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2017-11-14 | Philipp Bierschneider, DF FA SE DS DI, Siemens AG

The Digitalization Journey @ Siemens Amberg

Vita Philipp Bierschneider

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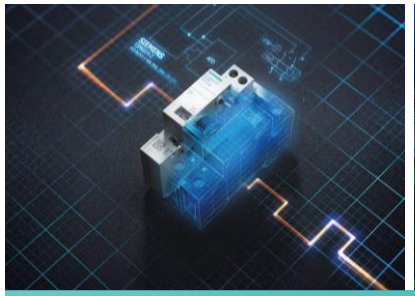
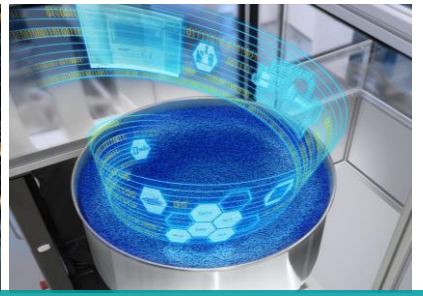
Diploma Examination
Electrical Engineering

Head of IT Department (Bremen)
Factory organization

Digitalization and Innovation
Lead Implementation Programm
@ Siemens Amberg (GWA)





1994 | 1998 | 2000 | 2003 | 2007 | 2016

Siemens
SAP Consultant

Head of IT Department (Amberg)
Lead of Quality, Sales and Development

Siemens Consulting
Principal Consultant
Digital Business

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Digitalization:
the extension of CIP and Lean Methodology

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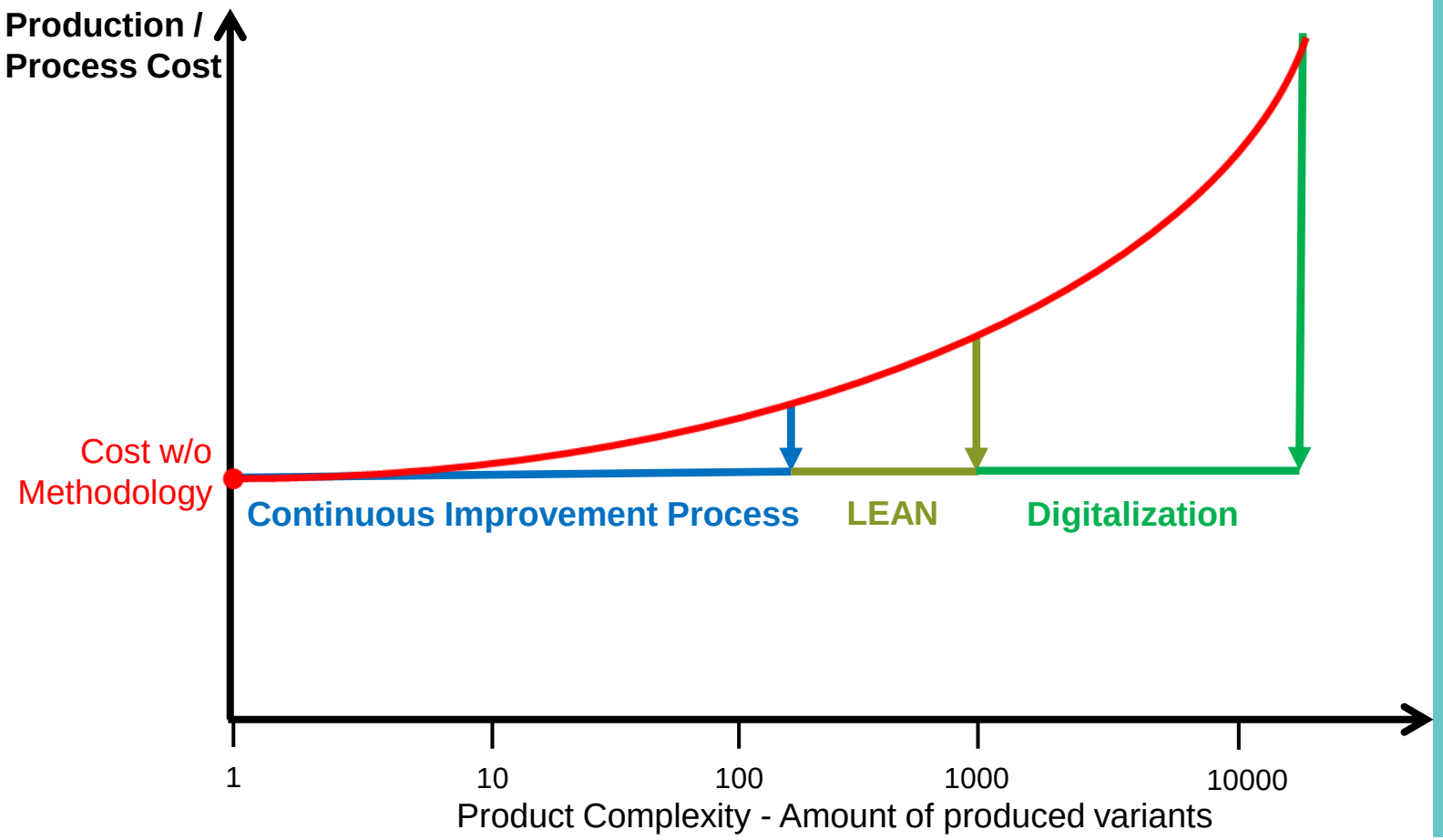

Digitalization continues the approach of CIP and LEAN:

Mastering complexity and cost reduction

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Complexity Driven Effort based on Industry Standards Industry 4.0 defends the cost position for Batch Size 1 Production

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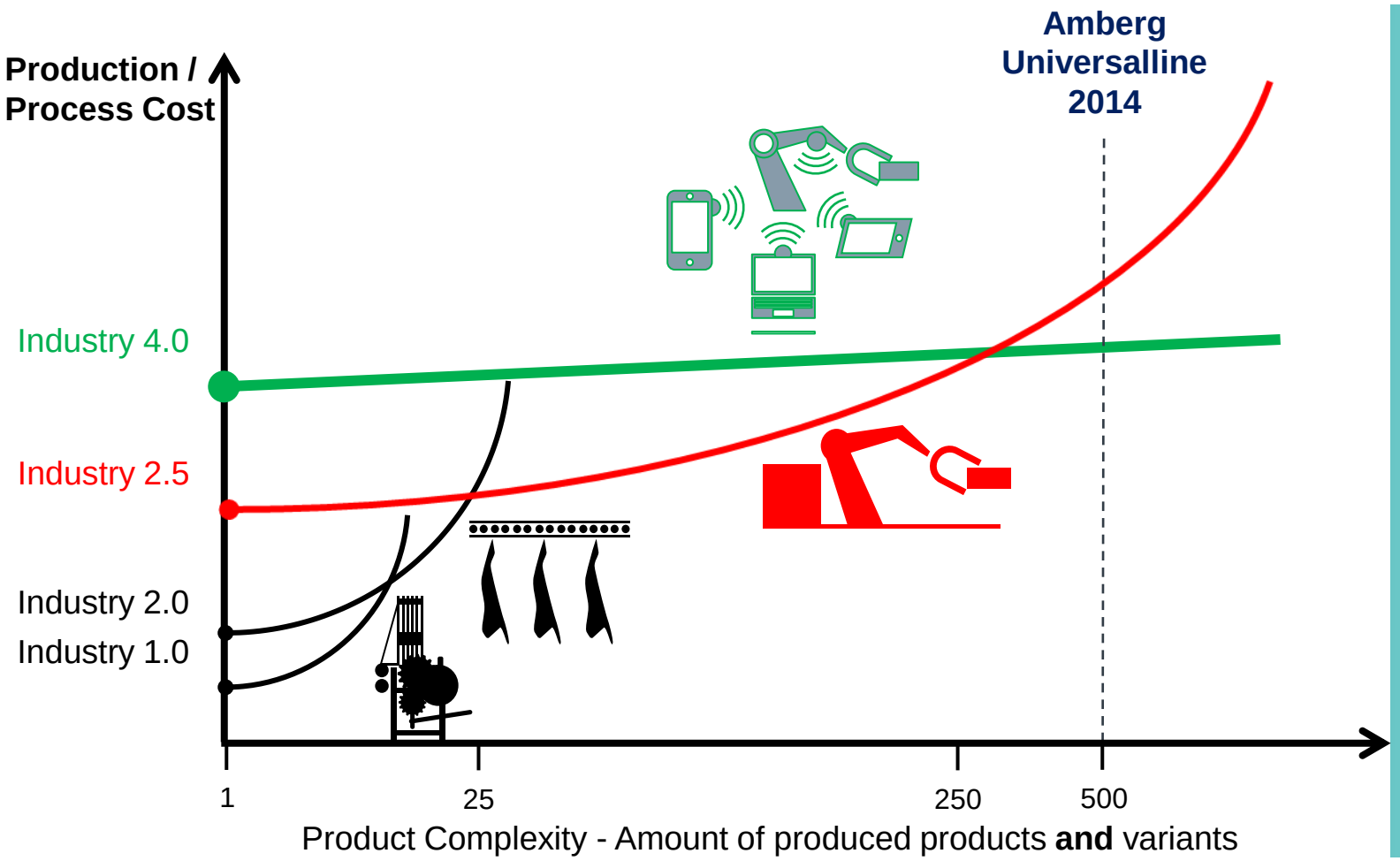

By increasing the variety of the product portfolio as well as the product volume, the Industry 4.0 Design is an enabler to reduce factory investments

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Siemens Factory Amberg produces Industrial switchgear portfolio: SIRIUS

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Switching

Protecting

Starting

Monitoring & controlling

Detecting

Commanding & signaling

SIRIUS – industrial controls for switching, protecting and starting loads and PCBs for industrial Automation

Systems

Safety

Engineering

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DF CP
Global setup – locations

12 Production Sites

5 Research Center

* EM-Lead-Division

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Location Amberg, DF CP Business Key-Figures

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Smart Factory CP Amberg:

Approx. 1.000 blue colors employees

Material consumption :

6000 t of metal

2000 t of plastic

Product & Process:

150.000 salable products

20.000 product modify changes per year

3.400.000 produced units per month

within 500 different Product types per day

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Digitalization Success Story of a DF CP Product out of 500 different products and 14 product Groups on one production Line

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SIRIUS 3RM1 Motor Starter

Product Highlights:

Compact – only 22.5 mm

Multifunctional – up to four functions in one device

Long service life – thanks to hybrid switching technology

Product launch: 12/2012

product design award 2013

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Industrie 4.0 Example:
Product Launch of SIRIUS 3RM1 Motor Starter

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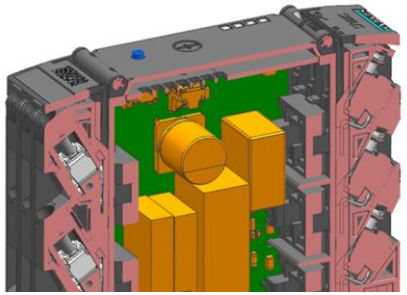
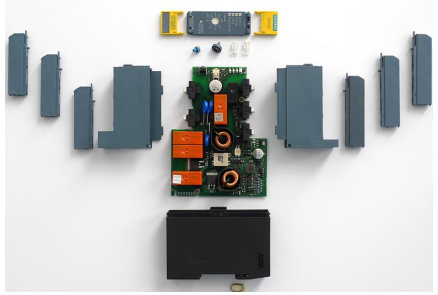
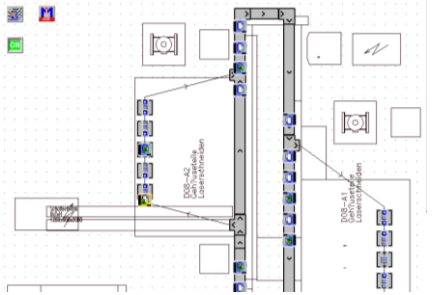
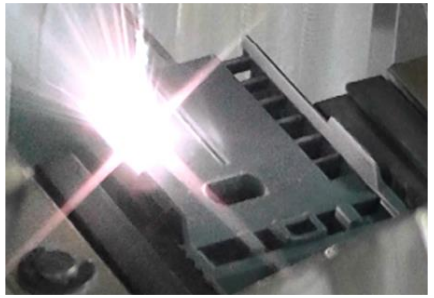
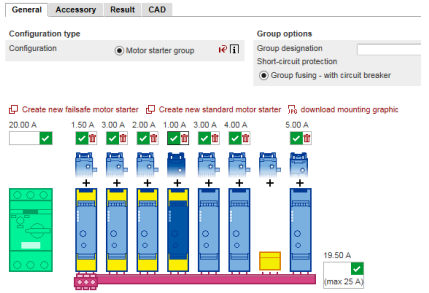
1 Product design	2 Production planning	3 Production engineering	4 Production execution	5 Services
Digital Development & Validation	New manufacturing concept	Simulation	Smart Manufacturing	Digital Sales & Service











Consistent use of all currently available Digitalization Tools along the whole value chain [NX, Teamcenter, Tecnomatix, MindSphere, TIA Portal]

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Digital Twins & Validation with Simulation Tools

Ansys – NX – FloTHERM - …

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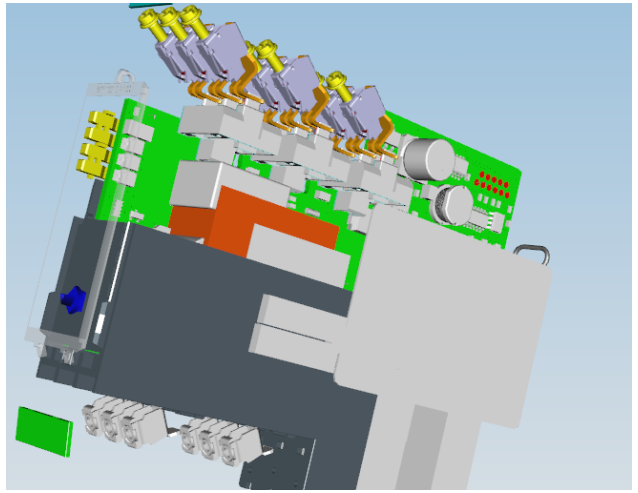
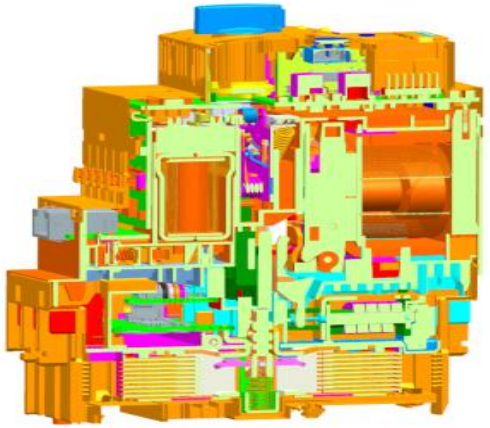
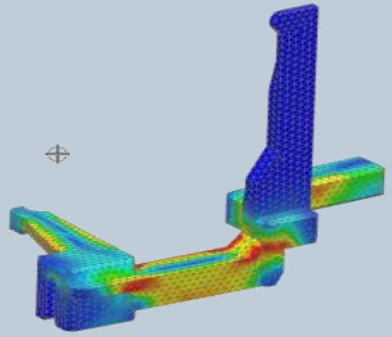
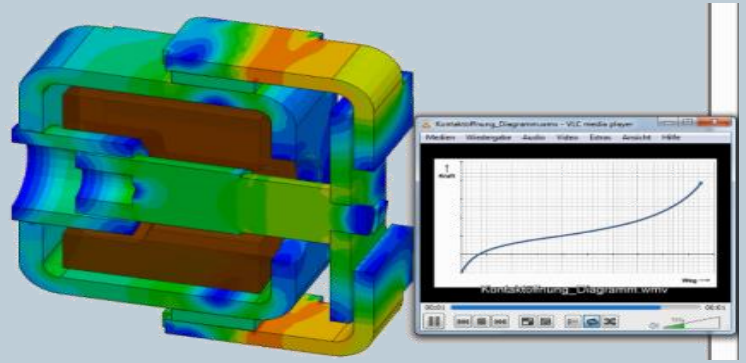




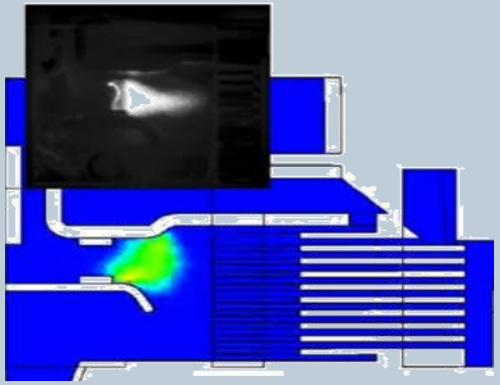
Mechanical



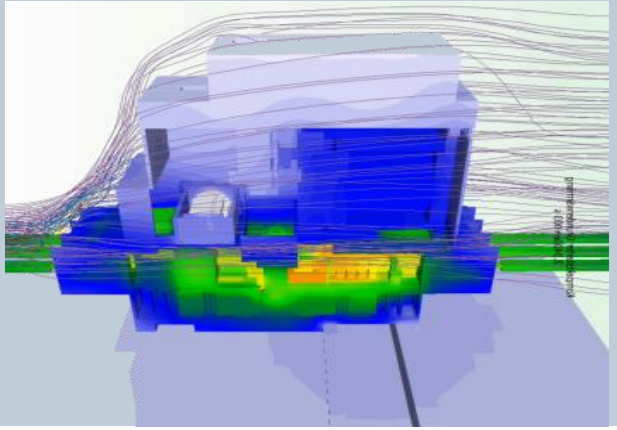
Electromagnetic Movement



System Simulation



Temperature



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Our answer for flexibility: Housing and Production Platform

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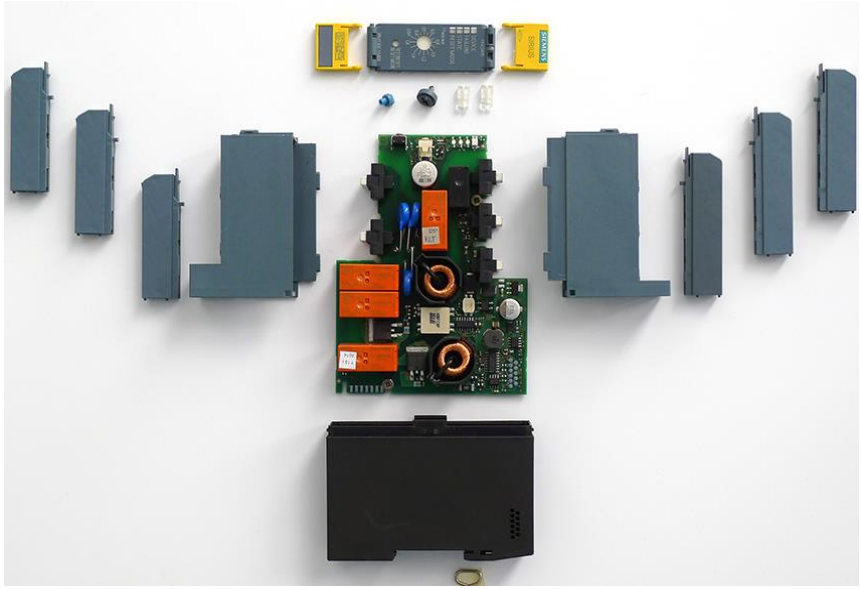
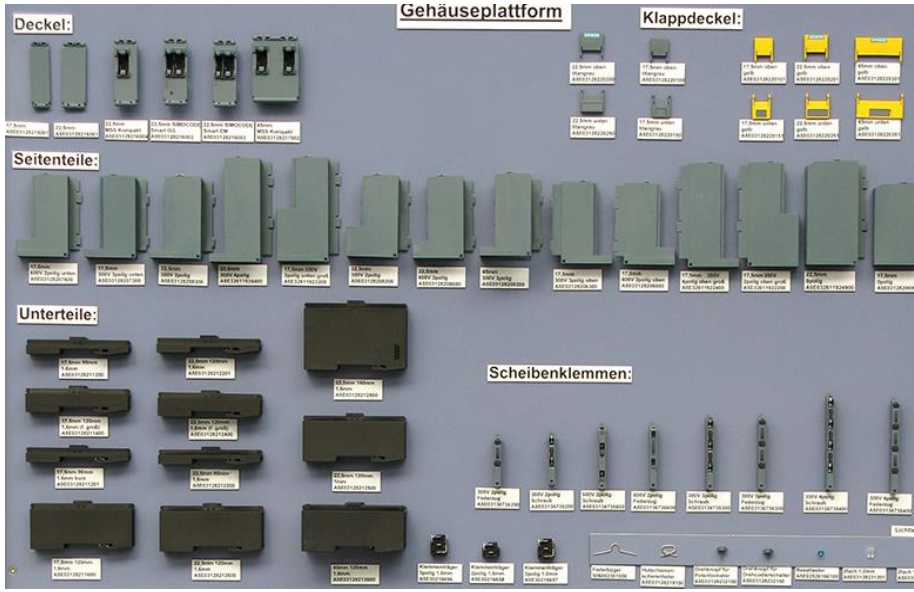
Housing

The housing assembly kit offers standardized housing parts for new developments which are flexibly combinable with each other.





Advantages

- Multi-usage of housing parts (reduction of variance)
- Provision of approved housing solutions → Decrease of development expenditure and risks
- Standardized design, accessories and handling of products for the customer

Reduction of

- Tool investment
- Material costs
- Development expenditure
- Project lead times

see annex for detailed economic data

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Digital Production Engineering – Digital Twin for Simulation and Validation of the Manufacturing Equipment

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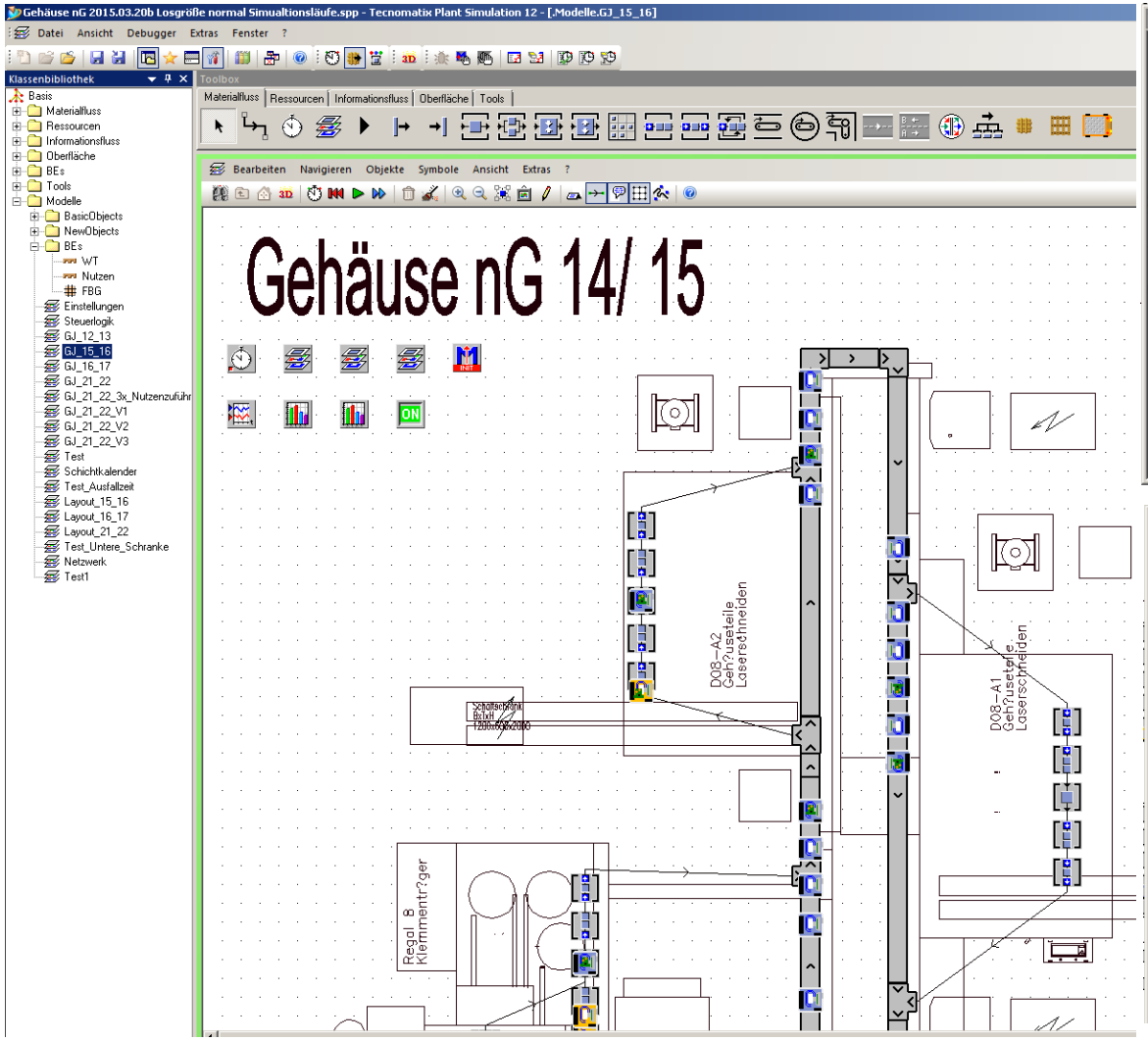
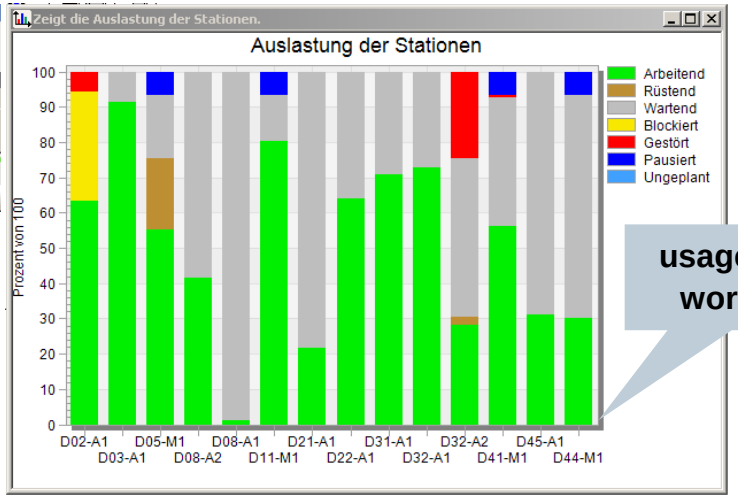
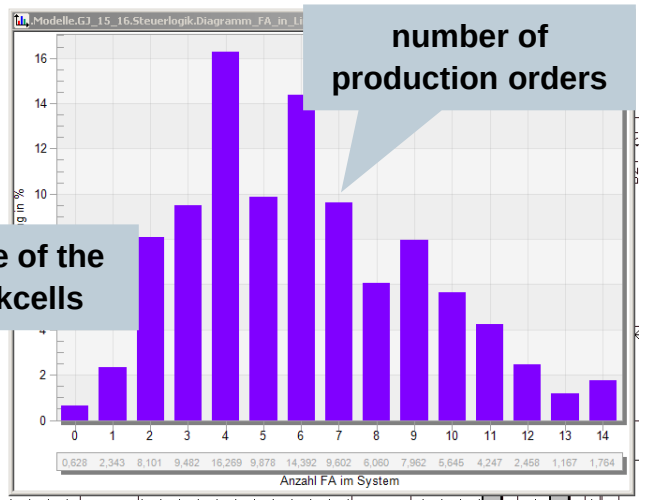
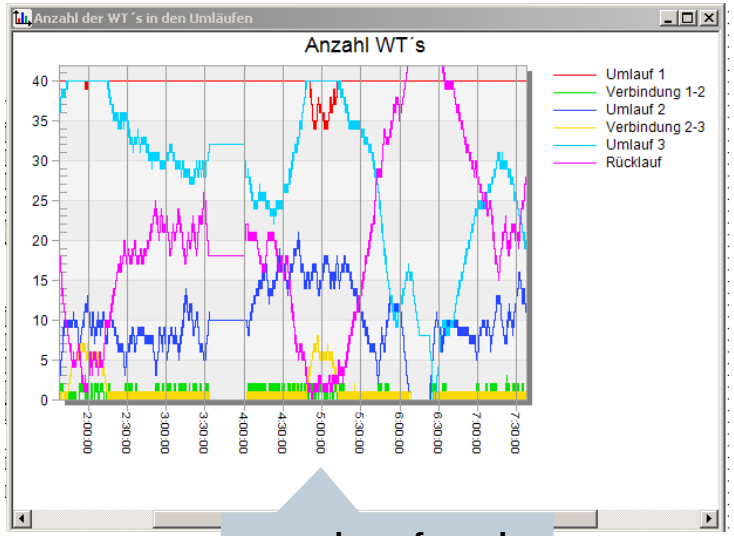




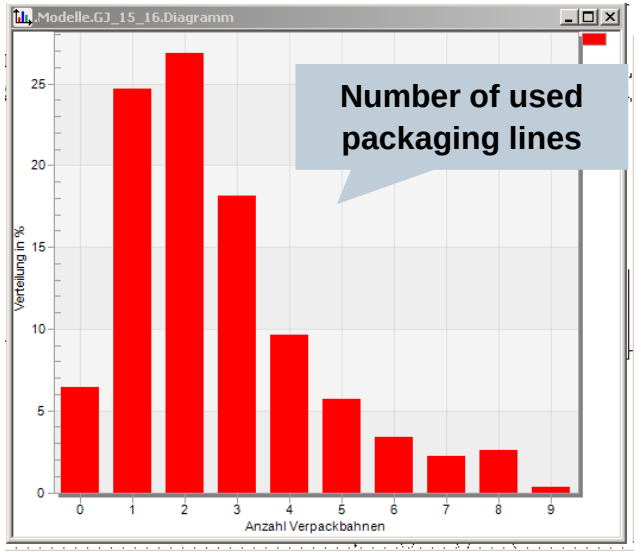
usage of the workcells



number of production orders



number of used workpiece carrier



Number of used packaging lines

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Smart Workpiece Carrier System “Cyberphysical System”

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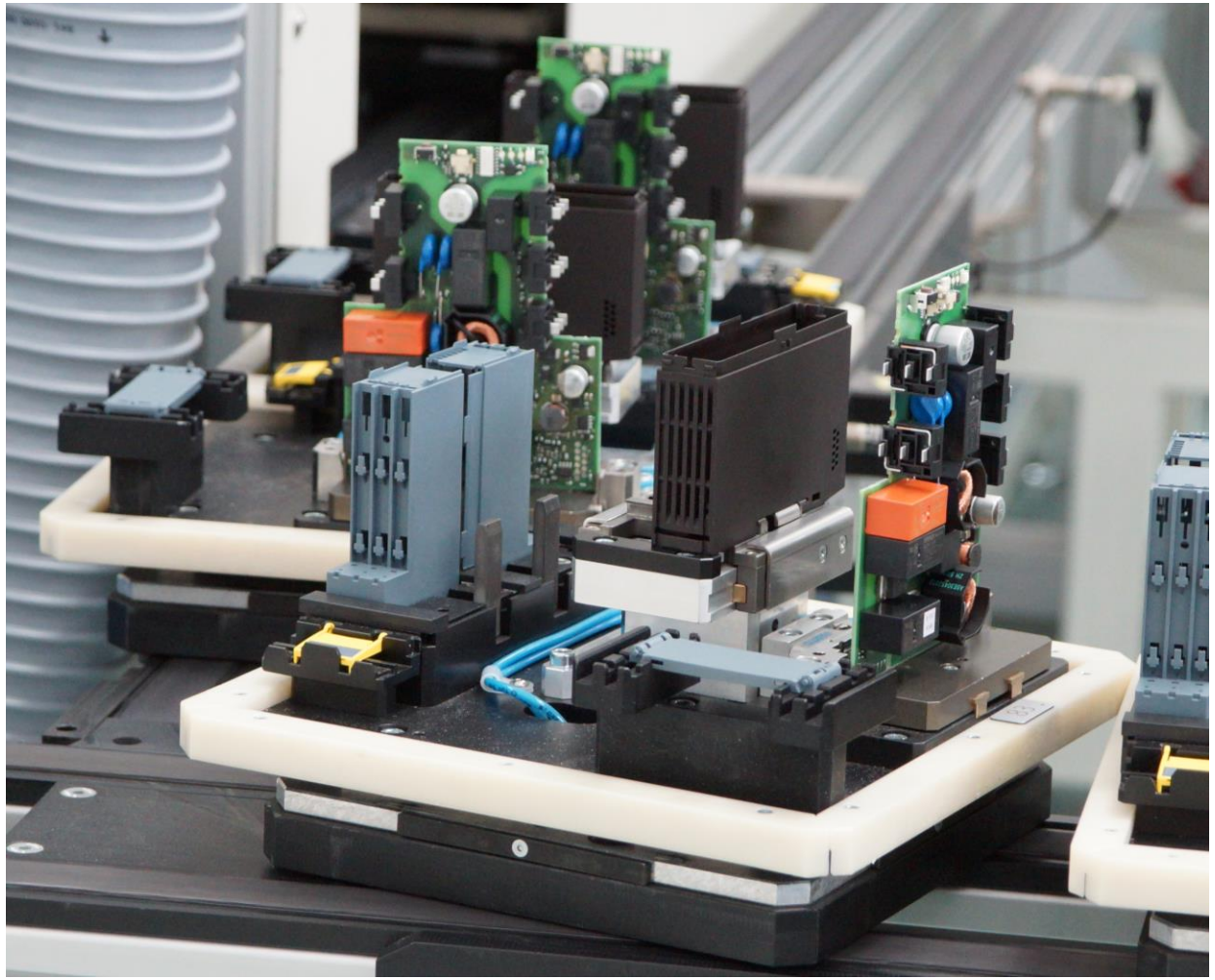

- Implements the whole manufacturing process
- Full traceability of the production process
- Quality information included
- Interaction with product knowledgebase
- One fits for all product variants
- RFID Chip based
- Just in Time Work Instruction

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Reality and Digital Twin

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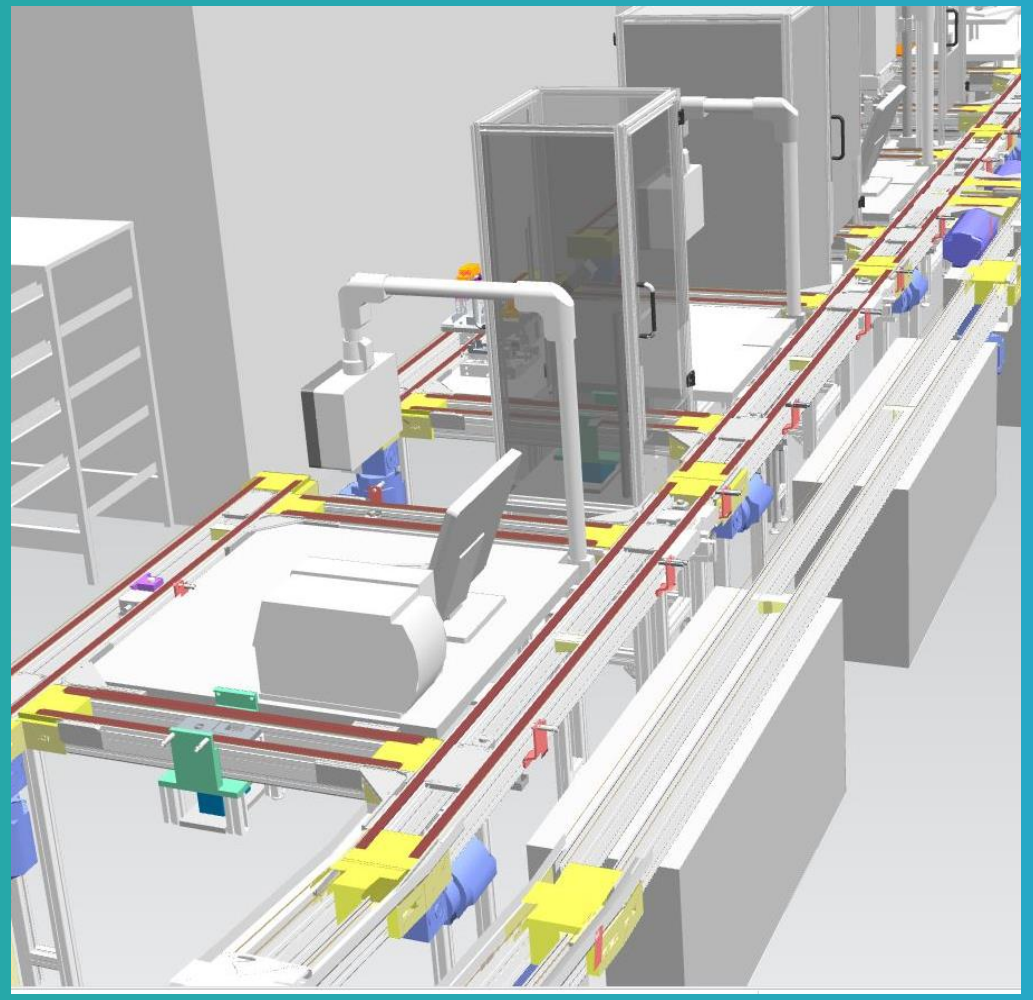

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Industry 4.0 Manufacturing with smart Interfaces for human operators

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Best possible combination of digital and human intelligence

Visualization of Machine Monitoring and status

Active and visual guidance of machine worker

Flexible System Configuration as reaction to interruptions

Active guidance of Assembly Line Personnel

Electronic Work Instructions supporting manual assembling workshop

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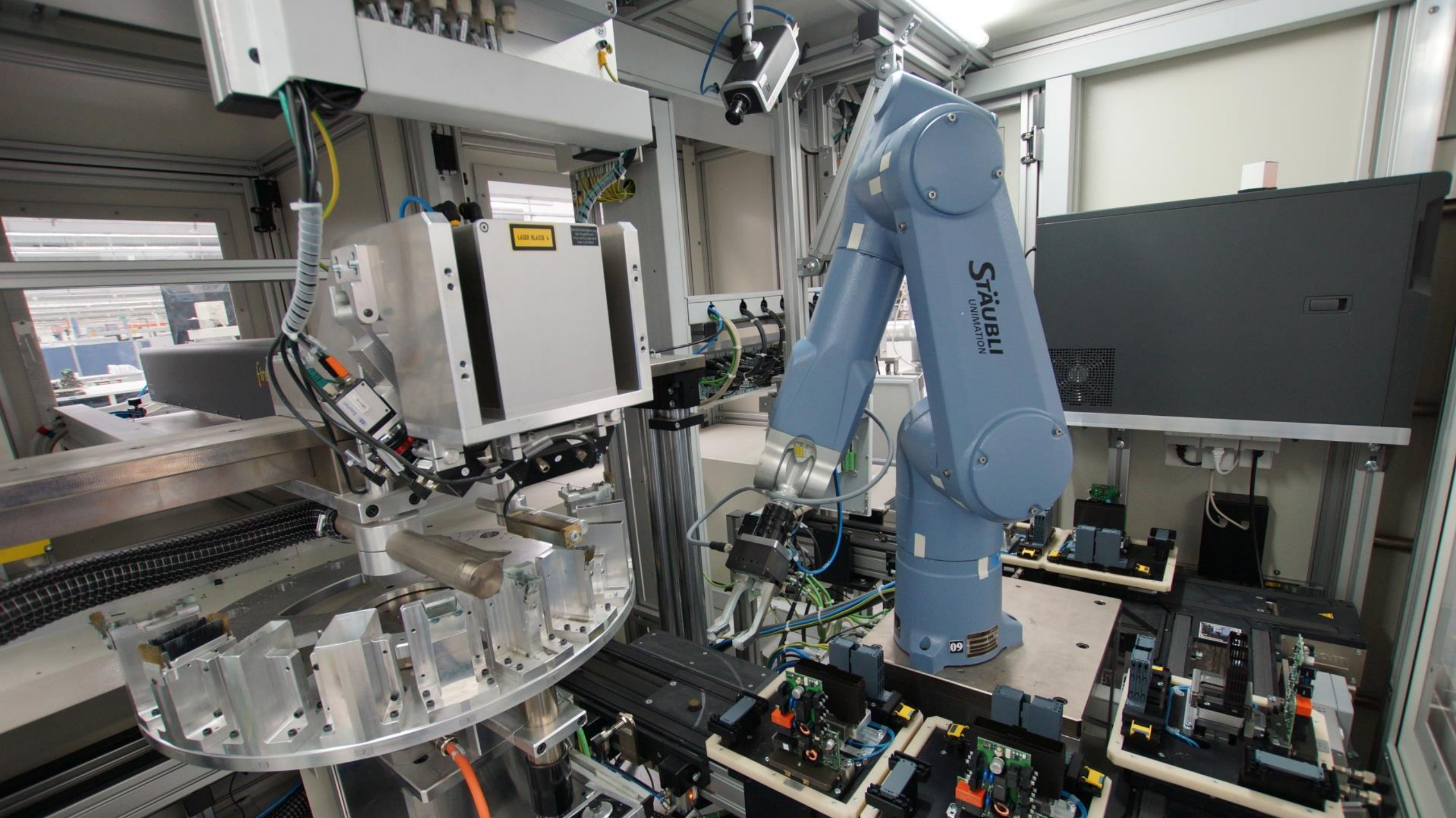
SIMATIC MULTI PANEL
ZURÜCK
HOME
Ein
Not - Halt
1
2
7
8


LASER KLASSE 4
STÄUBLI
UNIMATION
09

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Siemens Factory Amberg:

Impressions of the Digital Factory

Final Assembly and Quality Check

Monetary savings through IE 4.0 automation in our innovation production line

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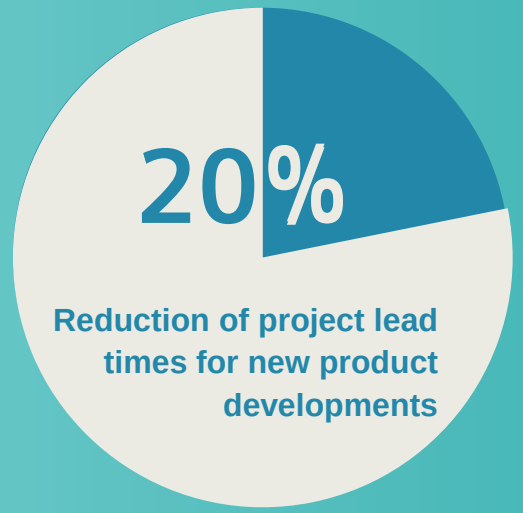
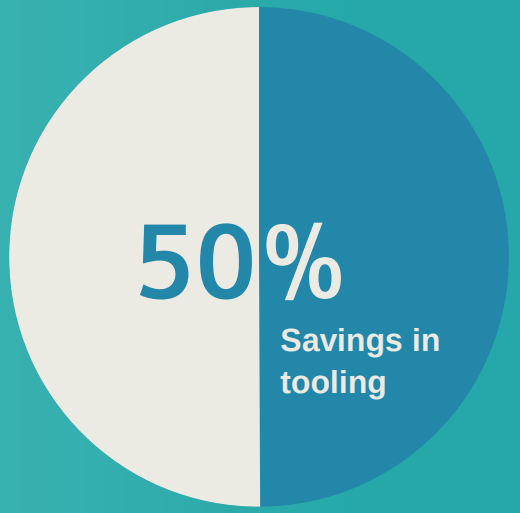
Savings in development of new products

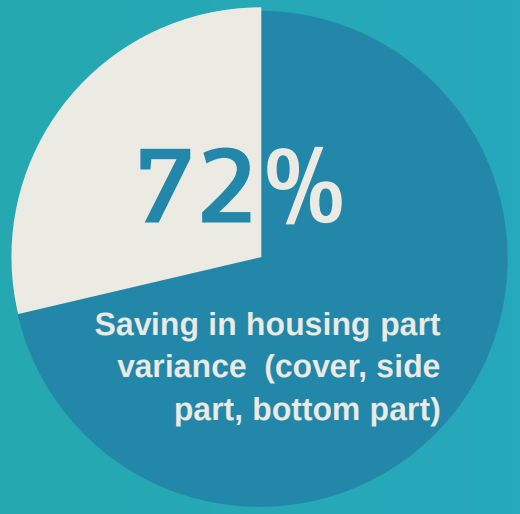
Usage of synergy effects through a common housing design concept



Cost reduction

Additional costs in molding tools and asset cost for every housing part type were avoided. Along the Market Lifecycle the production capacity and investment is scalable.





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Investigate further key areas and technologies

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Smart Data Analytics

Data analytics of production lines for …

- Machine monitoring
- Value stream optimizing
- Failure root cause analysis
- Predictive maintenance

Smart Wearables

Mobile and wearable data capture and information systems

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Key Activities and Benefits of Digitalization @ Siemens Amberg

One single source of development, quality and factory data - on site and globally

Comprehensive use of Digital Twins for product, process and performance

Fully connected and transparent shop floor
> 50.000.000 process data per day

Product complexity mastering by using cyberphysical production architecture

Technical and commercial scalable factory structure

> 99.5% delivery reliability to assure 24h delivery time

~ 11 dpm - A equals 99.9989% built in quality (electronics)

~ nine-fold of shop floor utilization till start of production (1990) equals 100pc./ sec (electronics)

We can support you with an holistic Tool, Automation and Interface Know-How

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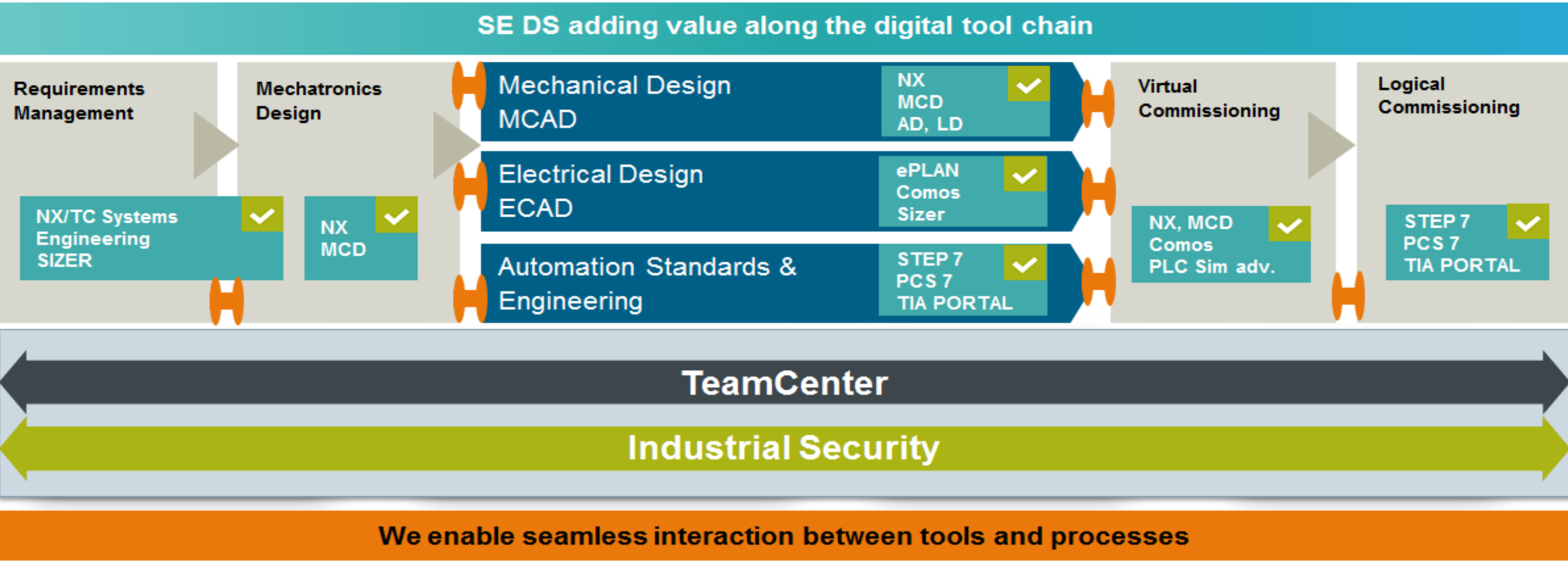

We enable seamless interaction between tools and processes

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Thank You!

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Contact

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Draft of the Presentation

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ADOPTION OF THE FOURTH INDUSTRIAL REVOLUTION

When everyone, including the factory, is connected to the internet, it becomes possible for the manufacture of custom-made products to be as cheap as mass production. But what impact will IoT have on the manufacturing value chain? And, most intriguing of all, how will automated manufacturing shape the future of management?

This is where the Amberg story sheds some light.

The factory at Siemens in Amberg, Germany, Opened in 1949, the plant produces programmable logic controls (PLCs) and Industrial controls for switching, protection and starting of loads used to automate machines such as ski-lifts and cruise ships' on-board systems, as well as industrial manufacturing processes. In an average year it produces 40 million SIMATIC and SIRIUS products – that's more than 100 units per second, and production quality at the factory is at 99.99885%.

At a fundamental level, IoT shifts the way manufacturers and engineering firms think, and could reap huge, production-related rewards – the flexible, self-organizing factory, for one. At Amberg, Siemens relies on its own software products, to develop and design products, plan production runs, market innovations, and handle unexpected incidents. Amberg's IoT systems & Digital Twins record and control the production process from start to finish; computer software defines all of the manufacturing processes and commands, and directly updates these processes with the latest data.

The digital factory is primarily a data-driven environment, where managers must get to grips with big data: how to collect it, analyze it and use it to optimize the manufacturing value chain. At the Amberg plant, more than 10,000 scanners document all the manufacturing steps in real time, and 150 million pieces of process data are generated daily to inform management decision-making. How should managers prepare for a digital transformation? They can start by collecting more data, joining the hunt for the best digital talents, retraining existing staff and thinking about how to structure a digital organization.

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