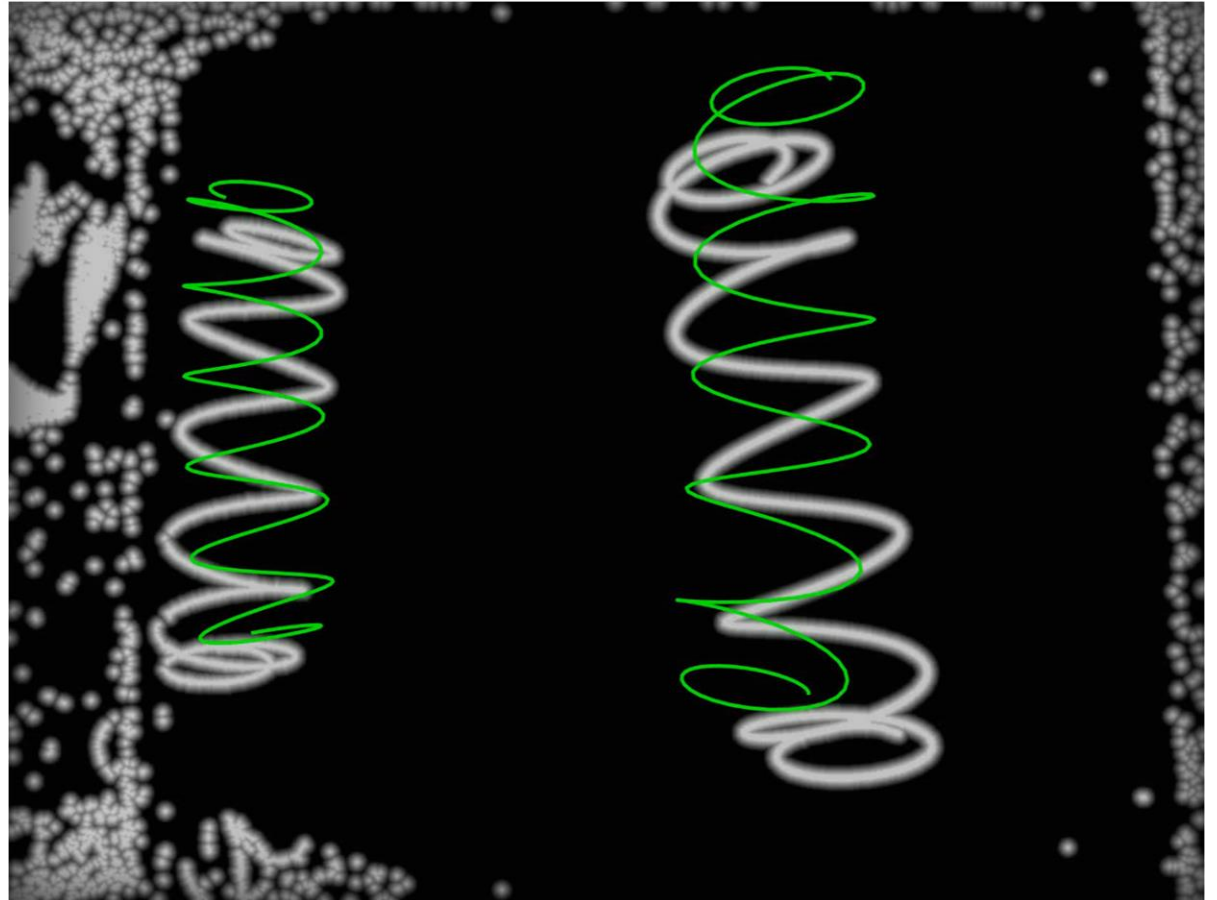


Aktuell interessante Technologien

Deep Learning zur Qualitätsüberwachung

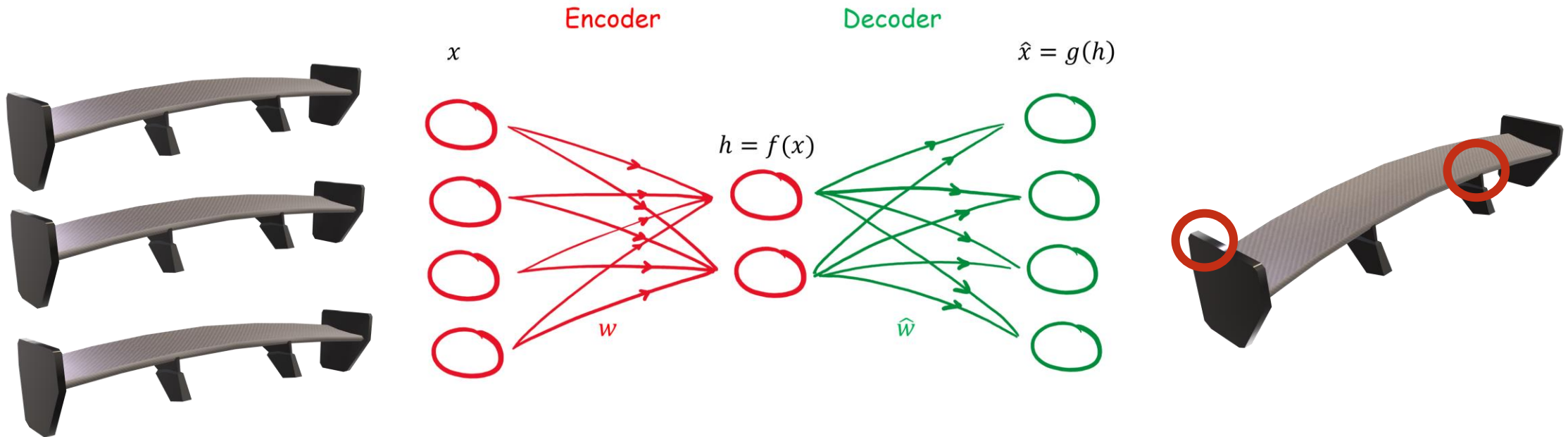


Bildquelle: OST intern / ICAI



Qualitätschecker

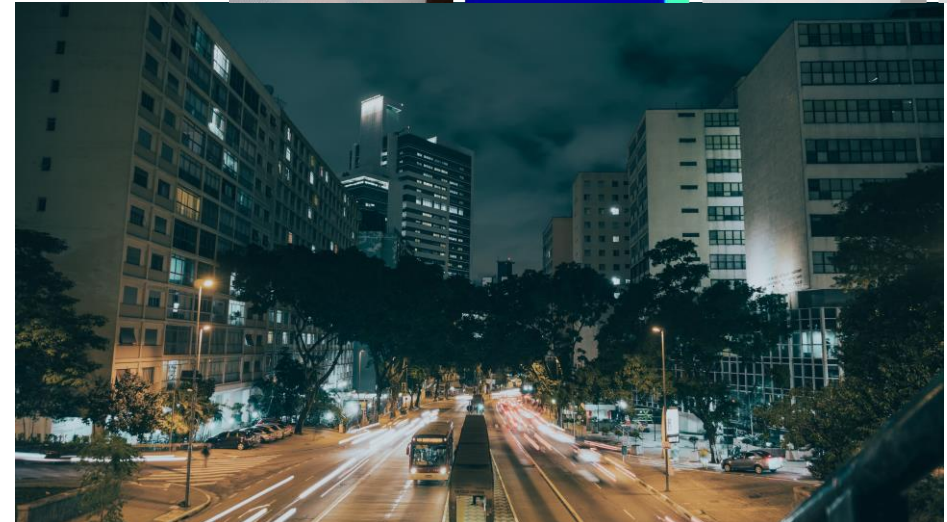
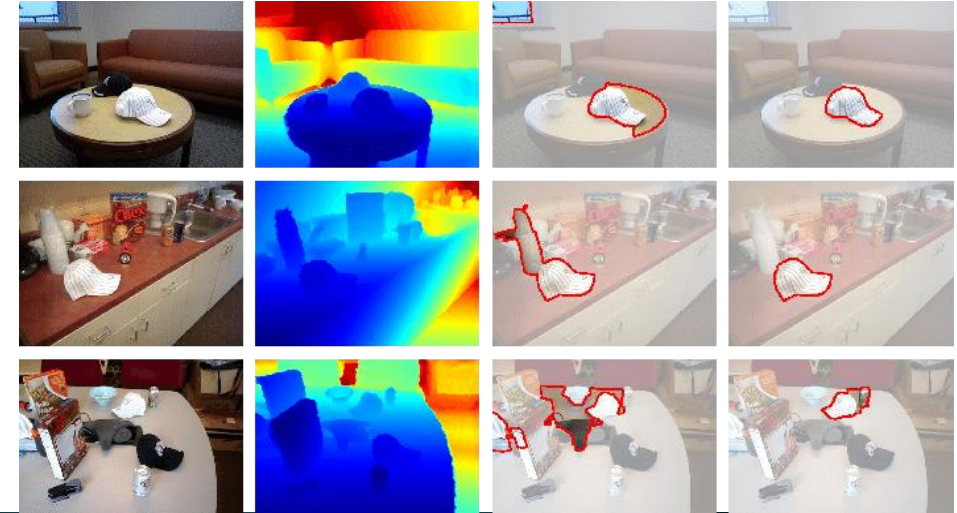
Ein Autoencoder ist ein neuronales Netz, welches versucht die Eingangsinformationen zu komprimieren und mit den reduzierten Informationen im Ausgang wieder korrekt nachzubilden.



Aktuell interessante Technologien

Objekterkennung und Inventarisierung

- Scanning der Umgebung mit RGBD-Technologie
- Objekte erkennen
- Kategorisieren
- Abgleich mit Objektdatenbank
- Informationen zu Objekt ergänzen
- Neue Objekte anlegen
- Kartografieren
- Digitalen Zwilling erstellen



Aus was besteht Ihr System?



Bildquelle: apple.com

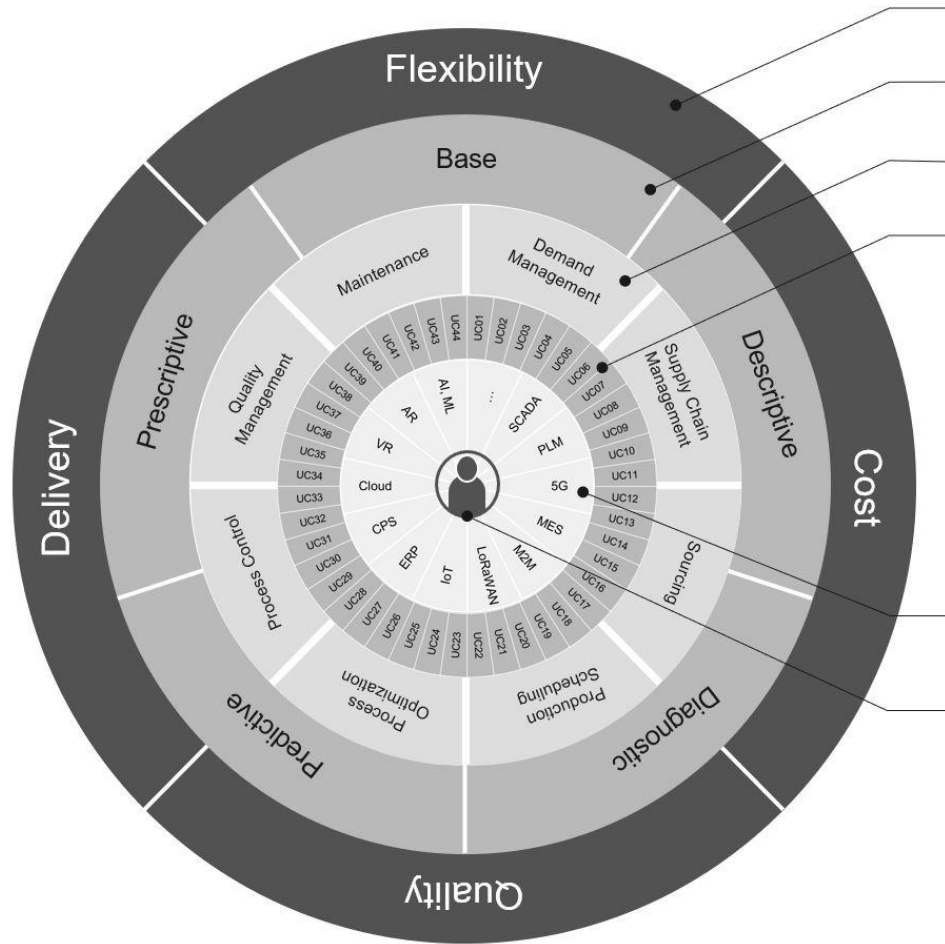
Ist Ihre Roadmap up-to-date?



Herausforderungen jenseits der Use-Cases

- Fehlen einer **klaren Strategie** sowie einer **Roadmap für die Industrie 4.0**
- Mangel an bestehenden **Pilotprojekten**
- Die Herausforderungen bei der **Suche nach Kompetenzen (intern / extern)**
- Umgang mit **Risiken und Unsicherheiten**
- **Technologische Komplexität** in der Umsetzung
- **Mangel an klaren Standards** für die Industrie 4.0

Diese Dimensionen gilt es in Einklang zu bringen



- Competitive Priorities
- Maturity Level
- Process Stage
- Use Cases

Unternehmensstrategie?
Anspruchsniveau – langfristige Vision?
Wo?
Was konkret?

- Enabling Technologies
- Human Centricity

Technologie?
Welche Mitarbeitende / Kompetenzen?

Quelle: Budde, L., Hänggi, R., Friedli, T. & Rüedy, A. (2022). Smart Factory Navigator. Identifying and implementing the most beneficial use cases for your company – 44 use cases that will drive your operational performance and digital service business. [S.I.]: SPRINGER INTERNATIONAL PU

Die Herausforderung auf dem Weg zur Smart Factory ist die hochgradige Intransparenz der Use Cases & Lösungsanbieter

Hunderte potenzieller use cases für die Smart Factory

Tausende Lösungsanbieter



Source: Industry 4.0 - Reinventing the Factory Stack by Robin Dechant

Hilfe, wie identifizieren wir die passenden Use Cases?



Industrieunternehmen

Oh je, welcher Anbieter hat die beste Lösung?

Smart Factory Navigator

In 5 Jahren Forschung der Universität St. Gallen (HSG) & OST wurde die Use Case Landschaft der Smart Factory bewertet und standardisiert



Veröffentlichung Nov '22

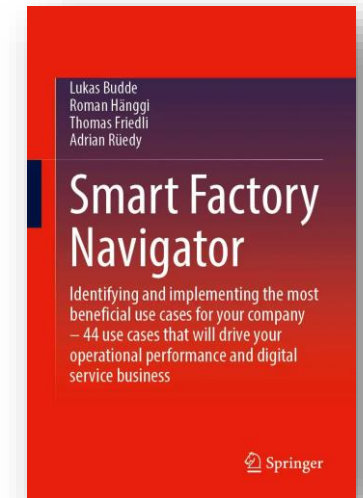
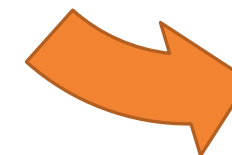
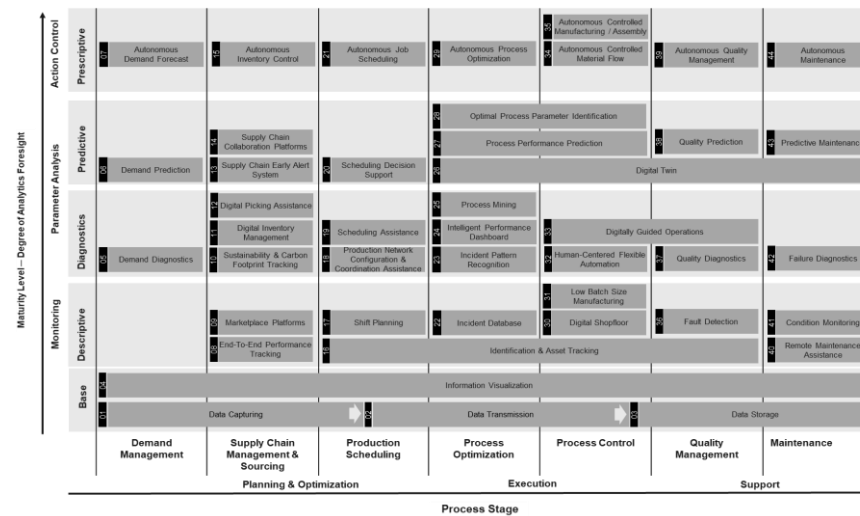
800+ analysierte Use Cases aus >20 Industrien

44 generische Use Cases

1 Prozess zur Identifikation der wichtigsten Use Cases

Technologie Mapping der Use Cases

Smart Factory Framework




Published 11/2022 | ISBN 978-3031172533




Quelle: Smart Factory Navigator AG | <https://www.smartfactorynavigator.com/>




Smart Factory Navigator



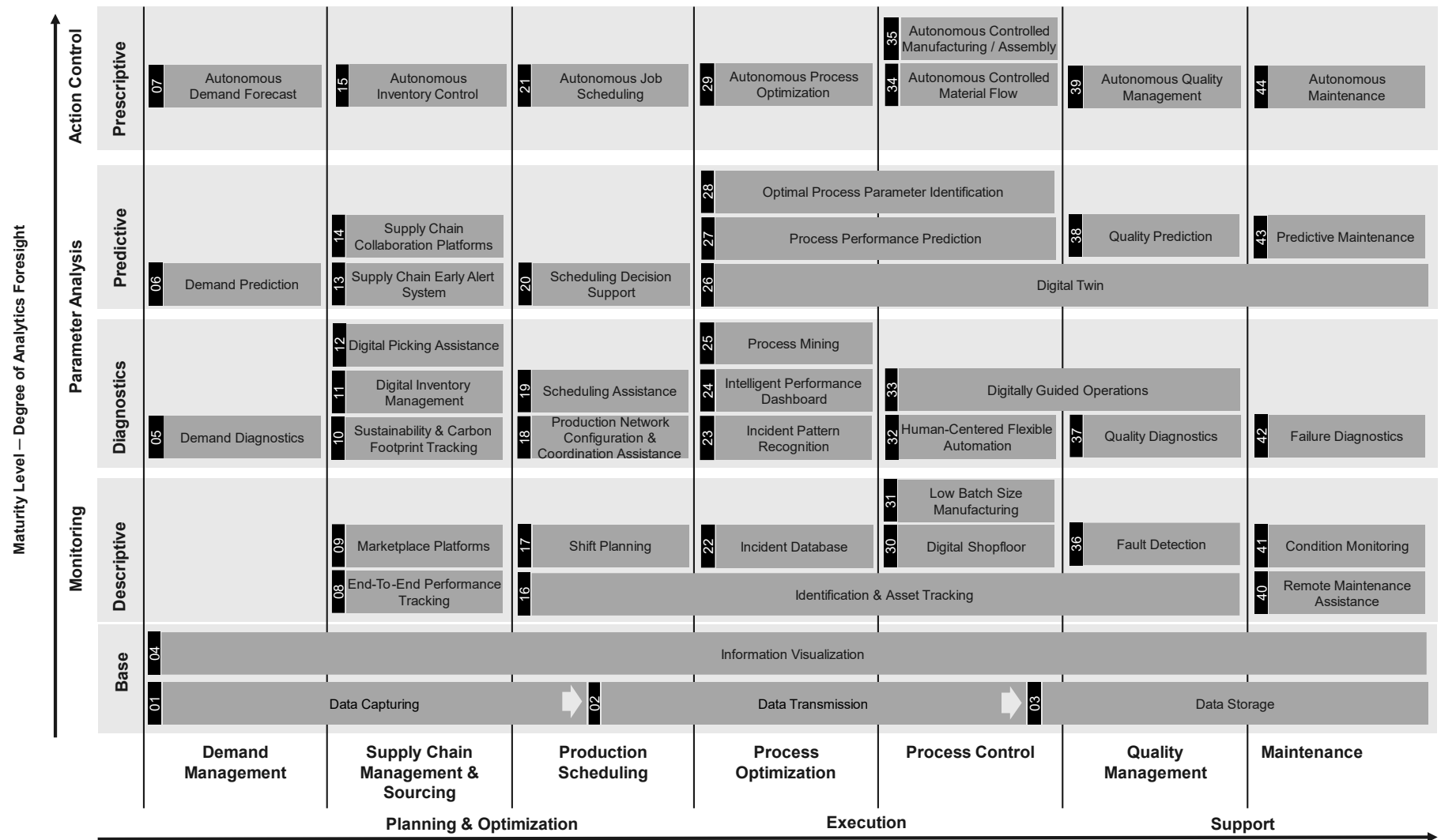
44 Use Cases



25 Technologien

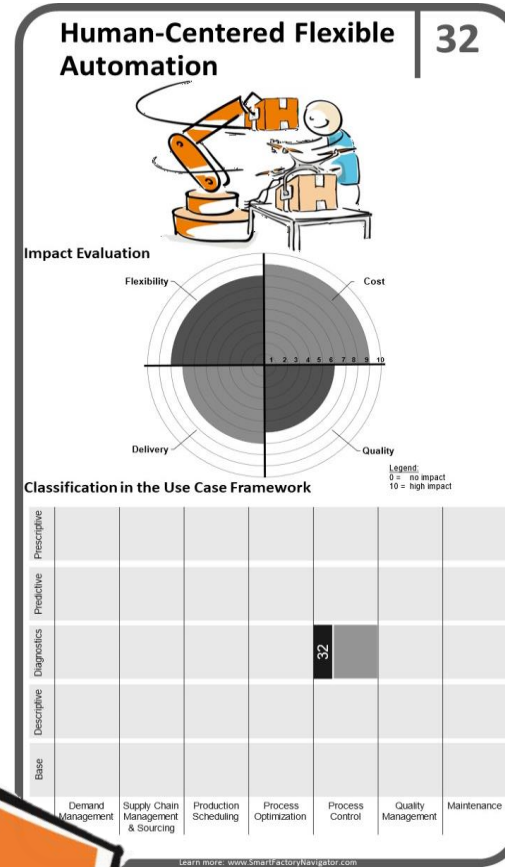
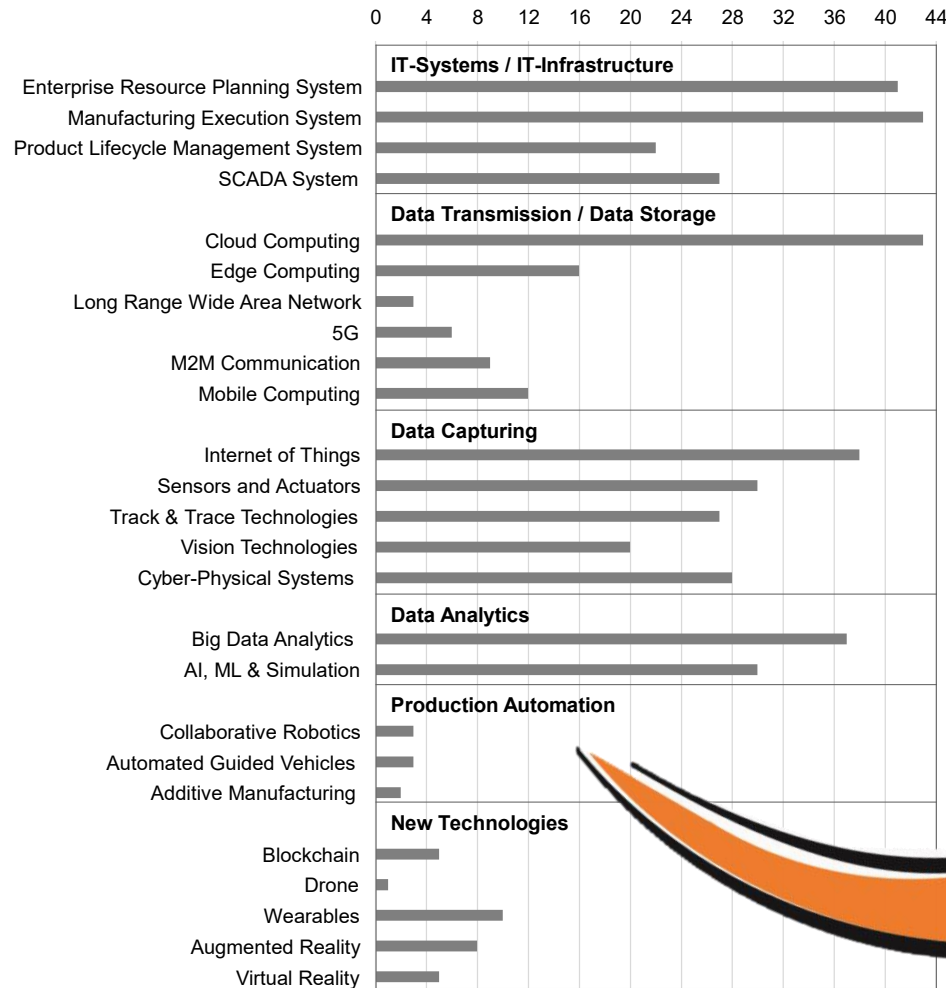


1 Standardisierter Implementierungsprozess



Quelle: Budde, L., Hänggi, R., Friedli, T. & Rüedy, A. (2022). Smart Factory Navigator. Identifying and implementing the most beneficial use cases for your company – 44 use cases that will drive your operational performance and digital service business. [S.l.]: SPRINGER INTERNATIONAL PU

Technologien ermöglichen die Implementierung eines Use Case



Human-Centered Flexible Automation 32

Description

This use case provides the flexible automation solution where humans interact together with machines. This allows the strengths of both players - the human and the machine - to be exploited, which leads to various benefits on the shop floor. The automation solutions are called collaborative robots or cobots. They assist human operators in different tasks at the shop floor and in the warehouse. Cobots are coded to work smartly and situation-dependently and to automation-dependent and support humans in different tasks in close proximity. This allows the workers to focus on more sophisticated and dangerous, repetitive and tedious tasks from human workers due to a lack of fatigue to new tasks hours operations workers

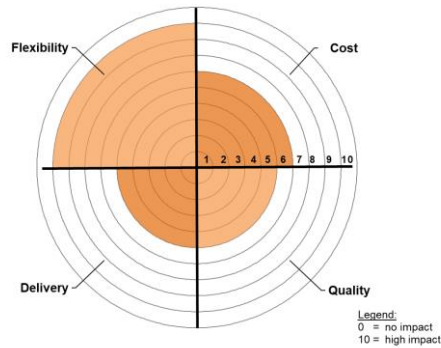
- Big Data Analytics
- AI, ML & Simulation
- Collaborative Robotics
- Wearables

Quelle: Budde, L., Hänggi, R., Friedli, T. & Rüedy, A. (2022). Smart Factory Navigator. Identifying and implementing the most beneficial use cases for your company – 44 use cases that will drive your operational performance and digital service business. [S.l.]: SPRINGER INTERNATIONAL PU

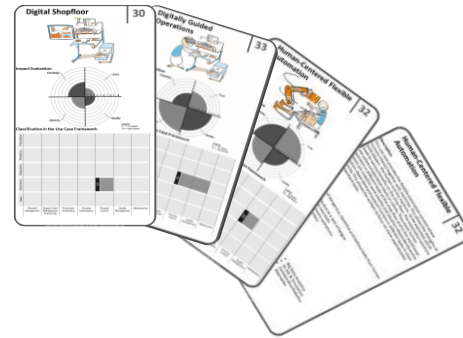
Smart Factory Navigator

Im Mittelpunkt steht ein strukturierter Prozess zur Identifikation der relevanten Use Cases

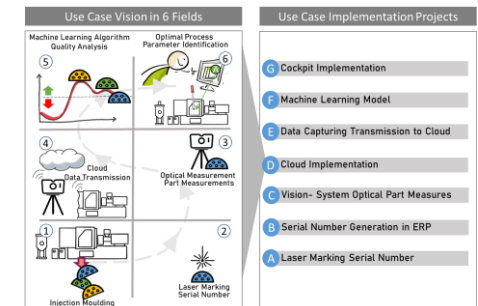
1. Strategische Prioritäten und Herausforderungen definieren



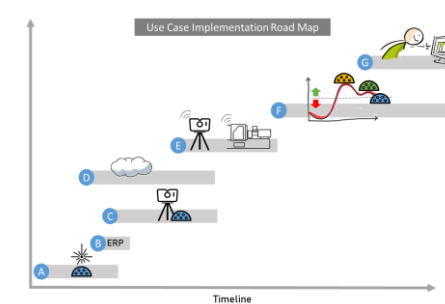
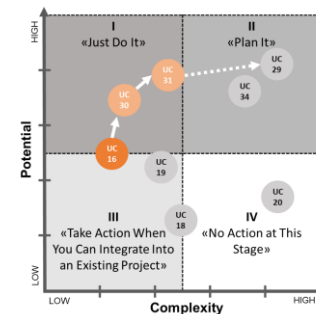
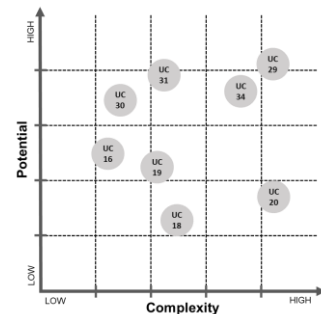
2. Use Cases Selektion und Bewertung in Potenzial und Komplexität – Priorisierung



3. Vom generischen Use Case zum unternehmensspezifischen Kontext der Implementierung

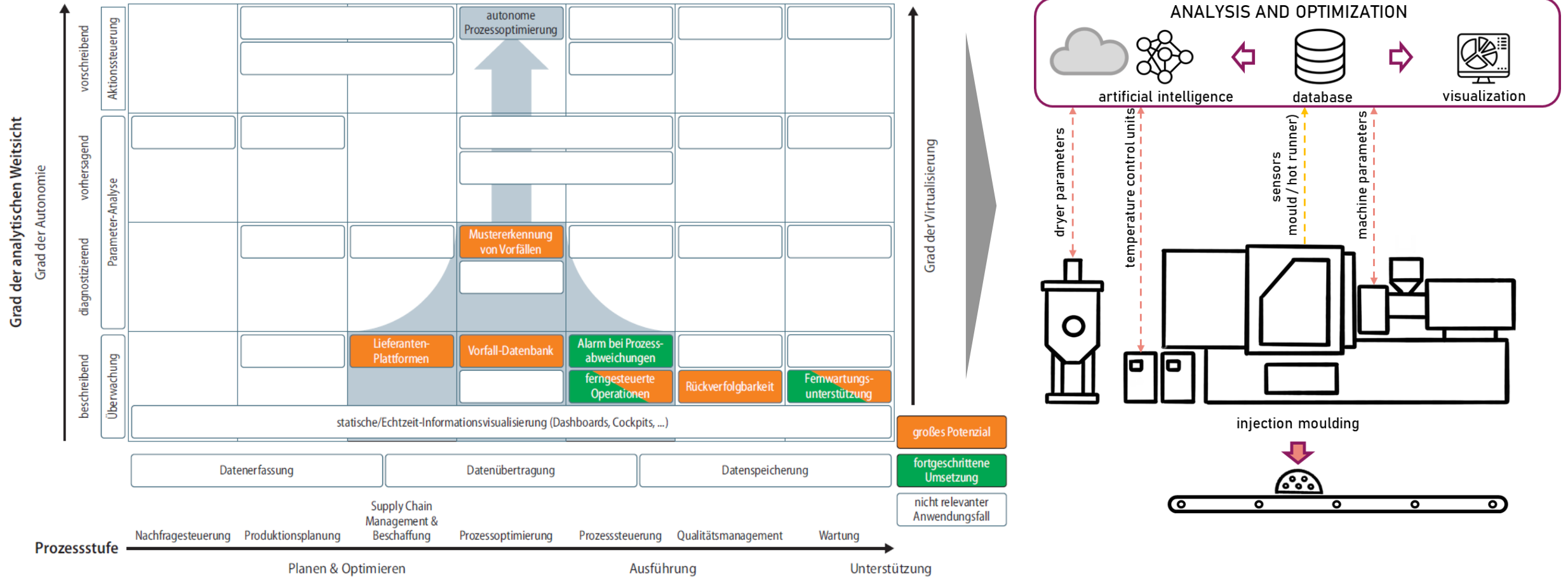


Smart Level - Digital-Factory/Smart-Factory	Process Stage	Use Case
Acting Control	Production Control	UC 1, UC 2, UC 3, UC 4, UC 5, UC 6, UC 7, UC 8, UC 9, UC 10, UC 11, UC 12, UC 13, UC 14, UC 15, UC 16, UC 17, UC 18, UC 19, UC 20, UC 21, UC 22, UC 23, UC 24, UC 25, UC 26, UC 27, UC 28, UC 29, UC 30, UC 31, UC 32, UC 33, UC 34
Parameter Analysis	Production Control	UC 1, UC 2, UC 3, UC 4, UC 5, UC 6, UC 7, UC 8, UC 9, UC 10, UC 11, UC 12, UC 13, UC 14, UC 15, UC 16, UC 17, UC 18, UC 19, UC 20, UC 21, UC 22, UC 23, UC 24, UC 25, UC 26, UC 27, UC 28, UC 29, UC 30, UC 31, UC 32, UC 33, UC 34
Diagnosics	Production Control	UC 1, UC 2, UC 3, UC 4, UC 5, UC 6, UC 7, UC 8, UC 9, UC 10, UC 11, UC 12, UC 13, UC 14, UC 15, UC 16, UC 17, UC 18, UC 19, UC 20, UC 21, UC 22, UC 23, UC 24, UC 25, UC 26, UC 27, UC 28, UC 29, UC 30, UC 31, UC 32, UC 33, UC 34
Monitoring	Production Control	UC 1, UC 2, UC 3, UC 4, UC 5, UC 6, UC 7, UC 8, UC 9, UC 10, UC 11, UC 12, UC 13, UC 14, UC 15, UC 16, UC 17, UC 18, UC 19, UC 20, UC 21, UC 22, UC 23, UC 24, UC 25, UC 26, UC 27, UC 28, UC 29, UC 30, UC 31, UC 32, UC 33, UC 34
Basic	Production Control	UC 1, UC 2, UC 3, UC 4, UC 5, UC 6, UC 7, UC 8, UC 9, UC 10, UC 11, UC 12, UC 13, UC 14, UC 15, UC 16, UC 17, UC 18, UC 19, UC 20, UC 21, UC 22, UC 23, UC 24, UC 25, UC 26, UC 27, UC 28, UC 29, UC 30, UC 31, UC 32, UC 33, UC 34
	Planning & Optimization	UC 1, UC 2, UC 3, UC 4, UC 5, UC 6, UC 7, UC 8, UC 9, UC 10, UC 11, UC 12, UC 13, UC 14, UC 15, UC 16, UC 17, UC 18, UC 19, UC 20, UC 21, UC 22, UC 23, UC 24, UC 25, UC 26, UC 27, UC 28, UC 29, UC 30, UC 31, UC 32, UC 33, UC 34
	Production Scheduling	UC 1, UC 2, UC 3, UC 4, UC 5, UC 6, UC 7, UC 8, UC 9, UC 10, UC 11, UC 12, UC 13, UC 14, UC 15, UC 16, UC 17, UC 18, UC 19, UC 20, UC 21, UC 22, UC 23, UC 24, UC 25, UC 26, UC 27, UC 28, UC 29, UC 30, UC 31, UC 32, UC 33, UC 34
	Process Optimization	UC 1, UC 2, UC 3, UC 4, UC 5, UC 6, UC 7, UC 8, UC 9, UC 10, UC 11, UC 12, UC 13, UC 14, UC 15, UC 16, UC 17, UC 18, UC 19, UC 20, UC 21, UC 22, UC 23, UC 24, UC 25, UC 26, UC 27, UC 28, UC 29, UC 30, UC 31, UC 32, UC 33, UC 34
	Process Control	UC 1, UC 2, UC 3, UC 4, UC 5, UC 6, UC 7, UC 8, UC 9, UC 10, UC 11, UC 12, UC 13, UC 14, UC 15, UC 16, UC 17, UC 18, UC 19, UC 20, UC 21, UC 22, UC 23, UC 24, UC 25, UC 26, UC 27, UC 28, UC 29, UC 30, UC 31, UC 32, UC 33, UC 34
	Quality Management	UC 1, UC 2, UC 3, UC 4, UC 5, UC 6, UC 7, UC 8, UC 9, UC 10, UC 11, UC 12, UC 13, UC 14, UC 15, UC 16, UC 17, UC 18, UC 19, UC 20, UC 21, UC 22, UC 23, UC 24, UC 25, UC 26, UC 27, UC 28, UC 29, UC 30, UC 31, UC 32, UC 33, UC 34
	Maintenance	UC 1, UC 2, UC 3, UC 4, UC 5, UC 6, UC 7, UC 8, UC 9, UC 10, UC 11, UC 12, UC 13, UC 14, UC 15, UC 16, UC 17, UC 18, UC 19, UC 20, UC 21, UC 22, UC 23, UC 24, UC 25, UC 26, UC 27, UC 28, UC 29, UC 30, UC 31, UC 32, UC 33, UC 34



Quelle: Budde, L., Hänggi, R., Friedli, T. & Rüedy, A. (2022). Smart Factory Navigator. Identifying and implementing the most beneficial use cases for your company – 44 use cases that will drive your operational performance and digital service business. [S.I.]: SPRINGER INTERNATIONAL PU

Innosuisse-Projekt: On the Way to the Smart Injection Molding Factory



Quelle: Rüedy, A., Hänggi, R., Budde, L., Ehrig, F., Wick, C. & Schwendemann, D. (2021). Umsetzung von Industrie 4.0 beim Spritzgießen und Compoundieren. Teil 1 der Serie: Use-Cases nach strategischen Prioritäten in der Kunststoffverarbeitung. In Kunststoffe.de (Hrsg.), Kunststoffe (09/2021, S. 22–26). München: Carl Hanser Verlag GmbH & Co. KG.
 Wick, C., Ehrig, F., Schwendemann, D., Hänggi, R. & Rüedy, A. (2021). Auf dem Weg zur smarten Spritzgießfabrik. Teil 2 der Serie: Durchgängige Datenerfassung für die Spritzgießproduktion. In Kunststoffe.de (Hrsg.), Kunststoffe (11/2021, S. 16–19). München: Carl Hanser Verlag GmbH & Co. KG.

Use Case 28: Optimal Process Parameter Identification

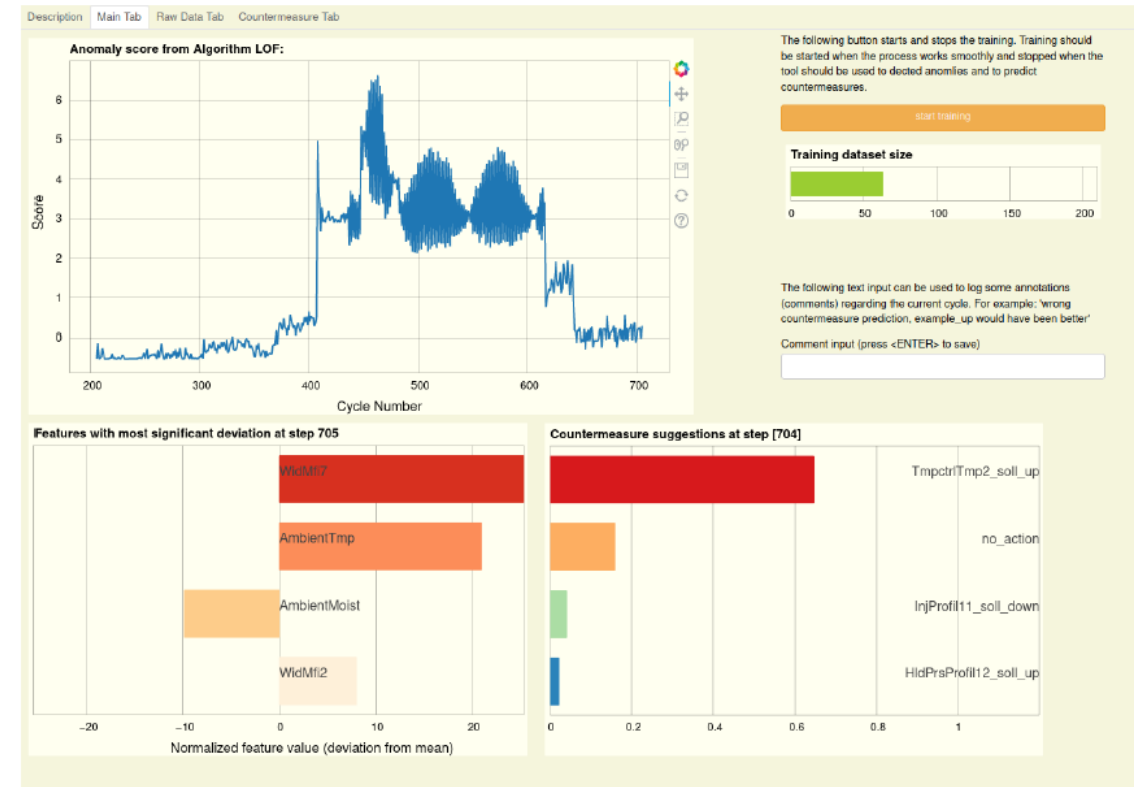
Beschreibung:

Betriebsdaten aus der realen Welt, wie Maschinen-, Werkstück- und Prozessdaten, werden erfasst, analysiert und zur Simulation verschiedener alternativer Prozesskonfigurationen verwendet. Dadurch können die besten Prozessparameter ermittelt und modelliert werden, was zu einer Verkürzung der Zykluszeit führt.

Wirkung:

- Prozessstabilität
- Reduziert Ausschuss und Nachbearbeitung
- Prozessstabilität
- Qualitätssicherung
- Verringerter Ausschuss

Beispiel:



Quelle: Rüedy, A., Hänggi, R., Budde, L., Ehrig, F., Wick, C. & Schwendemann, D. (2021). Umsetzung von Industrie 4.0 beim Spritzgießen und Compoundieren. Teil 1 der Serie: Use-Cases nach strategischen Prioritäten in der Kunststoffverarbeitung. In *Kunststoffe.de* (Hrsg.), *Kunststoffe* (09/2021, S. 22–26). München: Carl Hanser Verlag GmbH & Co. KG.

Use Case 02: Data Transmission

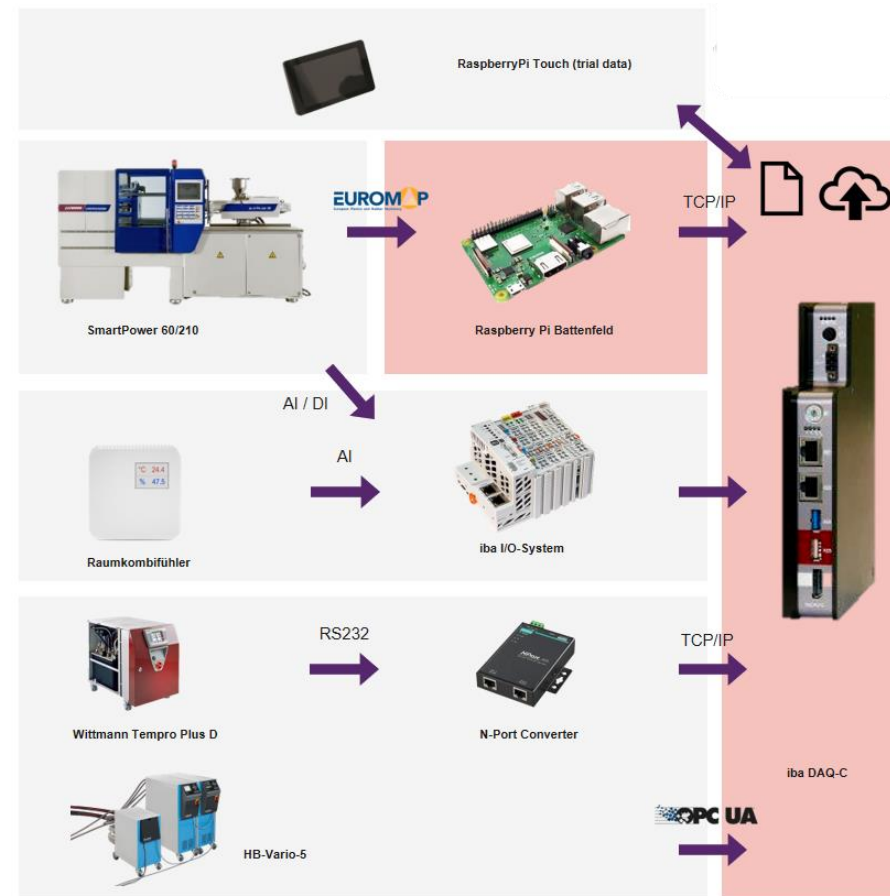
Beschreibung:

Datenübertragung bezieht sich auf das Senden von Datenobjekten entweder innerhalb eines Geräts oder von einem Gerät zu einem anderen. Dies ist für jede digitale, datenbasierte Technologie entscheidend, weshalb dieser Use Case als Base Use Case betrachtet wird.

Wirkung:

- Datentransparenz
- Ermittlung von KPIs
- Grundlegende Voraussetzung für übergeordnete Use Cases

Beispiel:



Quelle: OST IWK, C. Wick, Vorlesungsunterlage DigInd, Data Transmission of the Smart Factory, Oktober 2022

Use Case 04: Information Visualization

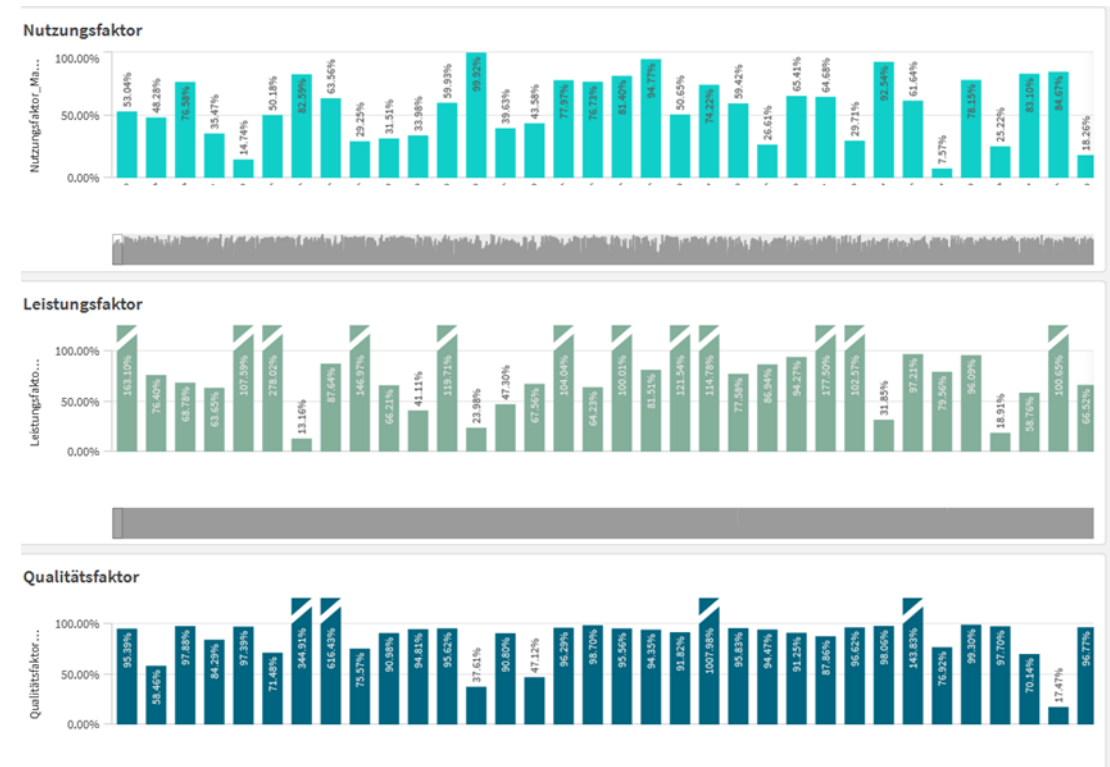
Beschreibung:

Die Visualisierung bildet die Grundlage zur Entscheidungsfindung und unterstützt die Beurteilung von aktuellen KPIs zur Effizienzmessung. Historische und/oder Echtzeitdaten können so über eine Benutzeroberfläche verarbeitet und für eine angemessene Visualisierung genutzt werden.

Wirkung:

- Datentransparenz
- Aufzeigen von KPIs (z.B. OEE)
- Validierung von Daten
- Entscheidungsgrundlage schaffen
- Ergreifen von Maßnahmen
- Prozesstransparenz
- Grundlegende Voraussetzung für übergeordnete Use Cases

Beispiel:



Use Case 16: Identification & Asset Tracking

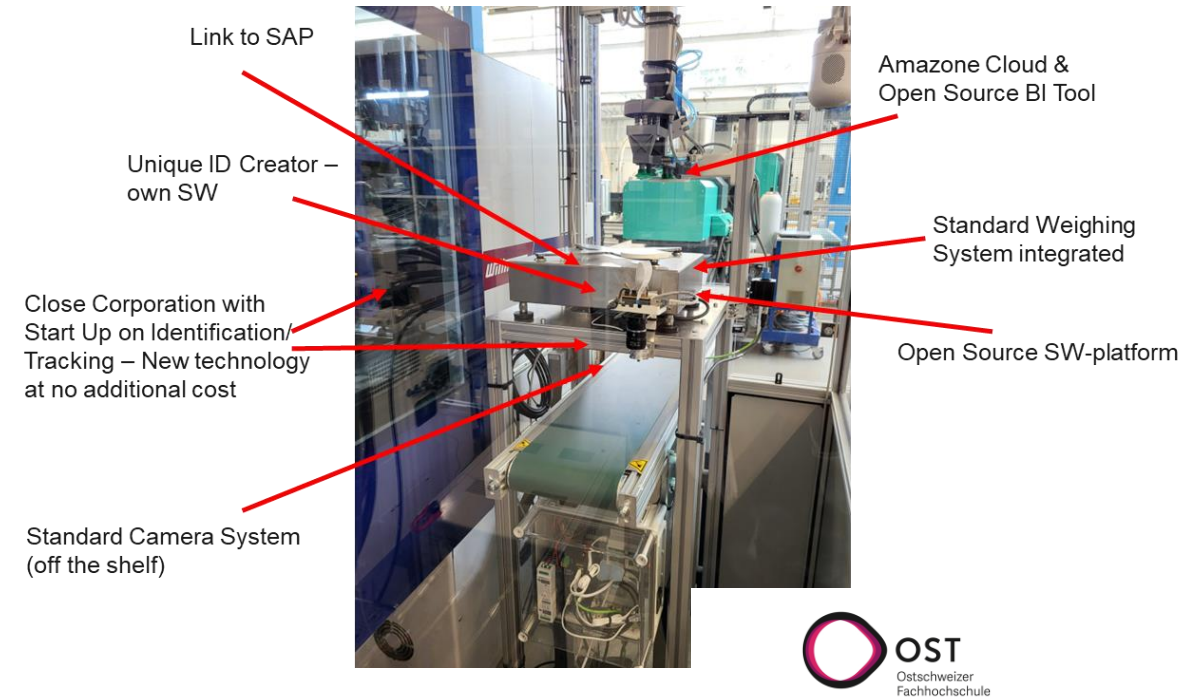
Beschreibung:

Track-and-Trace-Technologien, ermöglichen einen lückenlosen Informationsfluss von Werkstücke und Produkte entlang des Fertigungs- und Montageprozesses. Das Ziel ist die Rückverfolgbarkeit und Transparenz von Produktionsprozessen und die Optimierung einer Vielzahl von leistungs- und kundenbezogenen KPIs.

Wirkung:

- Umgang mit mehreren Produktvarianten
- Qualitätssicherung
- Prozesskontrolle- Termintreue
- Echtzeitverfolgung von Werkstücken
- Planung und Terminierung
- Rückverfolgbarkeit

Beispiel:



Quelle: OST IPEK R. Hänggi, Vorlesungsunterlage Smart Factory, Use Case Implementation, October 2022

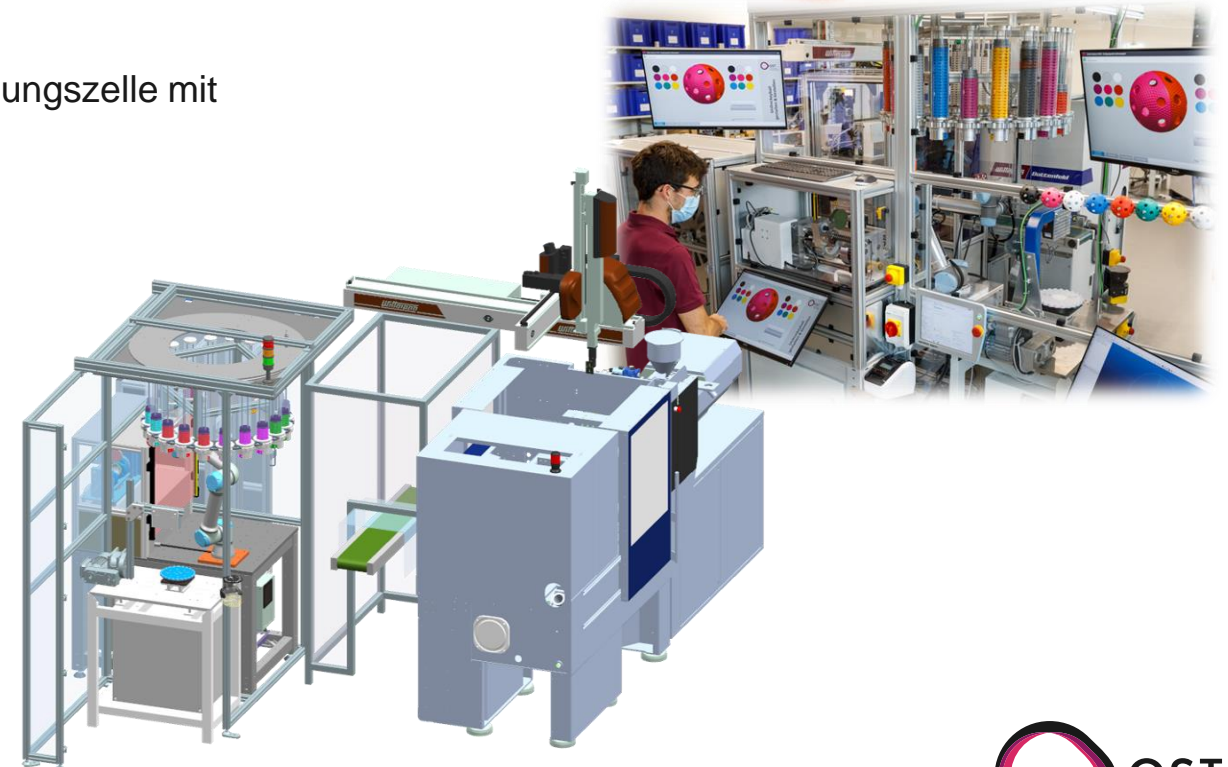
Case Study: Unihockeyball Fertigungszelle



Vollautomatisierte Fertigungszelle für kundenspezifisch gestaltete Unihockeybälle mit Losgrösse 1.

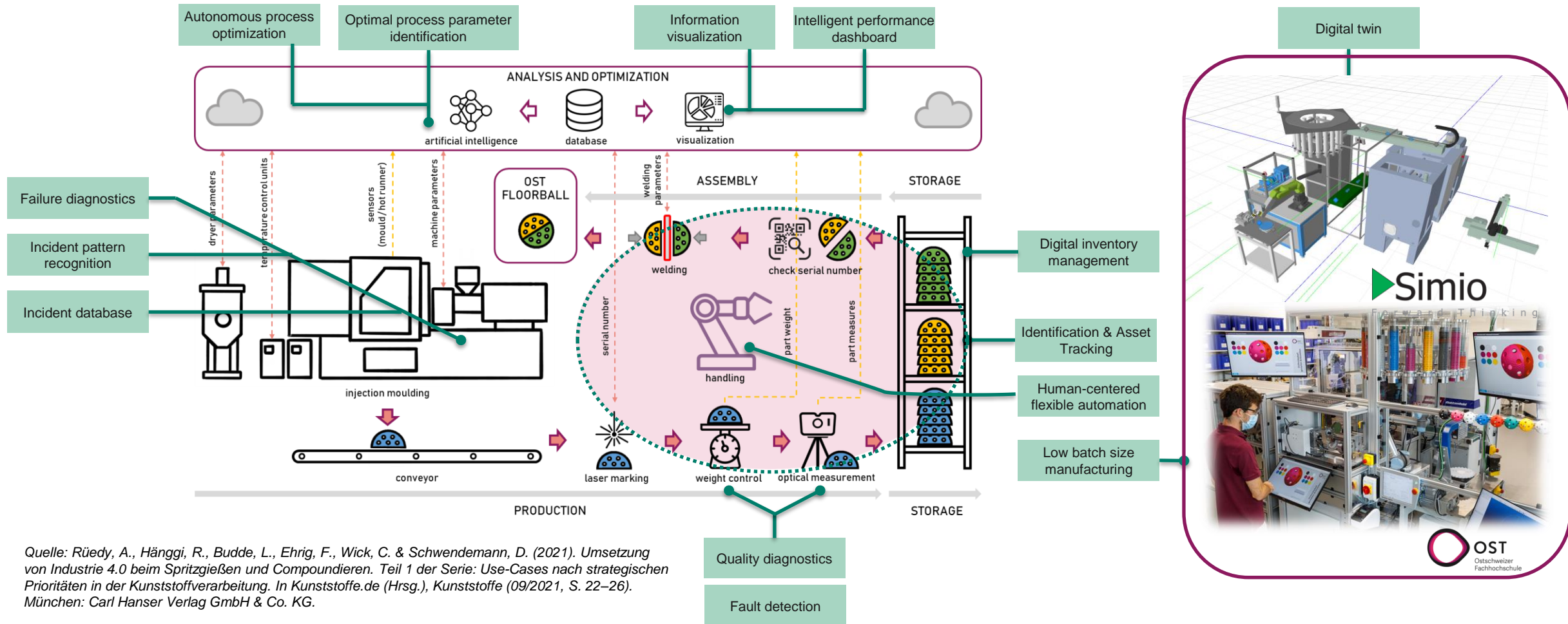
Ziele:

- Demonstration der Möglichkeiten einer automatisierten Fertigungszelle mit kontinuierlicher Datenerfassung
- Lückenlose Rückverfolgbarkeit der Produkte
- Vollständige Kopplung mit einem SAP-System
- Durchführung einer selbstoptimierenden Produktion



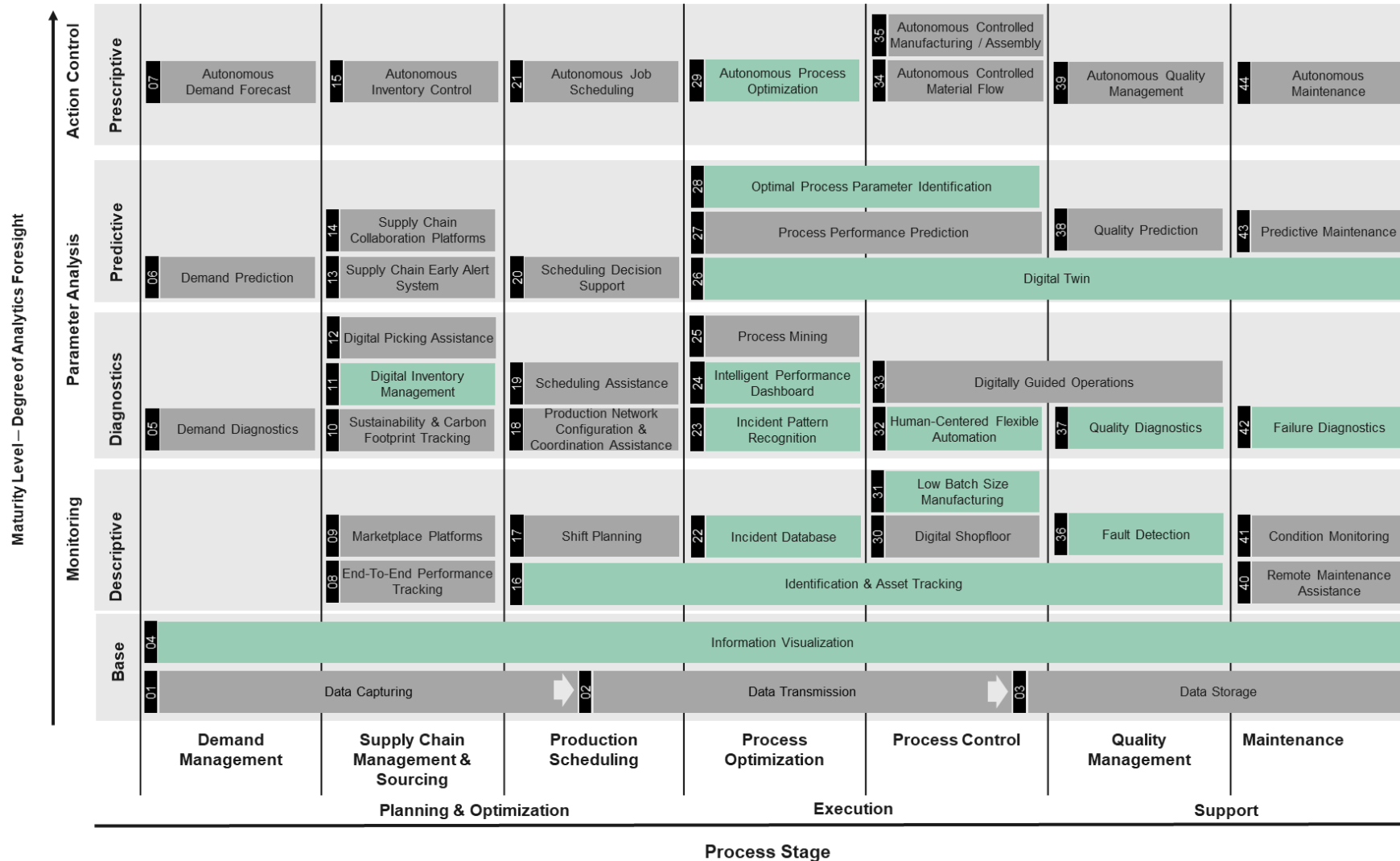
Quelle: SmartFactory@OST, IWK Institut für Werkstofftechnik und Kunststoffverarbeitung

Case Study: Unihockeyball Fertigungszelle



Quelle: Rüedy, A., Hänggi, R., Budde, L., Ehrig, F., Wick, C. & Schwendemann, D. (2021). Umsetzung von Industrie 4.0 beim Spritzgießen und Compoundieren. Teil 1 der Serie: Use-Cases nach strategischen Prioritäten in der Kunststoffverarbeitung. In *Kunststoffe.de* (Hrsg.), *Kunststoffe* (09/2021, S. 22–26). München: Carl Hanser Verlag GmbH & Co. KG.

Case Study: Unihockeyball Fertigungszelle – selected Use Cases



Quelle: Budde, L., Hänggi, R., Friedli, T. & Rüedy, A. (2022). Smart Factory Navigator. Identifying and implementing the most beneficial use cases for your company – 44 use cases that will drive your operational performance and digital service business. [S.I.]: SPRINGER INTERNATIONAL PU

Use Case 18: Production Network Configuration & Coordination Assistance

Beschreibung:

Die Verwaltung eines globalen Produktionsnetzes erfordert eine Vielzahl wichtiger strategischer Entscheidungen in Bezug auf Produktionsstandorte und die Koordinierung. Analytische Unterstützungssysteme - Simulation, Modellierung, etc. - ermöglicht eine größere Flexibilität und Optimierungsmaßnahmen.

Wirkung:

- Liefertreue
- Identifizierung von Outsourcing-Potenzialen
- Kosten durch internationale Handelsbeschränkungen (Zölle)
- Nutzung von Größen- und Verbundvorteilen
- Verlagerung von Produktionsvolumen und Ressourcen

Beispiel:

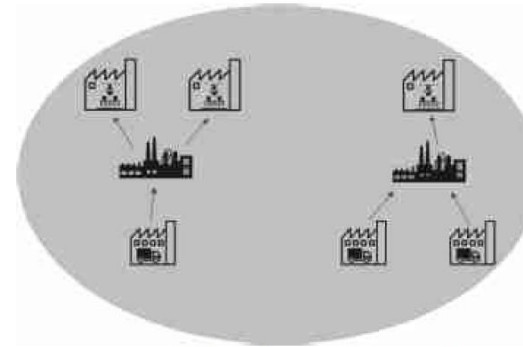


Figure 5: Local-to-local network

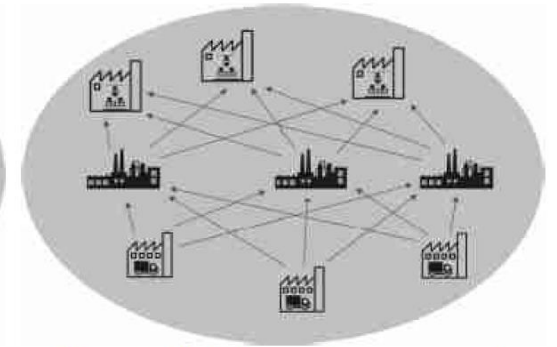
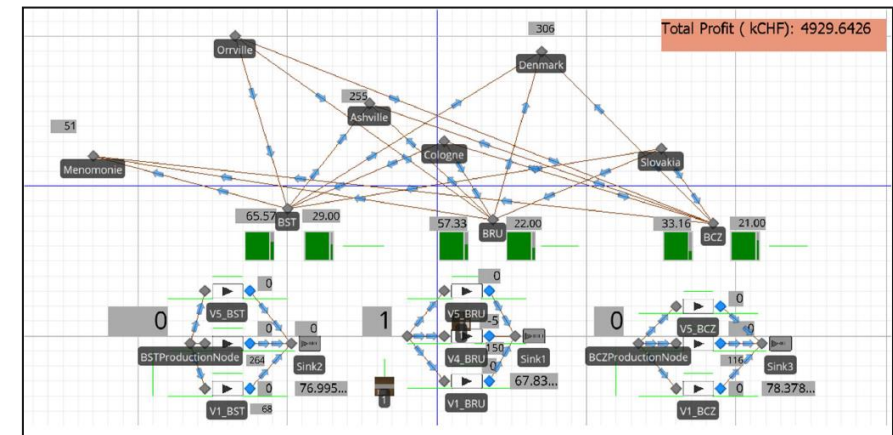
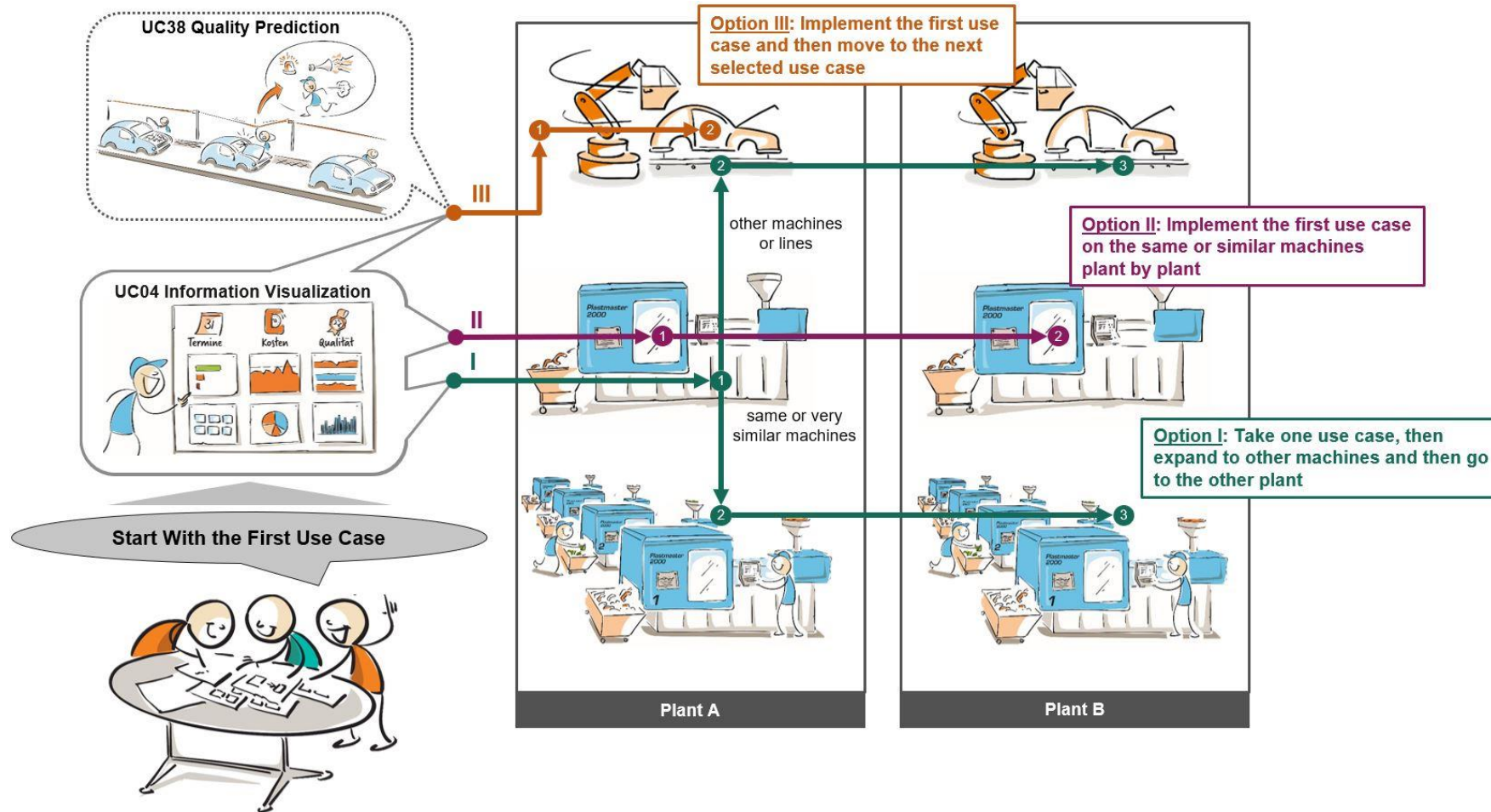


Figure 6: Global cross-shipping network



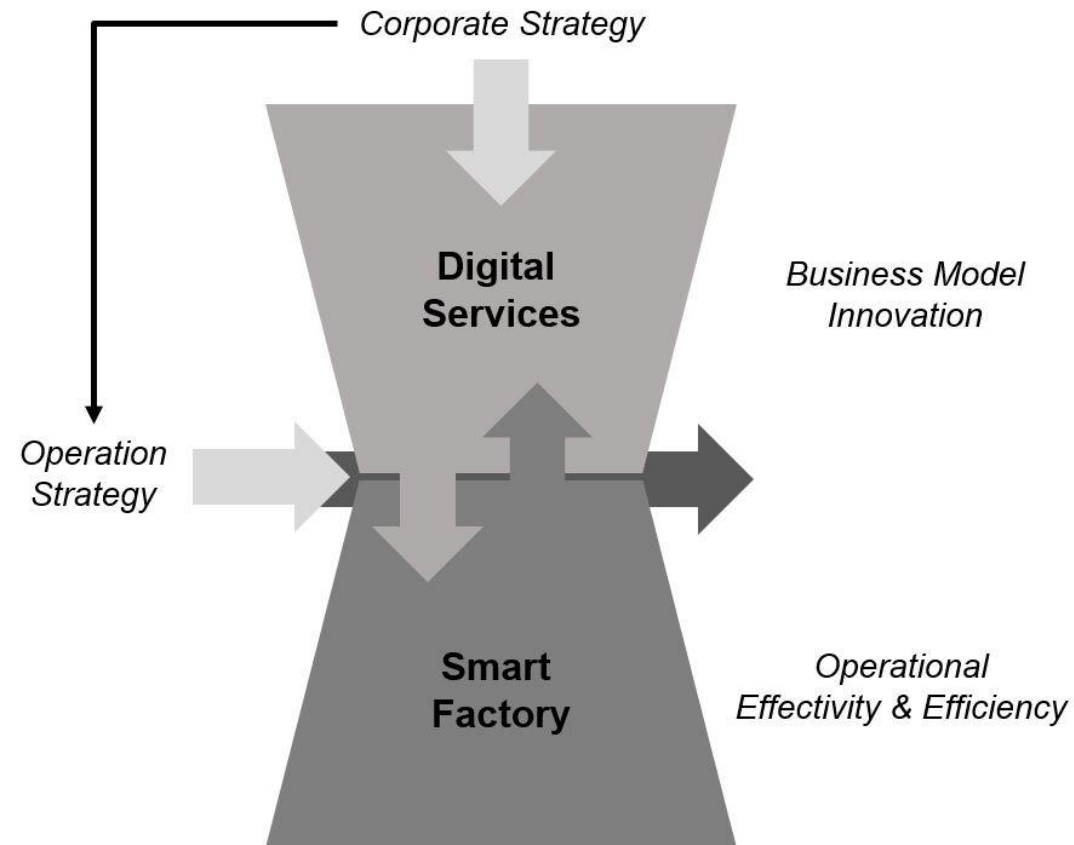
Quelle: Liao, S., Rüegg, A. & Hänggi, R. Deriving a global production network type in times of uncertainty – a simulation based approach.

Schritt für Schritt das erlernte Wissen skalieren



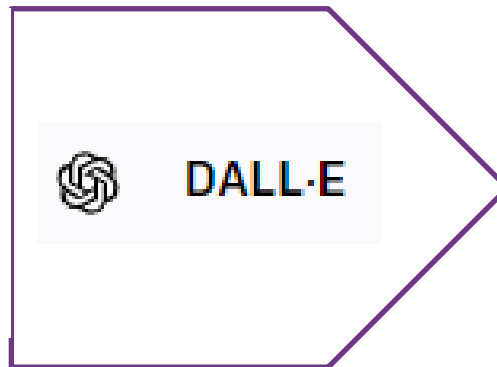
Quelle: Budde, L., Hänggi, R., Friedli, T. & Rüedy, A. (2022). Smart Factory Navigator. Identifying and implementing the most beneficial use cases for your company – 44 use cases that will drive your operational performance and digital service business. [S.I.]: SPRINGER INTERNATIONAL PU

Ableiten von digitalen Services



Quelle: Budde, L., Hänggi, R., Friedli, T. & Rüedy, A. (2022). Smart Factory Navigator. Identifying and implementing the most beneficial use cases for your company – 44 use cases that will drive your operational performance and digital service business. [S.I.]: SPRINGER INTERNATIONAL PU

play along,
do not watch from
outside.





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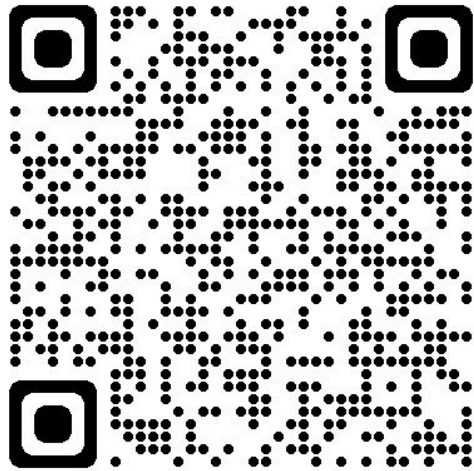
Mobile +41 79 959 22 92

E-Mail stefan.graetzer@ost.ch

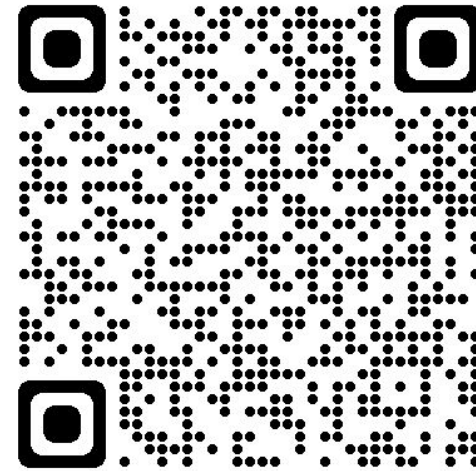


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