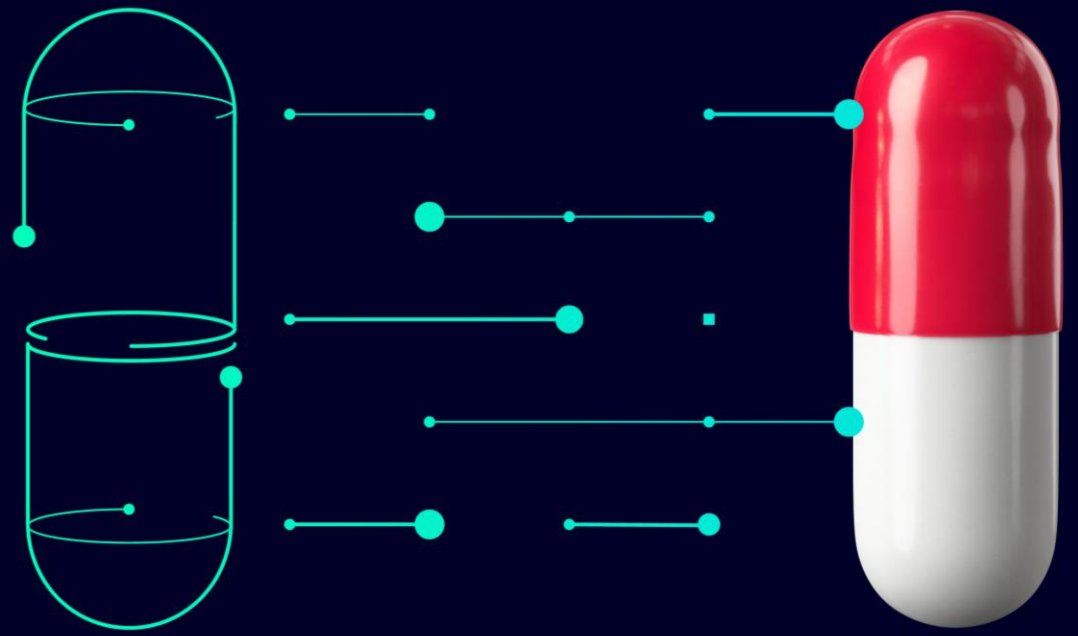
Accelerating the digital transformation in Pharmaceuticals and Life Sciences

Faster from lab to patient to win the race against time

SIEMENS

Why

accelerate your digital transformation



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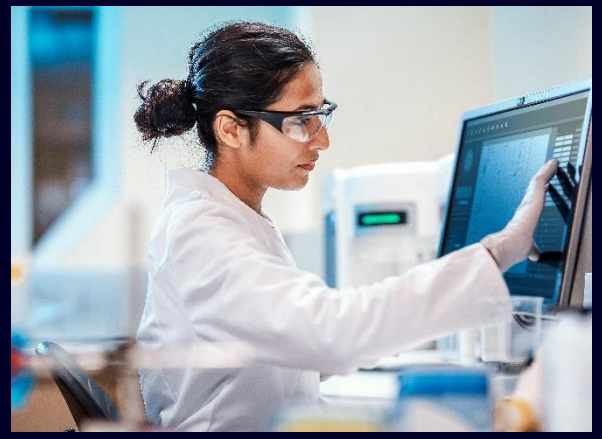
Urgent challenges in the pharmaceutical and life sciences industry

Key business drivers

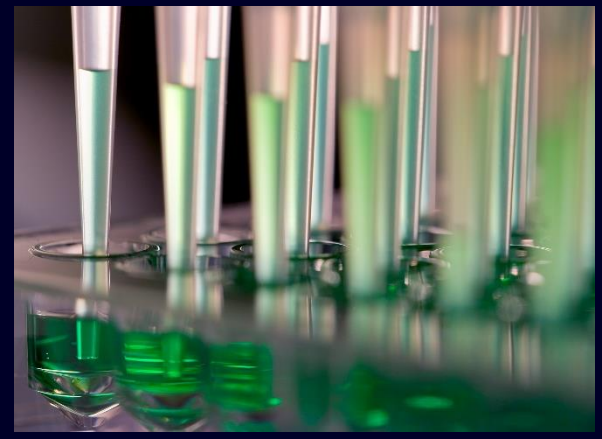
Patients

Products



Pace of change

Performance



Speed

Efficiency

Agility

Quality

Sustainability

Source: BioPhorum

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The pharmaceutical industry still shows potential for significant improvement in its leveraging of digital technologies

1.2%

average ROI from R&D in 2022 vs 6.5% in 2014

Source: Deloitte

>60%

drug shortages due to production or quality issues

Source: FDA

$1.5m

average cost of launch delay per drug, per day

Source: Contract Pharma

>2%

of global emissions generated by healthcare supply chain

Source: Sustainable Markets Initiative

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The journey from lab to patient can take over 10 years

Basic research
Drug discovery
Pre-clinical
Clinical trials
Phase I
Phase II
Phase III
Reg. review
Post-approval monitoring
Manufacturing

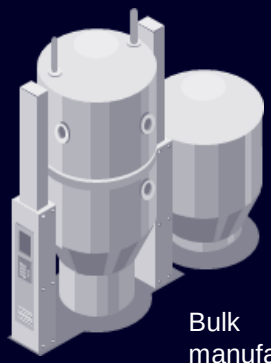
IND submitted
NDA/BLA submitted
Regulatory approval

5,000 drug candidates

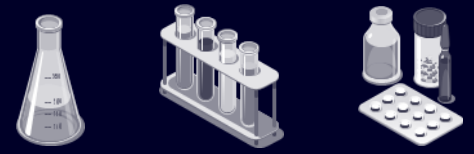
Approved medicine

Number of volunteers

Tens
Hundreds
Thousands



Bulk manufacturing



Formulation
Filling
Packaging

8 to 10 years

6 to 36 months

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Why take 10 years to launch a new medicine when you can do it much faster?

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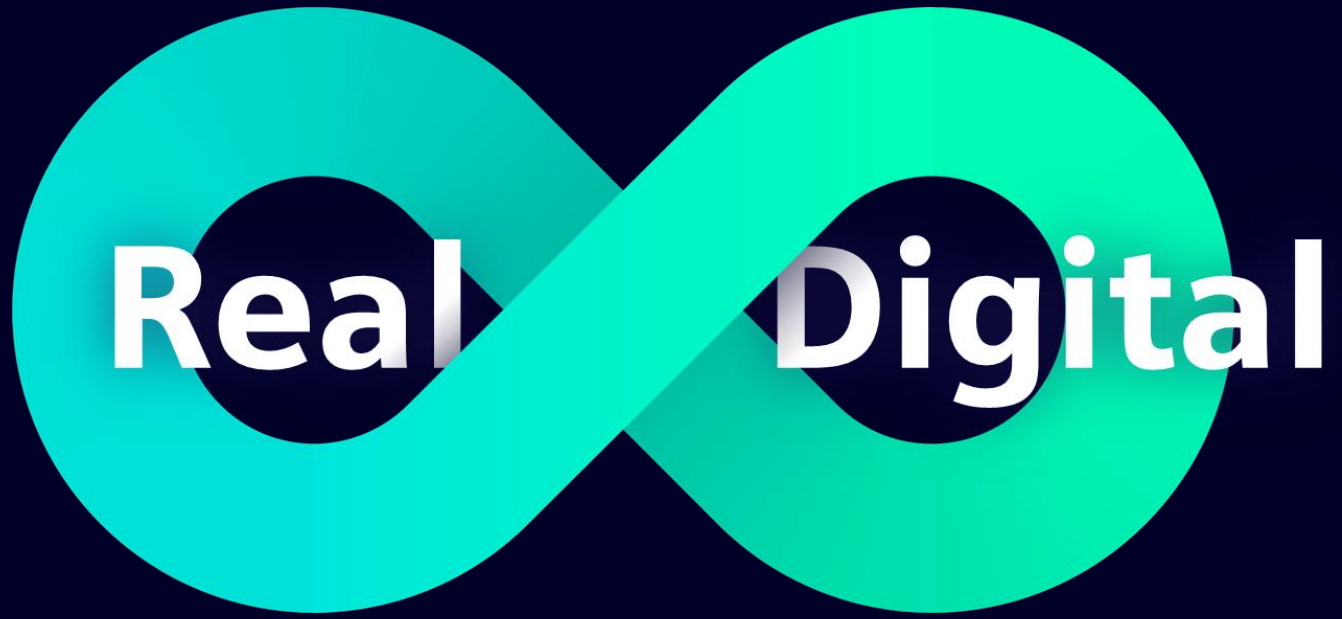
The Gamechanger

Combining the real and the digital worlds and using the power of data.



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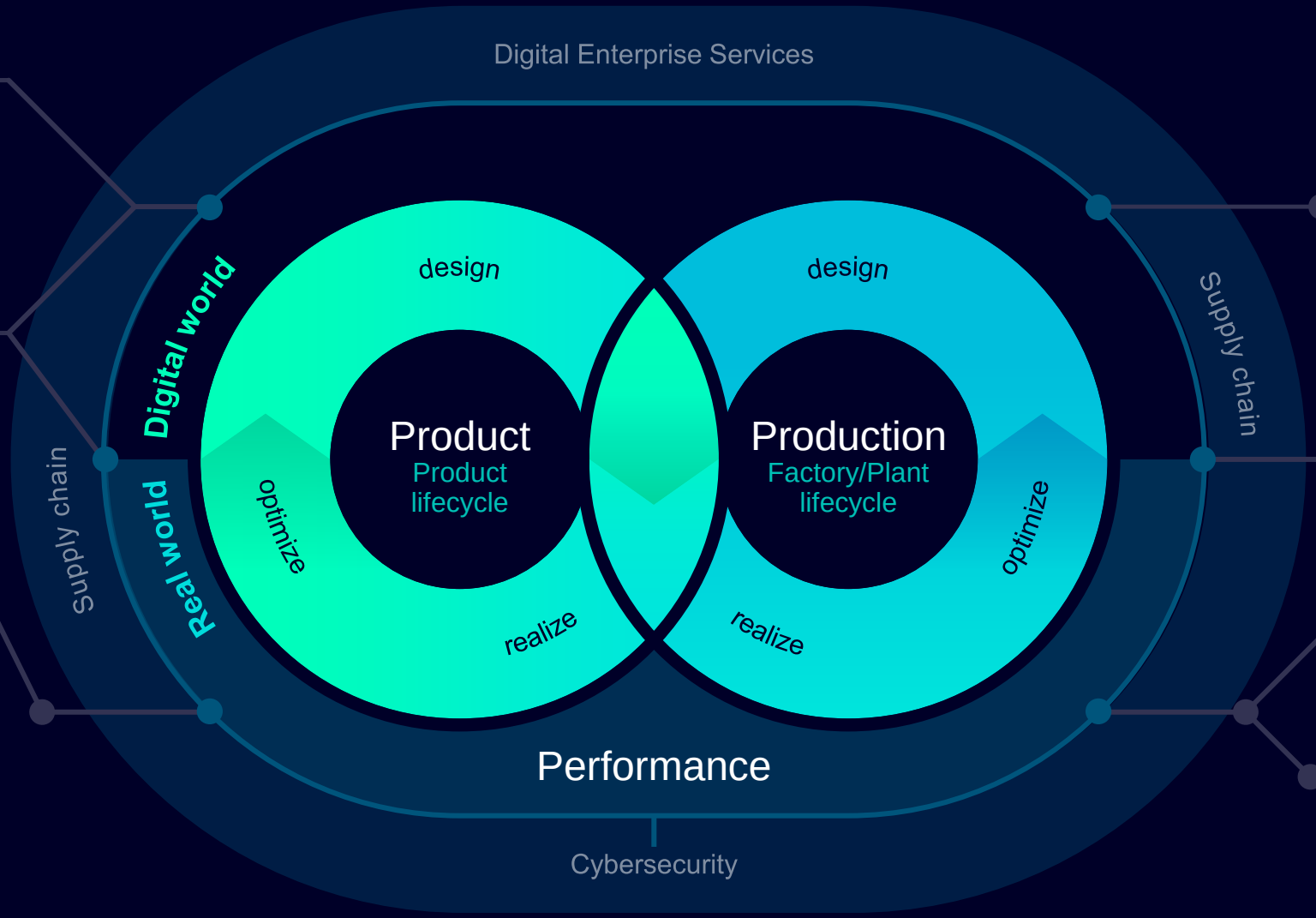
This is the Digital Enterprise

Combining the real and the digital worlds makes it possible to seamlessly integrate the entire value chain from design to realization, while optimizing with a continuous flow of data, both for the product and the production lifecycle.



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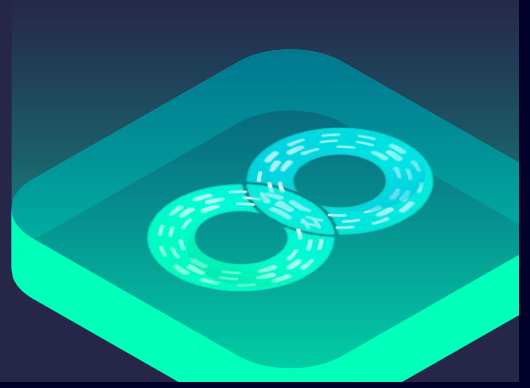
Become a sustainable Digital Enterprise

Combines the real and digital worlds for continuous improvement of product and production in a data-driven industry.



Comprehensive Digital Twin

for precise simulation and validation of products, machines, lines, complete plants and buildings. Digital Twins are the foundation for flexible and efficient product development and manufacturing.

Cybersecurity

for a holistic security approach to protect your IP and data with a multi-layered “Defense in Depth” concept, strengthened by Zero Trust principles.

Artificial Intelligence

augments humans in engineering processes. It fosters automation while increasing flexibility. With GenAI, humans can interact with machines in new ways.

IT/OT convergence

is the fundament for data-driven decision making and transparency in a Digital Enterprise.

Siemens Xcelerator

is our new and open digital business platform that will accelerate the digital transformation of companies of all sizes to become a Digital Enterprise faster.

Digital Threads

are the maps for the digital journey based on specific business workflows and support in becoming a Digital Enterprise.

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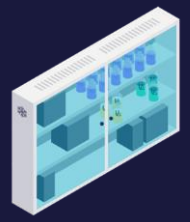
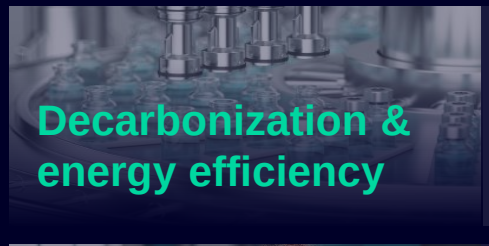
Become a sustainable Digital Enterprise to scale sustainability impact

	Sustainable product 	Sustainable production, incl. buildings 	Sustainable supply chain 
 **Decarbonization & energy efficiency**	Increase transparency & decarbonize product life-cycles	Decrease CO_2 footprint in production and facilities	Decarbonize logistics, warehousing and delivery
 **Resource efficiency & circularity**	Optimize packaging and its recyclability, material use	Reduce production waste & water usage	Source traceable, responsibly produced medicine & circular materials
 **People centricity & societal impact**	Deliver safe & effective therapies to target patient groups	Run safe, resilient & secure production and facilities	Manage responsible, resilient sourcing & supplier transparency

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Optimize processes and infrastructure for sustainability

Decrease CO_2 footprint in production

CO_2 transparency

CO_2 monitoring & tracking along production process

Energy measurement

Transparency on energy consumption and load peaks

Energy mgmt.

Improved energy consumption & efficiency (via waste heat recovery and load mgmt.)

On-site renewables

On-site CO_2 reduced power generation

Reduce production waste & water usage

Digital twin

Sustainable design of product, production, labs and infrastructure

Process electrification

Heat electrification with reliable power supply

Resource efficiency

Optimized resource use and incr. asset life-times, reduced waste & use of unavoidable waste for energy generation on-site

Flexible facilities

Design modular facilities for quick reconfiguration & sustainable operations

Operate safely & securely

Fire safety & security

Safe & secure operations

Critical environments

Ensure safe, secure and comfortable development & QC environments

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Siemens Xcelerator

What our unique solution is all about:

With Siemens Xcelerator for Pharmaceuticals and Life Sciences, we offer you a digital business platform which is easy, flexible, and open.

Our ambition is to create a powerful ecosystem of partners who can jointly accelerate the digital transformation, helping you to achieve your individual strategic objectives.

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INDUSTRIAL OPERATIONS X

From automated **to adaptive production**

Faster ideation and implementation

Integrate IT methodologies like the ability to deploy functionalities wherever needed and increased openness to any communication standards, protocols and APIs

Intuitive interdisciplinary collaboration

Reinforce your workforce with IT-minded engineers and foster a creative co-creation environment between OT and IT departments with parallel, interdisciplinary workflows

Improved operations decision making

By bringing together IT and OT data, new patterns emerge and reveal new insights that allow for data-driven operations decisions in near real-time

Easier scaling of operations

Seamlessly scale computing resources on demand and flexibly exchange software modules during operations to quickly respond to changing requirements

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BUILDING X

Achieve sustainable, autonomous and profitable Life Sciences operations

Creating efficient & resilient operations

Building X streamlines operations by merging IT/OT systems, providing data insights for swift action and minimizing the need for on-site staff through remote management tools

Driving energy savings & sustainability goals

Aiming for sustainability, the platform enhances energy efficiency and simplifies regulatory compliance, while offering strategic consulting for environmental initiatives

Ensuring the security of personnel & laboratory areas

For security, Building X combines biometric access with mobile tech for secure entry, and integrates systems for robust monitoring, ensuring quick incident response with automated workflows

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Pharma companies that use Siemens automation and software solutions can expect to achieve

-50%
reduced blend time using CFD simulation[1]

5 months
to repurpose a vaccine **plant**[2]

-80%
equipment integration effort[3]

-20%
reduction in operating costs with continuous manufacturing[4]

-50%
shorter time-to-market[5]

-30%
solvent consumption[6]

Sources: 1. ABEC, 2. BioNTech, 3. Sartorius, 4. Cipla and 5. Novonesis 6. Johnson&Johnson case studies

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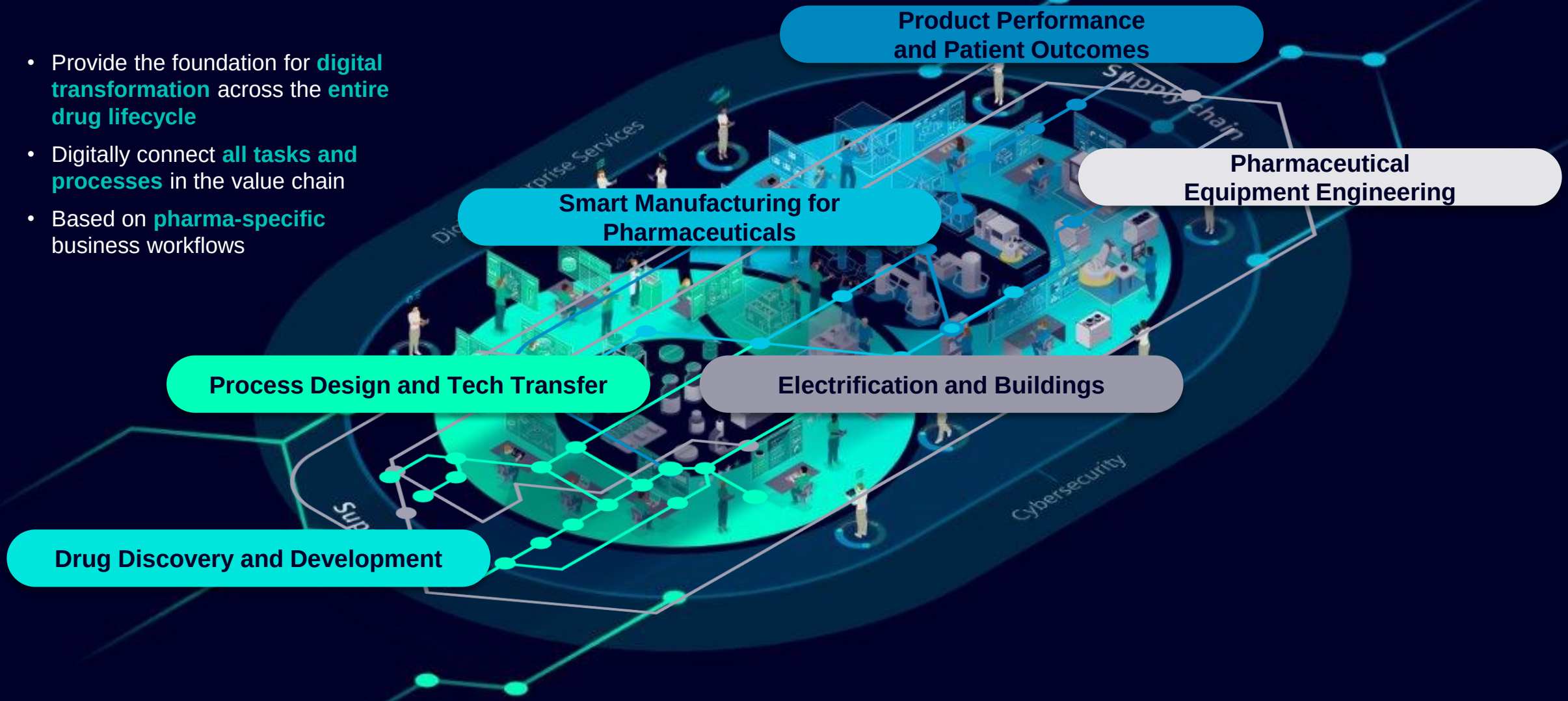
Siemens offers you the roadmap for your digital journey to become a sustainable Digital Enterprise

- Provide the foundation for **digital transformation** across the **entire drug lifecycle**
- Digitally connect **all tasks and processes** in the value chain
- Based on **pharma-specific** business workflows



Enterprise Recipe Management (ERM) vision
Speed up recipe transformation from lab to production

Performance insights

Drug discovery | Product and process development (PD) | Tech transfer | Drug substance manufacturing | Drug product manufacturing | Patient

Enterprise Recipe Management

Process knowledge management

PD Recipe → **General Recipe** → **Site Recipe** → **Master Recipe** → **Control Recipe**

Drug Discovery and Development

Process Design and Tech Transfer

Smart Manufacturing for Pharmaceuticals

Product Performance and Patient Outcomes

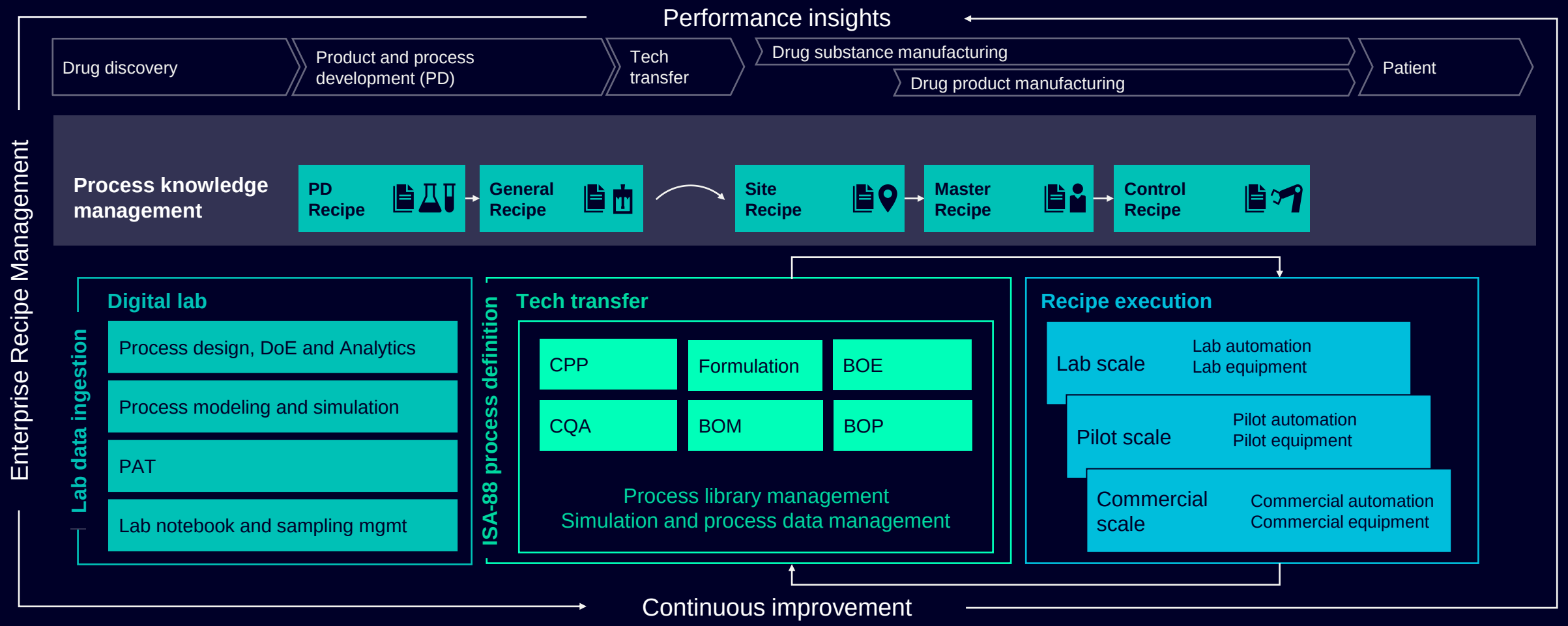
Electrification and Buildings

Pharmaceutical Equipment Engineering

Continuous improvement

SIEMENS

Enterprise Recipe Management (ERM) vision
Speed up recipe transformation from lab to production



DoE: Design of Experiments
PAT: Process Analytical Technology
CPP: Critical Process Parameters
CQA: Critical Quality Attributes

BOE: Bill of Equipment
BOM: Bill of Materials
BOP: Bill of Process

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Enterprise Recipe Management (ERM) end-to-end solution
Your digital journey from lab to patient

Accelerate new product introductions by streamlining collaboration across the drug lifecycle

Enable **data-driven knowledge sharing** with findable, accessible, interoperable, reusable (FAIR) data

Provide a **scalable, end-to-end recipe management solution** supporting an agile, sustainable outcome-driven approach

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Drug Discovery and Development

Rapidly identify promising candidates and improve the throughput of your drug pipeline

Data-driven innovation

- Identify potential targets and drug candidates using artificial intelligence and big data from real-world evidence

Digital twin of a patient

- Assess efficacy, safety and feasibility of your drug candidate earlier

In-silico drug design

- Digitally determine the behavior of potential drug molecules with multi-scale computational chemistry simulation

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Process Design and Tech Transfer

Speed up recipe development, enhance manufacturability and efficiently scale-up from lab to production

Digital design of products and processes

- Digitally design and plan experiments and accelerate process development using simulation
- Satisfy quality and regulatory compliance requirements

Knowledge-driven recipe transformation

- Deploy process knowledge across the organization
- Efficiently transform the recipe by leveraging a common digital backbone

Manufacturability verification and optimization

- Ensure a seamless tech transfer to clinical scale and commercial manufacturing
- Drive process optimization to increase robustness, cost-efficiency and sustainability

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Novonesis

Breaking down data silos at a global leader in industrial biotech

Customer challenge

- Make use of data across an entire organization and easily leverage it with customers
- Improve efficiency and speed of learning loops to unlock innovation
- Allow exploration of diverse possibilities and outcomes

Solution

- Ensure full data capture of all components and parameters integrated into the workflows, accommodating varied experimental designs
- Reduce error risks with interactive, real-time data capture during experiment design and execution using Riffyn X
- Uphold data governance and ensure compliance with FAIR principles

Customer benefit

- Shorten experimental data acquisition and processing from hours to minutes
- Increase efficiency with 50% employee time saved
- Reduce time-to-market by half for some market segments
- Increase market capture significantly

SIEMENS

GSK

Faster pace for vaccine development and manufacturing

Customer challenge

- Accelerate vaccine development time without compromising quality
- Enable more robust processes

Solution

- Collaborate with Siemens and Atos to digitalize the entire value chain using AI, SIMATIC SIPAT, TIA Portal and Simcenter
- Virtually test and gain insights into all stages of the development and production processes
- Collect real-time data by equipping each step in the vaccine development process with in-line sensors
- Create predictive and prescriptive models based on AI and machine learning

Customer benefit

- Develop a digital twin for adjuvant technologies reducing physical experiments by 25%
- Save double-digit percentage of batches
- Shorten time-to-market for a new process

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>3,000
virtual experiments performed

AstraZeneca

Rapid design space exploration of a tablet manufacturing process

Customer challenge

Characterize a multi-dimensional design space of an integrated drug product manufacturing process with minimal experimentation

Solution

- Construct a flowsheet model of a dry granulation and tableting process by integrating calibrated unit operation models
- Perform >3000 virtual experiments to rapidly quantify the importance and criticality of material properties and process parameters on product quality attributes
- Identify the multi-dimensional combination of process parameters where both product quality and manufacturability criteria are met

Customer benefit

- Virtual design space exploration to efficiently quantify the criticality of material attributes and process parameters on product quality attributes
- Significant savings in time, resource and materials

Gavin Reynolds, D3P: Digital Design of Drug Product Application of Global Systems Analysis to a Tablet Manufacturing Process, PSE Webinar, 2016

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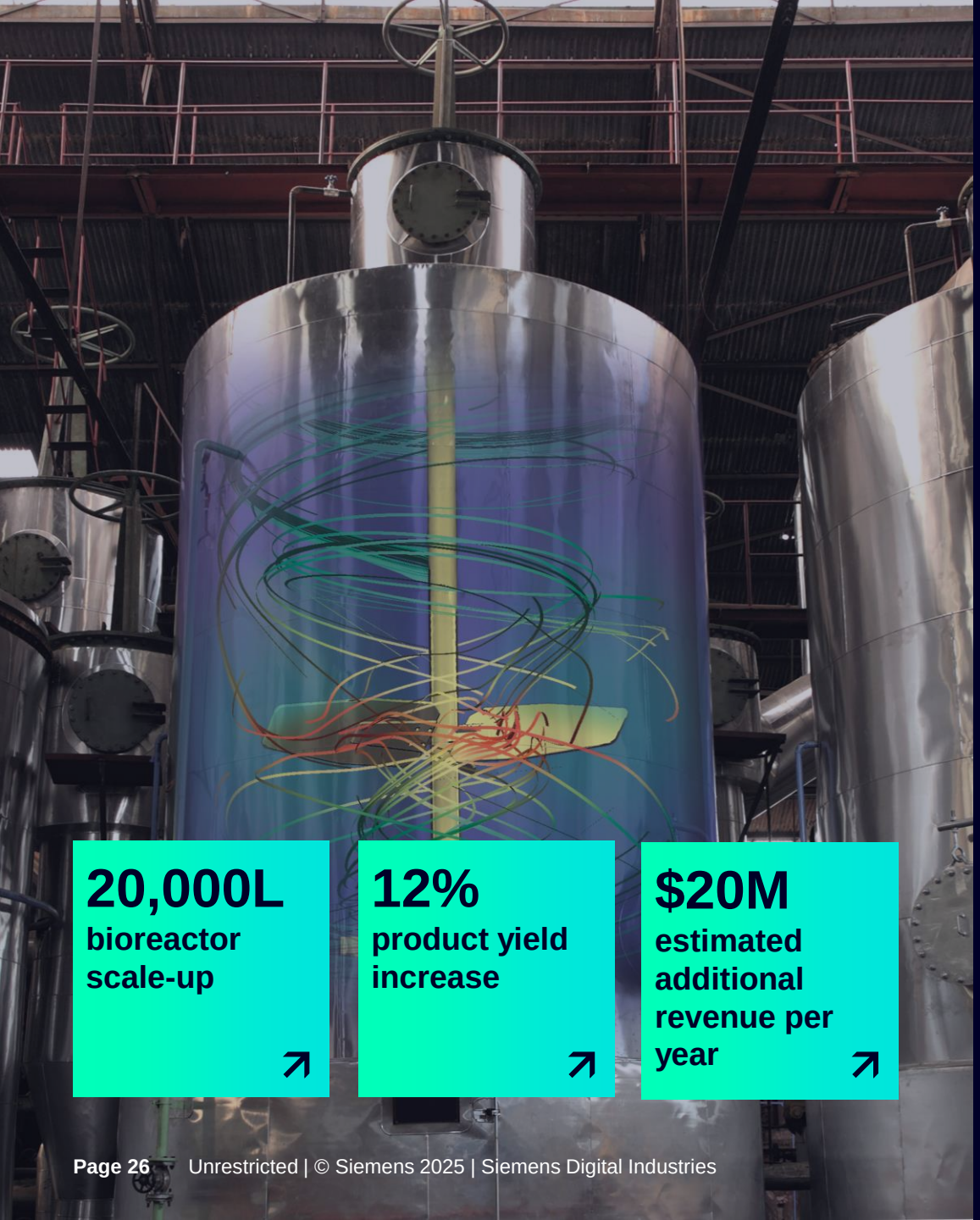

20,000L
bioreactor scale-up

12%
product yield increase

$20M
estimated additional revenue per year

Procegence

Bioreactor scale-up from 1.5 L to 20,000 L

Challenge

- Analyze how scale affects mass transfer in aerated bioreactors
- Optimize performance in a cost-effective manner, while reducing trial-and-error approaches

Solution

- Accurately model governing physics at lab and manufacture scale, using CFD analysis with Simcenter STAR-CCM+
- Perform sensitivity analysis to enable process characterization across a range of conditions
- Model multicomponent gas & liquid phases and mass transfer

Benefit

- Deeper process understanding from simulation results to develop a customized mixer design
- Reduced reliance on physical experiments, accelerating process development and reducing costs

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-30%
raw material consumption ↘

-35%
overall costs ↘

J&J Innovative Medicine

Digital process twin for solvent switch

Customer challenge

- Rapidly bring new products to the market
- Significantly reduce lead times, chemical consumption and costs in the pilot project
- Efficiently scale up from 1 liter to tens of thousands of liters while meeting GMP requirements
- Minimize the environmental impact

Solution

- Build a digital process twin using gPROMS FormulatedProducts
- Calibrate the model against process data using gPROMS Digital Applications Platform
- Use SIMATIC SIPAT to cover all the GMP requirements

Customer benefit

- Reduce switch time and total cost by 35%
- Reduce raw material consumption by 30%
- Enable larger optimizations with 5 times less data

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-10%
reduced drug substance usage

$1m
savings in process development

Takeda

Making an impact on patients' lives by improving segregation of solid drugs

Customer challenge

- Reduce usage of drug substance in production scale and thereby reduce costs
- Develop customized design for process equipment (feed hopper) to reduce particle segregation

Solution

- Leverage Discrete Element Modeling (DEM) capabilities of Simcenter STAR-CCM+ to analyze material characteristics
- 3D printing of various design configurations
- Discover the lowest segregating design through simulation

Customer benefit

- 10% reduction in drug substance usage in production scale
- $1m savings in process development by reducing number of trials
- Time savings due to reduced number of trial-and-error experiments

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Smart Manufacturing for Pharmaceuticals

Maximize operational readiness and efficiency without compromising quality

Agile process and plant engineering

- Optimize facility layout and material flow with a comprehensive digital twin
- Increase flexibility and minimize start-up time with modular automation and standardization

Flexible and paperless manufacturing

- Maintain data integrity, ensure traceability across the plant and produce right first time
- Improve quality control efficiency by enabling real-time release for batch or continuous manufacturing

Intelligent, lean and sustainable operations

- Enable data-driven operations through IT/OT convergence
- Meet production, quality, and sustainability targets while continuously driving efficiency

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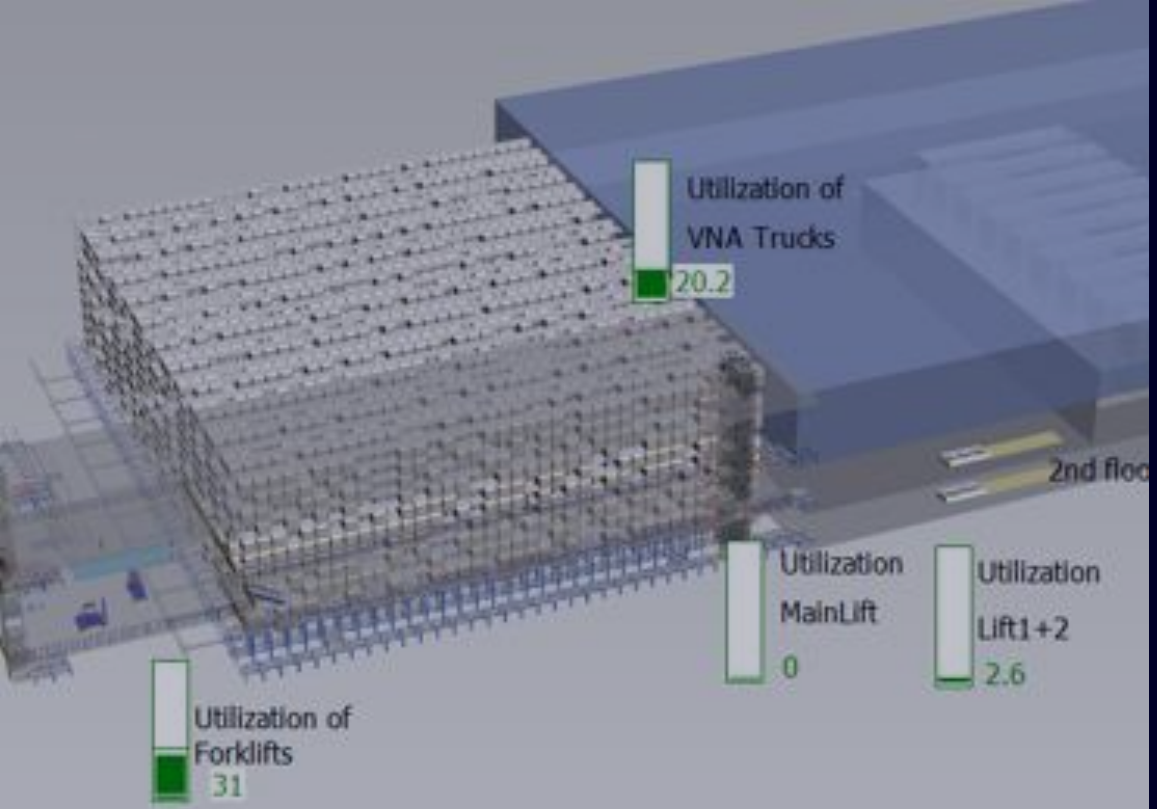

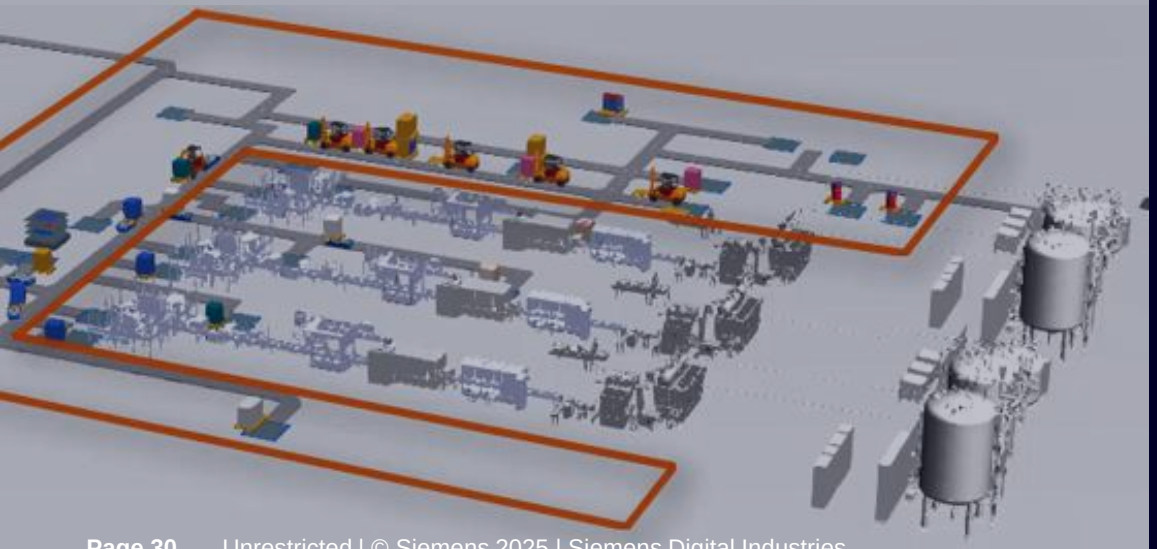

Miebach Consulting GmbH

Pharmaceutical plant simulation

Customer challenge

Simulate:

- Production logistics and the picking process of a pharma manufacturer
- Production logistics of blister-packaged pills, defining the number of forklifts to transport material to the warehouse
- COVID-19 antibody test liquid production
- Intralogistics processes of blood plasma medication
- Production of personalized cancer medications

Solution

Use Tecnomatix Plant Simulation as a standard tool for the simulation studies

Customer benefit

- Determine the maximum throughput and the bottlenecks in the system
- Model the storage, kitting, picking and production processes
- Determine the storage capacity limit
- Increase throughput (from lab scale to mass production)
- Minimize total processing time taking into account waiting time restrictions

Pictures Courtesy of Miebach Consulting GmbH

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Centre For Process Innovation (CPI)

Collaborative innovation to transform the pharmaceutical industry

Customer challenge

Derisk the implementation of new technology in the pharmaceutical industry, through collaborative innovation with UK government, academia and industrial partners like GSK and AstraZeneca

Solution

Provide a real manufacturing facility with the implementation of proven digital and automation solutions, including digital twins, plant simulation, PAT, MES, RTLS, automation within a robust cybersecure concept

Customer benefit

- Leverage data to accelerate batch release with a low-code QP dashboard
- Identify bottlenecks and optimize design
- Accelerate sustainable drug manufacturing

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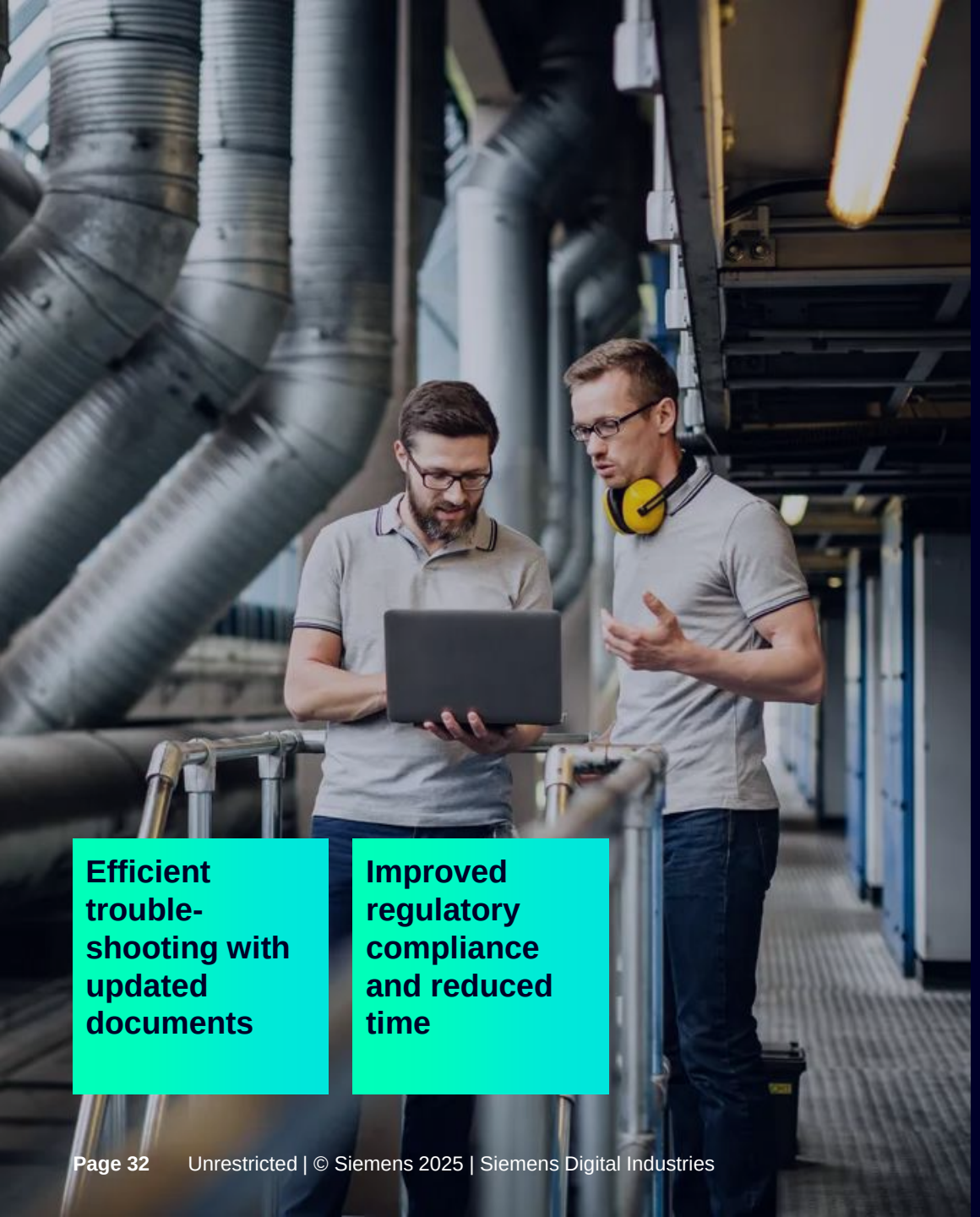

Efficient trouble-shooting with updated documents

Improved regulatory compliance and reduced time

Boehringer Ingelheim

Pharma engineering goes paperless

Customer challenge

- Unstructured paper-based documents and data with onerous manual searching for documents
- Technical documentation not up to date, inefficient commissioning with unclear redundant processes
- Lack of clear document versioning and audit trail system

Solution

- Implementation of Siemens DDMS (Data and Document Management System) to create a centralized digital database with object-orientated structure
- Validated archive for engineering documents and data, as a single source of truth to support lifecycle management

Customer benefit

- Ensuring technicians have up-to-date documentation for troubleshooting, with easier document and data retrieval
- Enhanced security with access control, audit trail, change management, back-up and disaster recovery
- Improved regulatory compliance (CFR Part 11) leading to reduced time for commissioning, qualification and validation
- Reduced physical storage and paper savings

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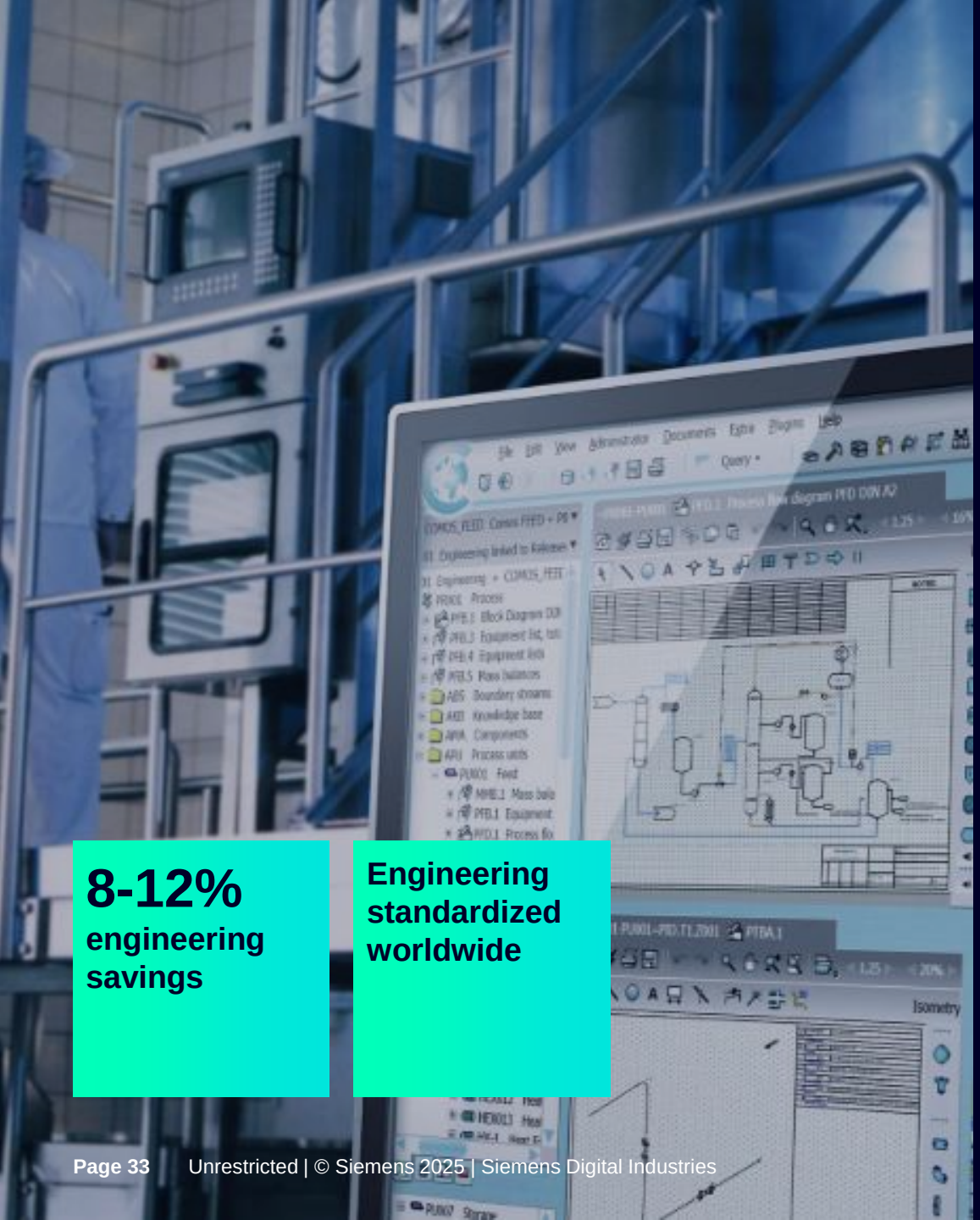

8-12%
engineering savings

Engineering standardized worldwide

Novartis

Streamlining plant engineering and lifecycle data management

Customer challenge

- Ensure data integration and interoperability
- Seamlessly integrate different systems and software

Solution

- COMOS Platform, P&ID, FEED, EI&C, DDMS
- Novartis has been successfully using COMOS since 2004 for plant engineering, lifecycle data management, and plant documentation
- The software is at the heart of the company's innovative plant management concept
- Novartis subsidiaries and the company's external partners work with the central engineering platform

Customer benefit

- Easy access to updated information
- Engineering data standardized worldwide
- Engineering savings between 8% and 12%

SIEMENS

-80%
time and effort

Bayer Bitterfeld GmbH

Modernizing large-scale tablet production

Customer challenge

- Upgrade a highly automated, modern plant
- Avoid production outage during system migration
- Adopt an advanced paperless documentation approach

Solution

- Opt for a comprehensive and integrated solution:
  Opcenter Execution Pharma, SIMATIC BATCH, SIMATIC PCS 7
- Leverage Siemens' industry expertise
- Highly responsive service and support

Customer benefit

- Control MES and DCS systems via the same user interface
- Enable successful system migration without downtime
- Model all subprocesses in 3 to 6 weeks
- Accelerate batch release thanks to the review-by-exception concept
- Meet GMP requirements

SIEMENS

Connected
80
pieces of equipment

4,000
data tags extracted in real time

AGC Pharma Chemicals Europe

Pharma production goes paperless

Customer challenge

- Maintain high operational standards, keep up with demand and remain profitable
- Replace paper-based production processes

Solution

- Upgrade the entire production operating system to the SIMATIC PCS 7 distributed control system (DCS)
- Introduce Opcenter Execution Pharma to cover material receipt, weighing, execution and review by exception
- Connect eBR system to the DCS

Customer benefit

- Remove 530 manual entries from operators, ensuring data integrity and simplifying the process
- Continuously monitor the entire production process
- Increase agility and ensure quality and safety

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1
year develop-ment

-7
months conversion time

BioNTech

COVID-19 vaccine: from development to production in one year

Customer challenge

- Rapidly scale up COVID-19 vaccine production
- Convert existing facility and switch from rigid to mobile production setup with many single-use components

Solution

- Implementation of Opcenter Execution Pharma for process orchestration in 2.5 months
- SIMATIC PCS 7 and TIA Portal for control systems and engineering framework
- Project engineering, implementation and 24/7 ongoing support

Customer benefit

- Accelerated vaccine development and production within one year
- Reduced conversion time for existing production facility cut from 1 year to 5 months

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Boehringer Ingelheim

Higher availability with SIMATIC PCS 7 Service Contract

Customer challenge

- Demand for high degree of standardization of automation systems
- For resource reasons, maintenance is not carried out in-house
- Demand for high availability
- Inexpensive way to keep the licenses up to date

Solution

- Maintenance support through a 5-year SIMATIC PCS 7 Lifecycle Services Contract
- On-call service for 24/7 availability of technical support
- Cyclical and standardized maintenance of SIMATIC PCS 7 systems
- Backing up and patching all virtual machines
- Optimization of the systems based on maintenance findings
- Software Update Service

Customer benefit

- Permanently high availability through periodic maintenance
- Shortest troubleshooting times thanks to on-call service
- Most cost-effective way to keep licenses up to date
- Permanent contact with the system manufacturer

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Bayer Hispania

Industrial Automation DataCenter

Customer challenge

- Reliable digitalized infrastructure providing accessibility and connectivity for all systems
- Compliance with highest requirements of pharma industry (GMP, FDA, ISA 88)

Solution

- SIMATIC Virtualization as a Service
- Backup and Restore Professional server, Process Historian server
- On-site and remote support during the implementation phase
- Technical support for the network and active directory integration
- Consulting, Implementation and Optimization Services for the entire lifecycle

Customer benefit

- Pre-configured, tested system and utilization of the latest digital technologies
- High availability and reliability while maintaining system flexibility
- Basic IT/OT security measures implemented as standard
- Coordinated lifecycle services, technical pre-sales and after-sales support from Siemens provide security and cost transparency

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Product Performance and Patient Outcomes

Improve patient outcomes by aggregating data to drive patient-centered development and more efficient operations

Therapy optimization

- Refine your recipe and therapy by leveraging patient data
- Enforce your success rate in the context of value-based healthcare

Patient-centered healthcare and wellness

- Empower personalized medicines
- Leverage data from clinical and remote patient monitoring

Data-driven innovation

- Inform your next discovery and development programs with a continuous feedback loop based on patient outcomes

SIEMENS

Electrification and Buildings

Make buildings and production more resilient, adaptable and sustainable through smart electrification and building technologies

Sustainable buildings and infrastructure

- Improve energy and asset efficiency
- Increase electrification and share of renewables
- Reduce carbon emissions and footprint

Flexible and intelligent facilities

- Embrace modular, highly adaptable labs and hybrid environments
- Break down the silos and increase performance through digitalization and scalable system integration

Resilient and data-driven operations

- Collect real-time data and gain operational transparency across all facilities
- Gain competitive advantage by making better decisions faster

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Pfizer

HighCon: one of the most modern and sustainable facilities

Customer challenge

- Accelerate time-to-market for medications against new diseases
- Increase production capacity
- Commit to the future viability and competitiveness of innovative pharmaceuticals “made in Germany”

Solution

- Collaborate with Siemens as a single-source provider of complete industrial solutions, from initial design to the running system
- Monitor and control the special containment concept

Customer benefit

- Create one of the safest and most sustainable facilities in the world
- Increase energy efficiency by 40%
- Improve safety: drugs classified as OEB4 can be manufactured, but employees are only required to wear OEB3-level protective clothing
- Increase yearly production capacity up to 12b units of drugs

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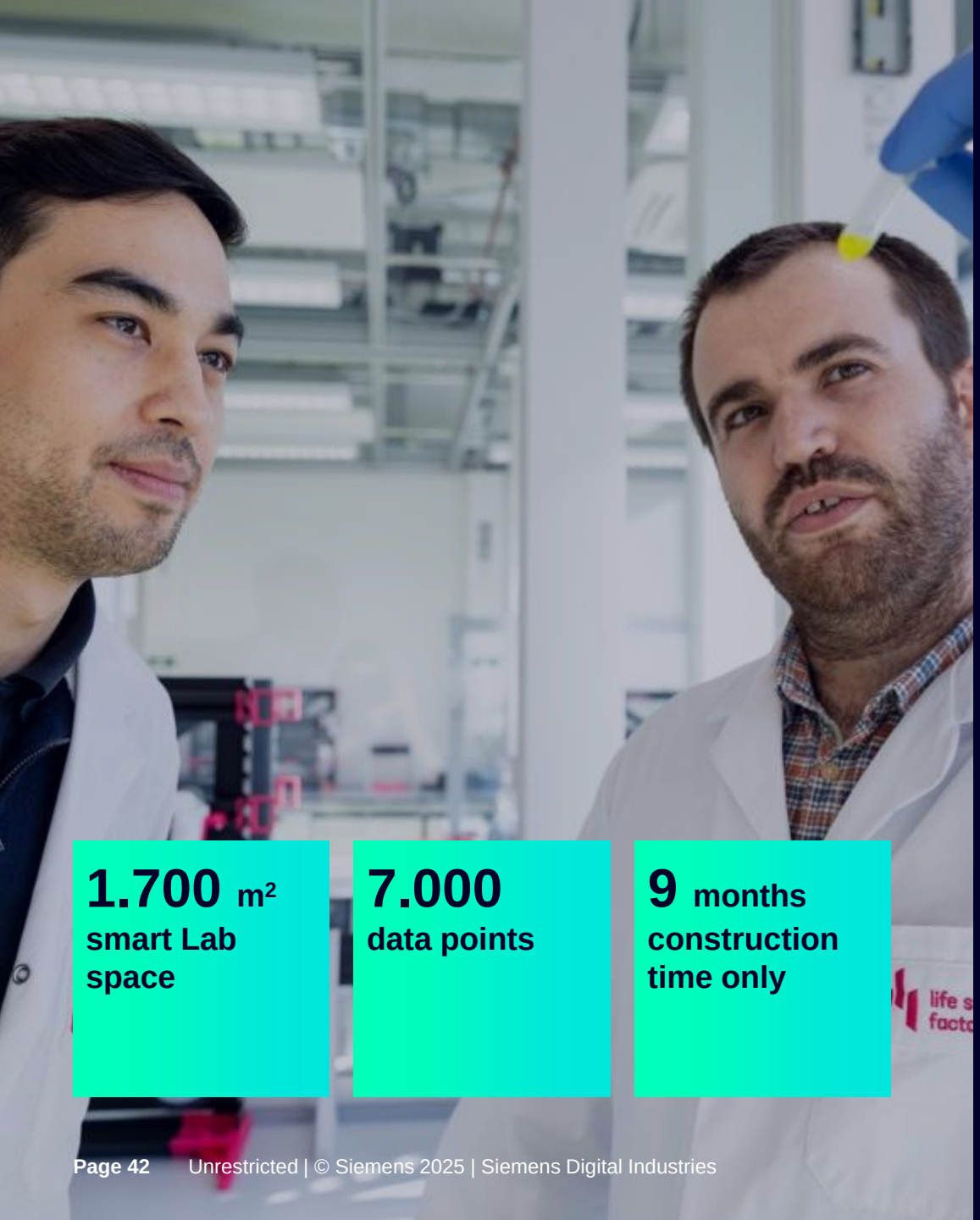

1.700 m^2
smart Lab space

7.000
data points

9 **months**
construction time only

Life Science Factory

Next-level smart lab

Customer challenges

- Enable a quick launch with interdisciplinary exchange, shared equipment and facilities, lab media access
- Mitigate risks, exposure and costs associated with safety, security and sustainability
- Quickly adapt lab spaces without “outside” help using a single platform

Solution

- Lab space and its components completely modular and controlled via interdisciplinary management platform Desigo
- Smart lab solutions paired with complete smart room automation – highly flexible software-based implementation of customer demands and requirements
- All systems monitored via a user-specific modified building management platform

Customer benefits

- Maximum flexibility, quick lifecycle adjustments – pays towards the lifecycle consideration for DGNB certification (global benchmark for sustainability)
- Lab users don’t have to worry about laboratory or safety regulations
- Higher energy efficiency through demand-based control of air volume flows and room pressure values, as well as automated lighting and shading control

SIEMENS

1.1 GWh
energy saving per year ↘

€95,000
annual electricity savings ↘

21%
average energy saving rate for chiller system ↘

Development Center for Biotechnology (DCB)

A leader in biotechnology and sustainability

Customer challenges

- Maintain a stable, safe, and high-performing research environment for its laboratories
- Achieve sustainability goals while adhering to strict environmental regulations

Solution

- Chiller plant energy efficiency improvement
- Energy management services with cloud-based energy and asset monitoring
- Lab intake and exhaust system optimization
- On-site and remote facilities management system
- Advanced lighting control

Customer benefits

- Greater transparency of building data
- Access to actionable insights enables to deliver energy savings, lower operating costs and achieve overall sustainability goals
- Create optimal environments for laboratories
- Obtained ISO 50001 certification through the installation of Navigator

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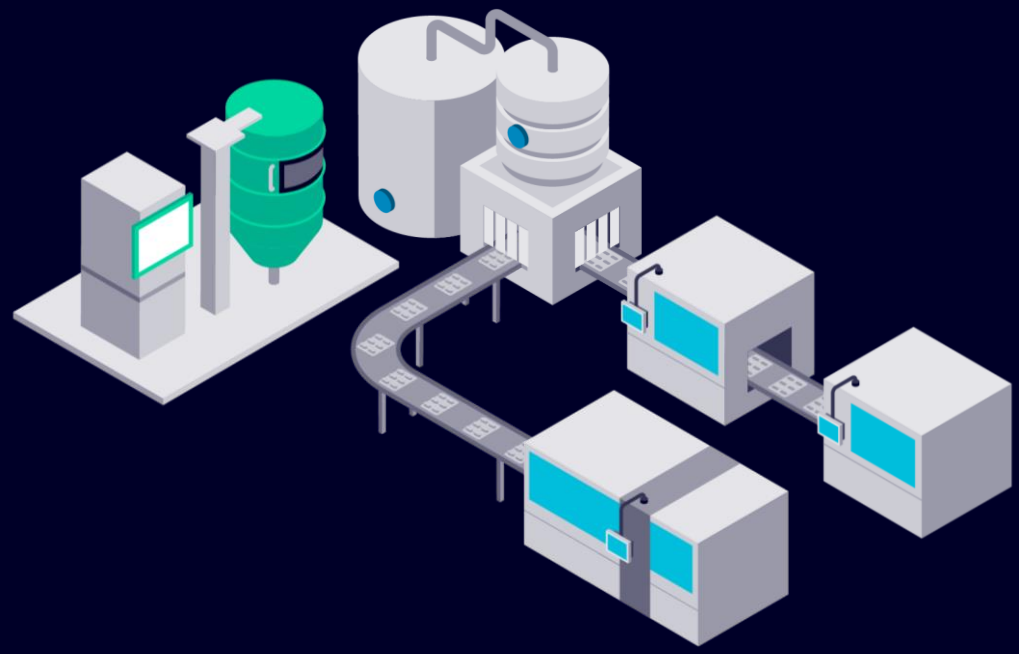
Pharmaceutical Equipment Engineering

Accelerate deployment and meet sustainability goals with smart, digitally-enabled equipment



Design flexibility and modularization

- Embrace a modular approach to equipment and automation engineering
- Deliver fast, accurate equipment bids

Next generation design

- Execute rapid development of new equipment
- Effectively use the digital twin from concept phase to commissioning
- Increase the speed of equipment deployment and commissioning

Data-enabled services

- Implement offerings supported by IIoT connected sensors and analytics
- Deploy new business models for revenue generation and customer service

SIEMENS

Up to
+42%
batches per year

Up to
-67%
CAPEX costs

Sartorius

Single-use processing in biopharma

Customer challenge

- Reduce costs
- Increase the flexibility of biologics production and improve speed-to-market

Solution

- Enable single-use (SU) technology, which can host several different process steps
- Use SU technology with a modular package unit incorporating an industrial automation platform
- Provide clear operational guidance for correct configuration

Customer benefit

- Prequalified and pretested equipment
- Fast implementation and reduced build-up times
- Flexibility to change process, move equipment, and use process skids
- Fewer expensive, skilled bioprocess personnel are required
- Sustainable processes through reduction of cleanroom footprint (less heating, ventilation, air conditioning (HVAC), and CIP/SIP utilities)

SIEMENS

-30%
downtimes reduction

-10%
energy consumption

KORSCH AG

Smart data processing for tablet presses with Industrial Edge

Customer challenge

- Lack of transparency regarding various parameters in tablet production
- Machine maintenance requiring expertise and access to diverse machines
- Unplanned downtimes and material shortages

Solution

- Data Service and Performance Insight store and visualize machine data
- Machine Monitor simplifies maintenance oversight. SIMATIC Notifier sends machine reports to mobile devices

Customer benefit

- Reduce unplanned downtimes by 30% and energy consumption by 10%
- Easily determine the maintenance status of each machine and ensure uninterrupted plant operation
- Notify employees via a smartphone or a smartwatch

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IBERFAR

Modular machine concept for virtual design and commissioning

Customer challenge

Flexibility in the production lines of pharmaceutical products for mass-customization capabilities

Solution

- Delivery of a new concept of machine with modular design, virtually designed and commissioned to reduce the delivery time
- Conversion of standard single-use existing lines to high-mix/low-volume capable lines
- Merging existing machines with new functional modules to be easily adapted to new production

Customer benefit

- Continuous machine optimization and adaptation to new production requirements via a digital twin
- Increased flexibility (liquids to solids) and product variability
- IIoT secure connectivity with standard protocols as an interface to new machines and platforms
- Extended lifecycle enabling future applications in different lines

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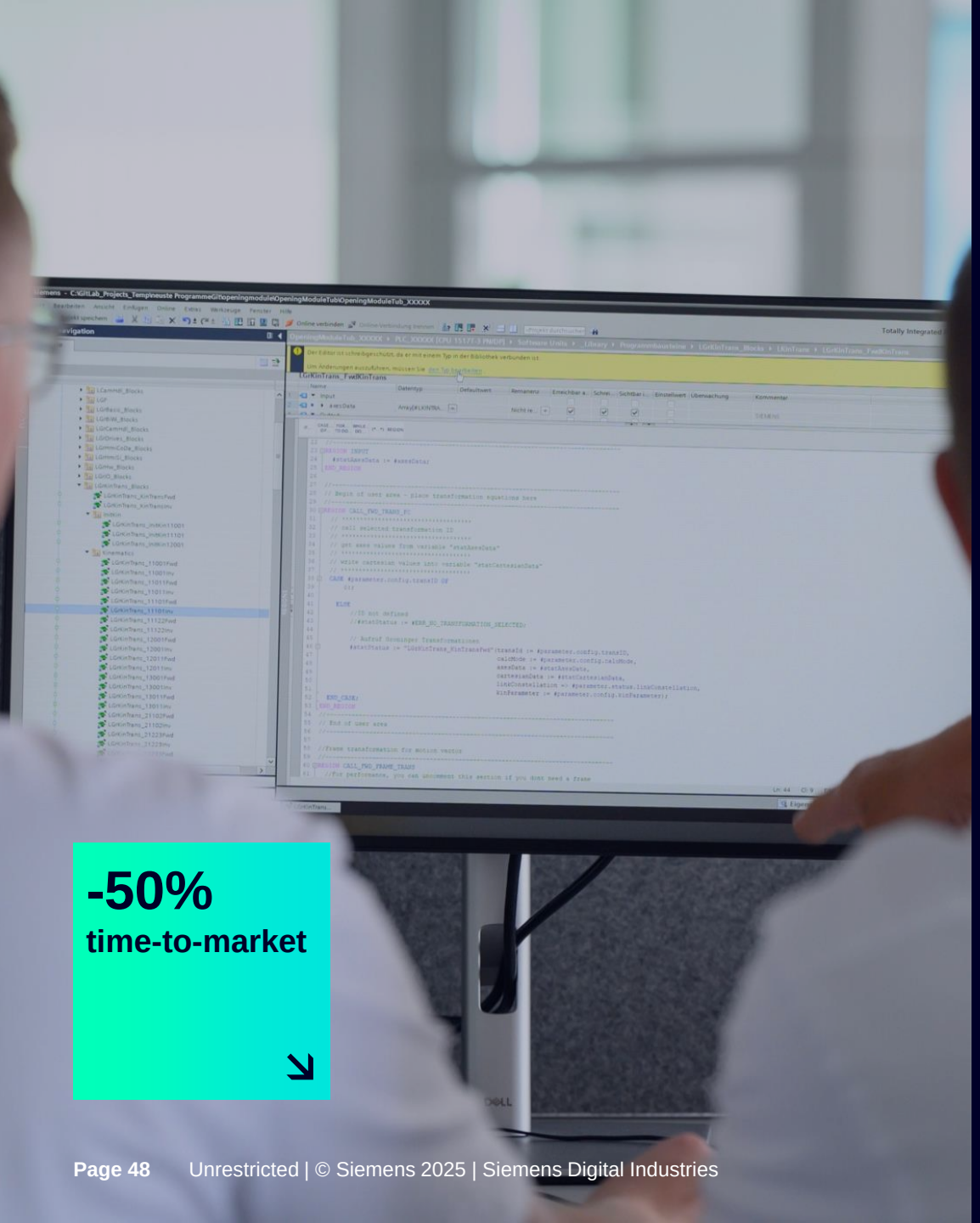

-50%
time-to-market

GRONINGER & Co GmbH

Modular machine concept for virtual design and commissioning

Customer challenge

- Accelerate time-to-market, from development to production of the machine to be able to produce faster
- Reduce complexity to offer a variety of processing options
- Increase response time to different customer needs and market requirements

Solution

- A modular and standardized concept makes it possible to significantly reduce development and production time, increase flexibility and improve resource efficiency

Customer benefit

- Up to 50 % shorter throughput time compared to individually developed special machines
- Wide range of variants and adaptability to different customer requirements
- Reduced complexity through standardized modules and technologies

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Single Use Support

Reducing pharmaceutical fluid, cold chain management design and customization cycles

Customer challenge

- Design and manufacture products and systems on tight deadlines
- Comply with stringent medical and technical standards
- Reliably manage engineering documents and BOMs

Solution

- Build digital twin of consumables and equipment
- Use of Solid Edge for 3D design and Teamcenter for PLM
- Employ automatic BOM inter-change with cloud-based ERP software

Customer benefit

- Reduced design and customization cycles by 25 percent
- Reduced project time by 15 percent by eliminating manual BOM creation
- Shortened parts purchasing process by one to two days
- Supported 30 percent annual company growth across three global site

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Digital threads for pharmaceuticals are the map for your digital journey

Drug Discovery and Development

Process Design and Tech Transfer

Smart Manufacturing for Pharmaceuticals

Product Performance and Patient Outcomes

Electrification and Buildings

Pharmaceutical Equipment Engineering

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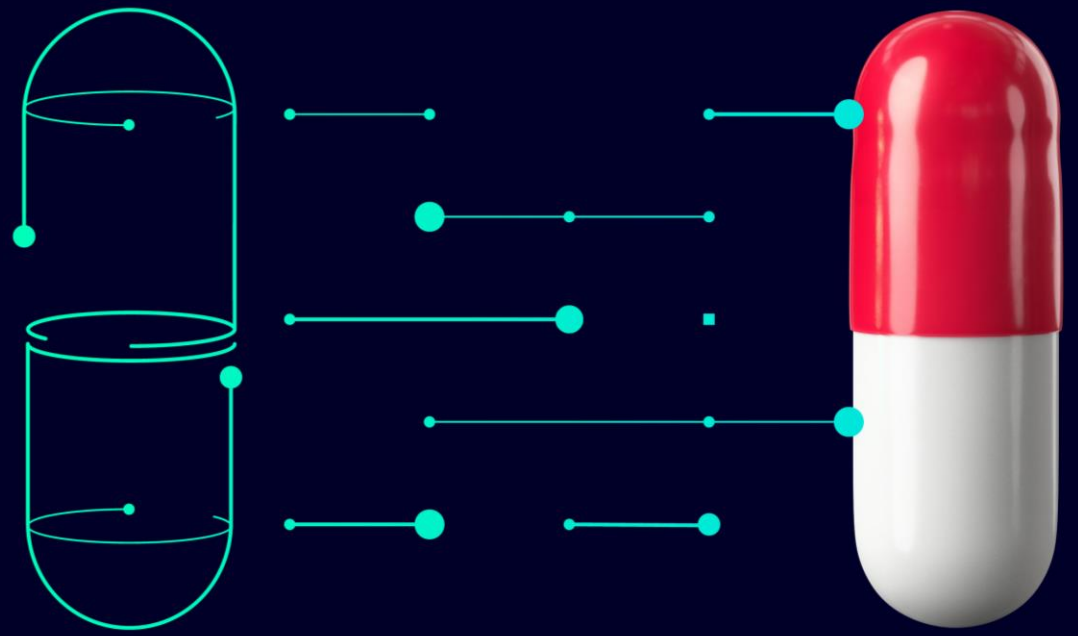
What

Siemens can do for you



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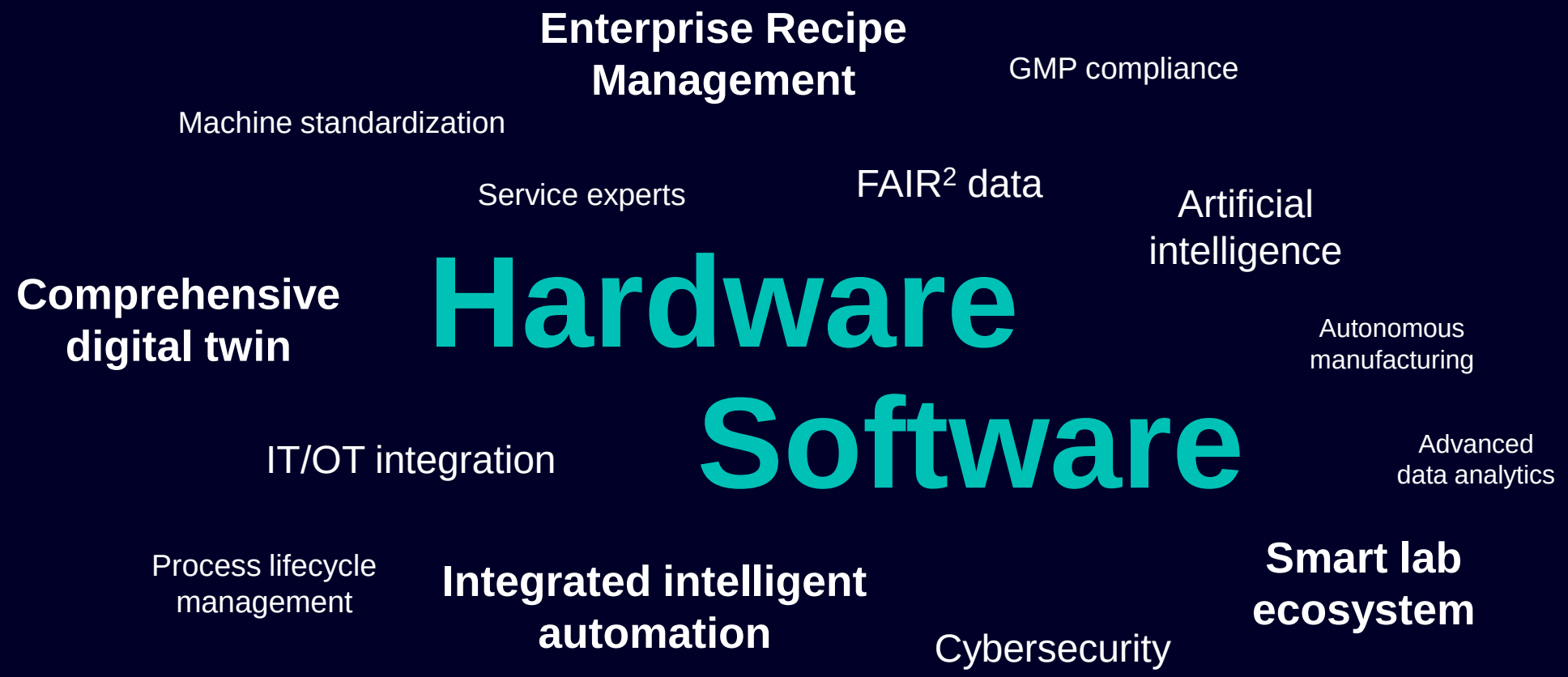
Your sustainable partner[1] offering you a comprehensive suite of technologies to help you rapidly deliver affordable therapies at scale



1. Find out more about Siemens' EcoTech sustainability framework
2. Findable, accessible, interoperable, reusable

SIEMENS

Local support from a strong global ecosystem of pharmaceutical experts and strategic partners

Pharma HQ Global Pharma Hub

SIEMENS

Together we can win the race against time

Accelerate your transformation journey toward a Sustainable Digital Enterprise

Speed up the **path from lab to patient**

Maximize **operational efficiency** for faster time-to-market

Build more **resilient** and **sustainable** global pharma value chains

SIEMENS

Thank you

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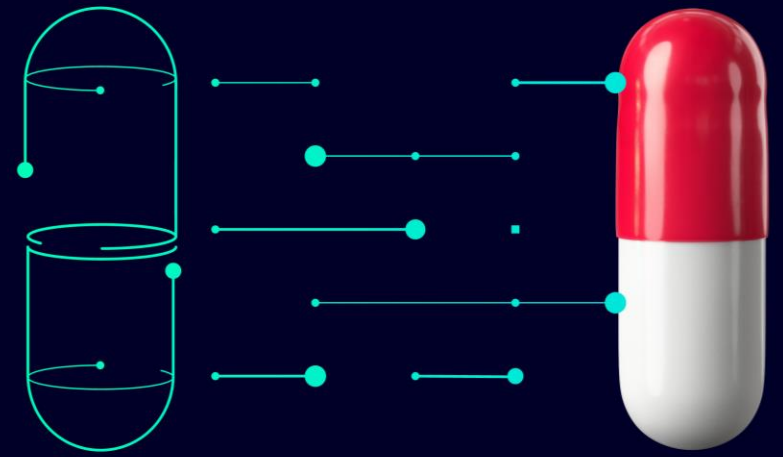

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