



# NEXT UP

En fremtid med digital twins og  
muligheden for at simulere processer

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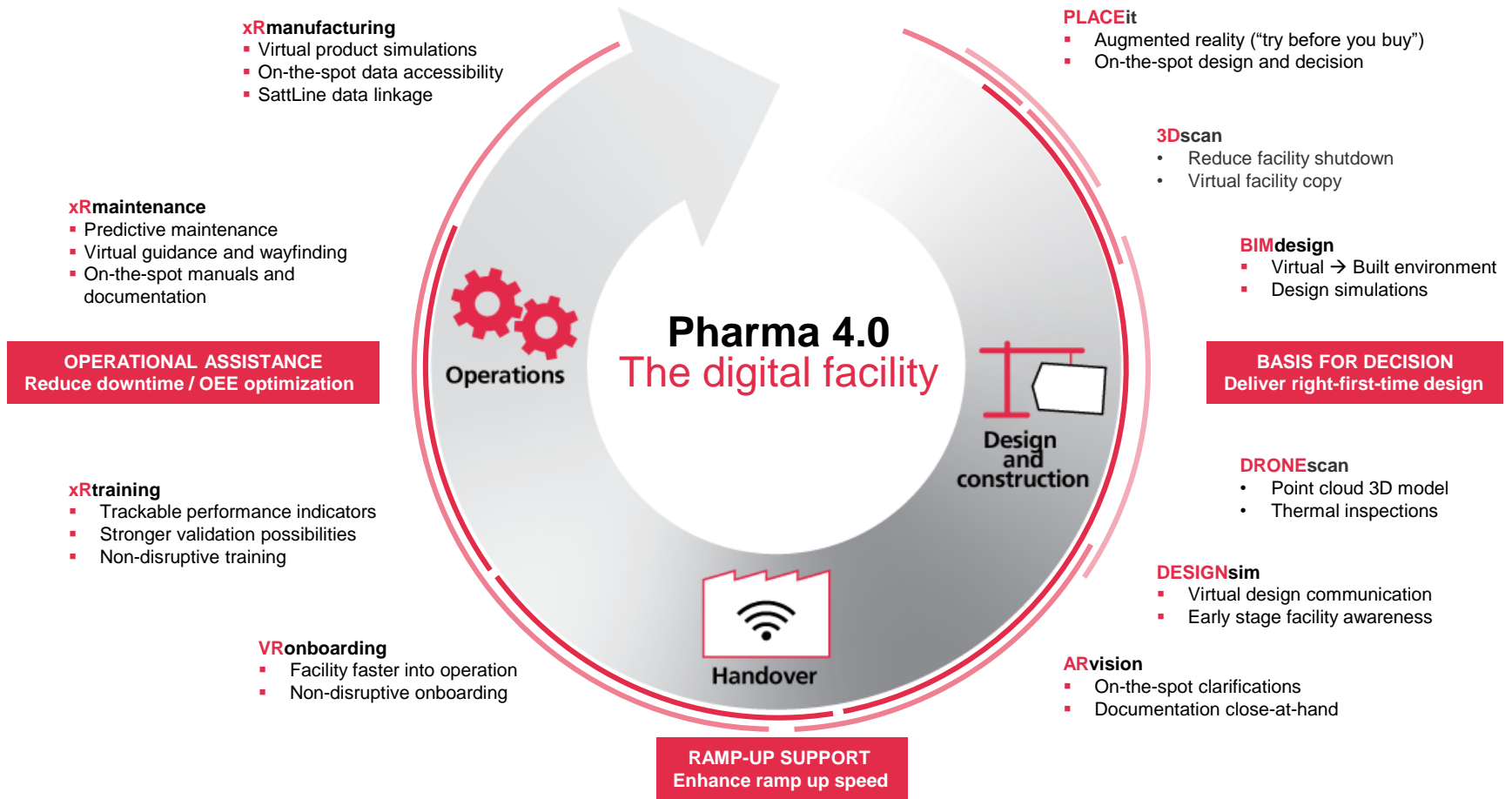
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Digital Business Developer,  
Digital Design

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# Driving right-first-time design with digital twins







An abstract 3D visualization featuring a dark purple grid background. Scattered across the grid are numerous 3D rectangular blocks of varying sizes and orientations. The blocks are primarily colored in shades of red, blue, and purple, with some appearing as glowing lines or thin slices. The lighting creates strong highlights and shadows, giving the blocks a three-dimensional appearance. The overall composition suggests a complex, interconnected system or data structure.

We have the **data** and **knowledge** already –  
how do we combine  
everything in one,  
integrated digital twin?

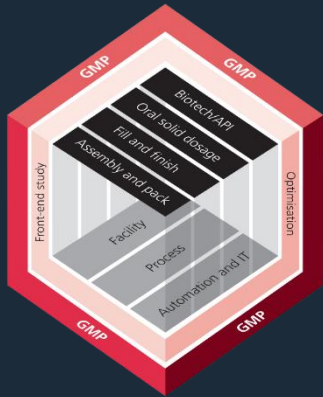
Digital twins is just a tool –  
how do we plug it in to drive  
benefits for our customers?



# Focused pharma engineering

NNE is an international company specialized in pharma engineering.

We operate **only** within the world of pharma. Our expertise is tailored specifically towards this highly GMP-regulated industry.



End-to-end engineering services tailored to pharma

- Facility
- Process
- Automation and IT

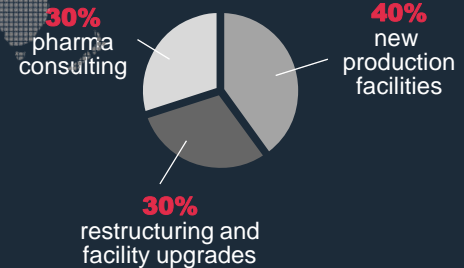
We bring best practices to our customers through

**1,500**  
projects globally / year

We are

**1,000**  
professionals

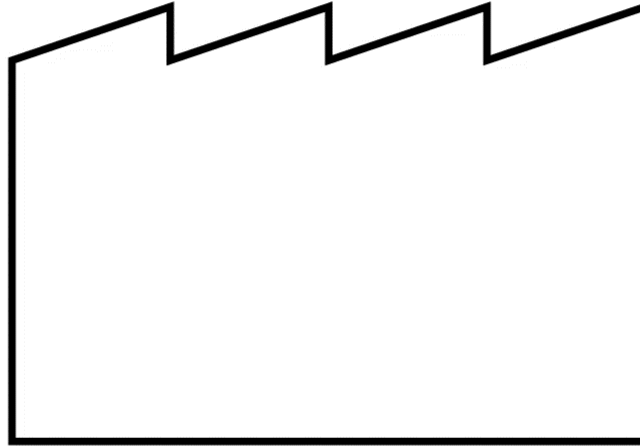
Our pharma experience is built on:



# Full service pharma engineering

Facility design – process engineering - automation

Engaging with a full service provider you get flexibility, decreased project timelines through parallel activities and efficient qualification



- Facility design
- Process engineering
- Automation

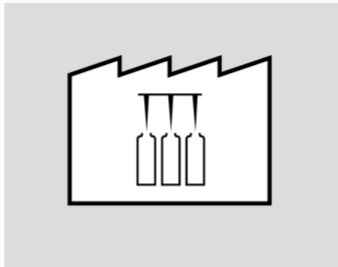
# Our expertise areas

## End-to-end pharma engineering

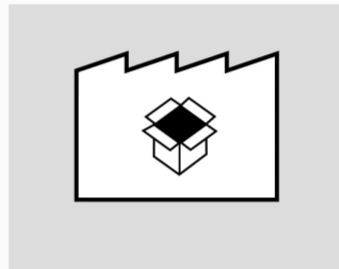


Biotech and API

Fill and finish

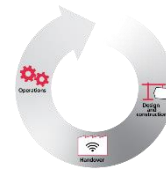


Oral solid dosage



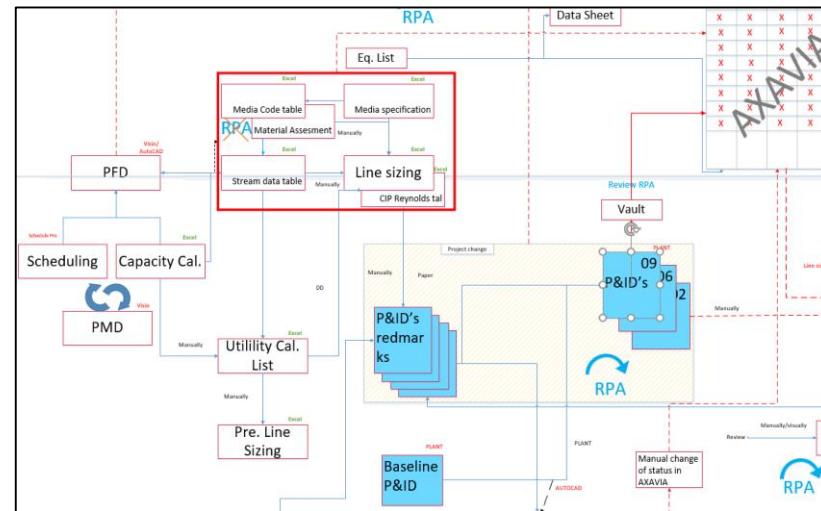
Assembly and pack



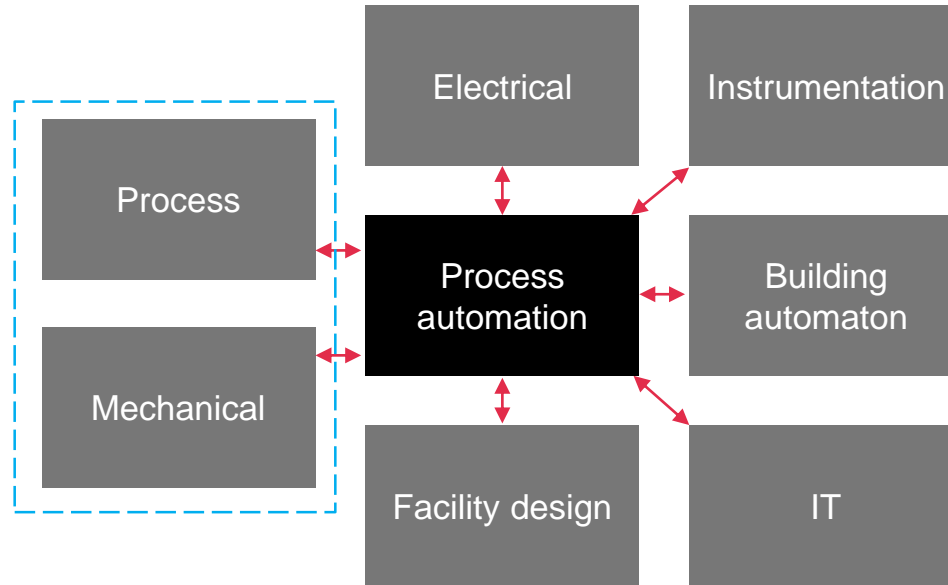


# First steps in digitalization

- 1 Create an overview of our current engineering model for design and construction
- 2 Improve existing engineering model "Our Model" (digital tool)
  - Outlines activities and deliverables for all disciplines
  - Includes all project phases
  - Does not provide a complete overview
- 3 Develop AS-IS mapping of:
  - Work processes
  - Information flow / exchange
  - Cooperation between disciplines
  - System and tools used
- 4 Next step is to specify TO BE

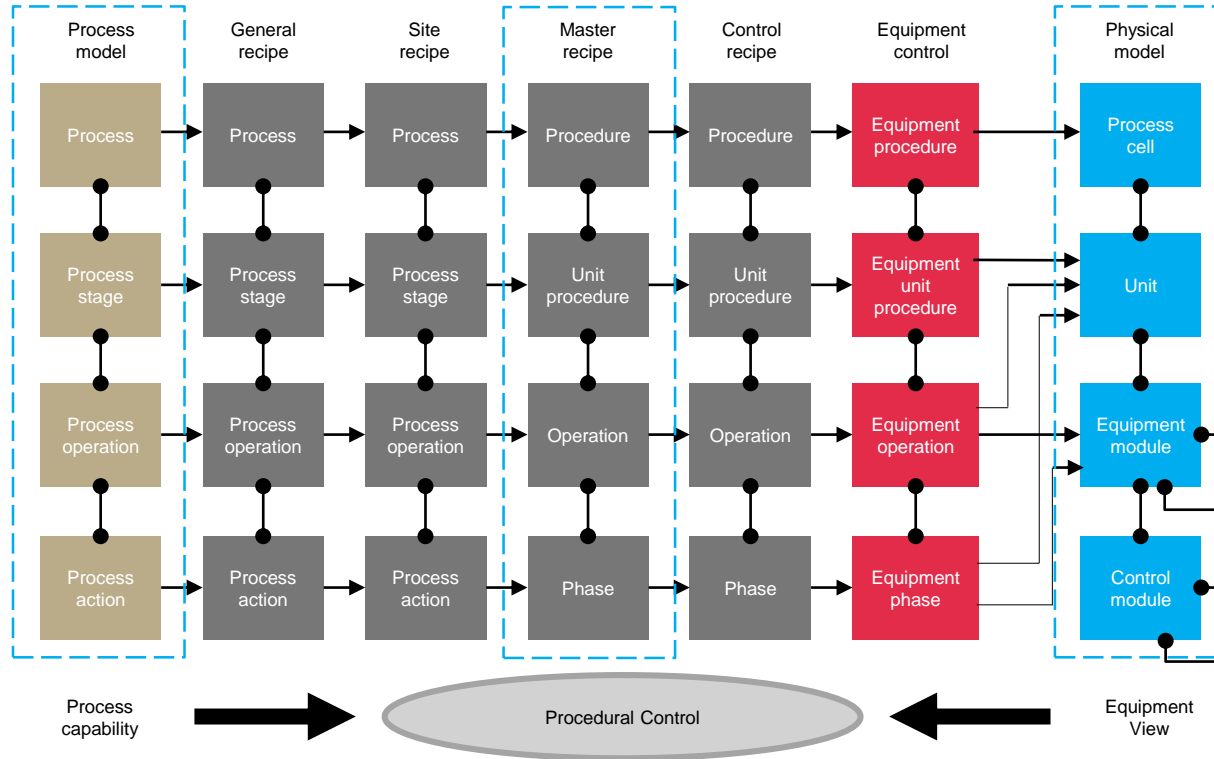
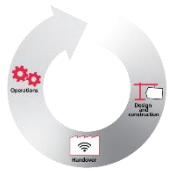


## Develop content for a digital model

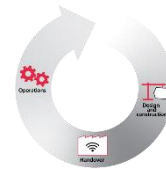


# Common language

## ISA S88

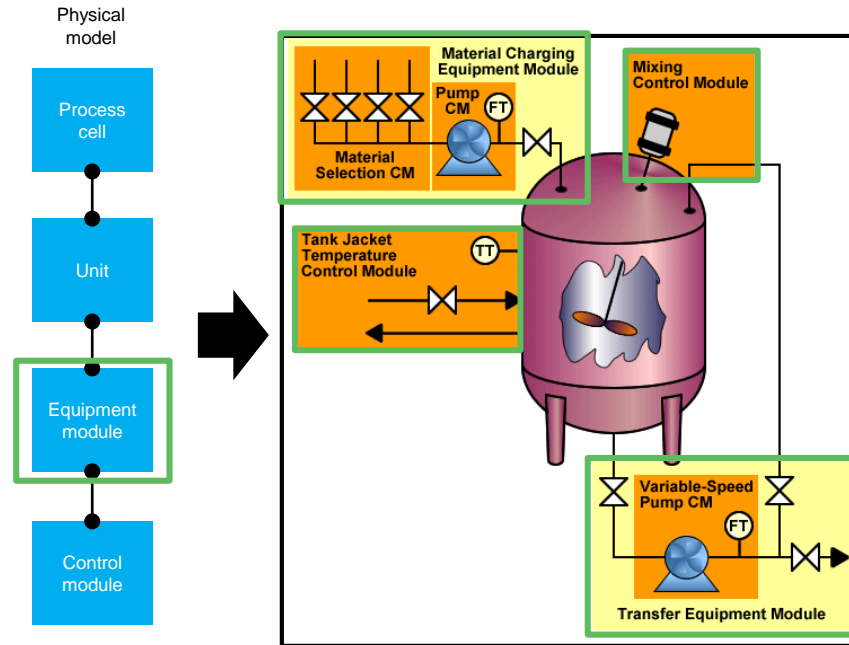


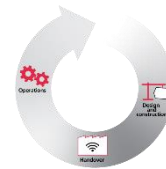
ANSI/ISA-88.01-1995 Batch Control Part 1: Models & terminology



# Basis for typicals

- Process and mechanical basic design deliverables
    - User requirement specifications (URSSs)
  - Object breakdown structure (OBS)
    - gives the equipment overview of the project
  - Process module diagram (PMD)
    - gives the overview of the project
  - Operational flow diagrams (OFDs)
    - describe the operation of the production
  - Process flow diagrams (PFDs)
    - detailed process flow information
  - Process and instrumentation diagrams (PIDs)
- 
- Process automation basic design deliverables
    - Batch model
    - S88 based functional specifications
      - Physical model
      - Procedural model

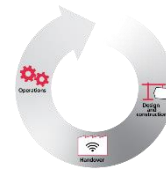




# Characteristics for a Typical

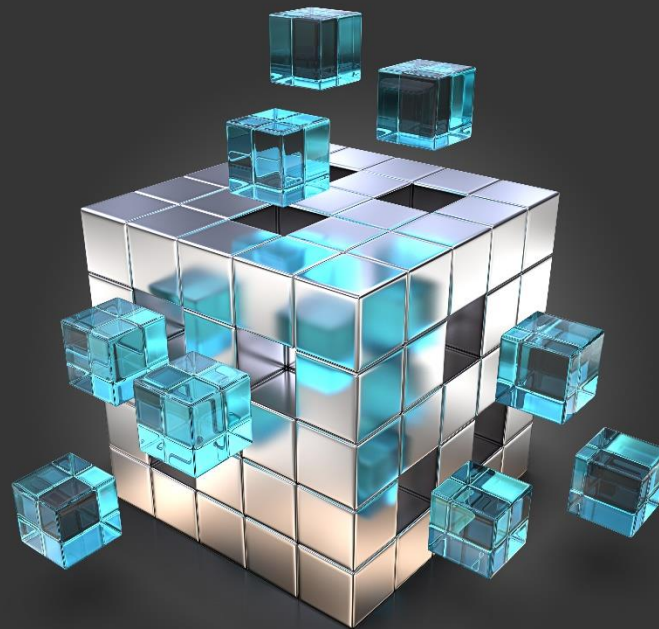
- As few Typicals as possible, based on one or more equipment modules
- Has the right detail level
- Consists of standard micro solution
  - Pressure control
  - Gas filter with CIP/SIP
- Includes all possible functions of the Typical, even though not all may be used in many cases
- Contains information that is common for more than one discipline (typically process, mechanical, electrical and instrumentation and automation)
- Is not for a specific media – purely functionality

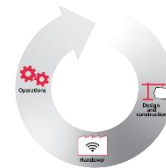





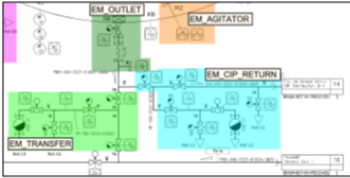
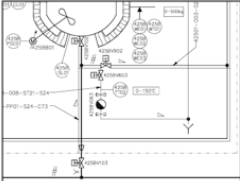

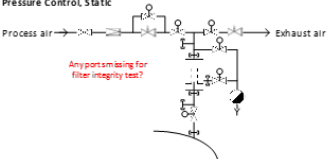

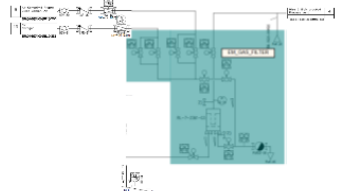
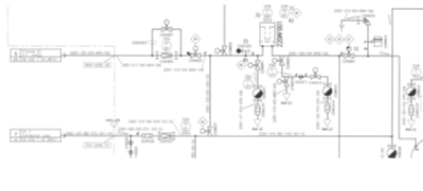
# Advantages with Typical

- Off the shelf "specifications" e.g.
  - Functional specification
  - P&ID drawing
  - Instrument list / data sheets
- All disciplines develops from the same digital Typical
  - Common baseline
  - Changes are immediately available for all disciplines
- Improve design quality (right first time)
- Improve flexibility and speed
- Predefined total investment cost for related deliverables and activities



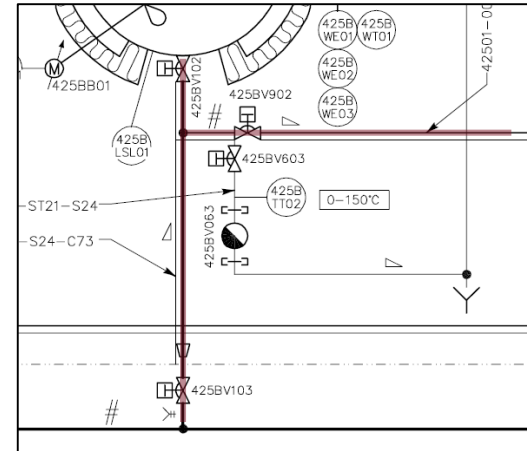
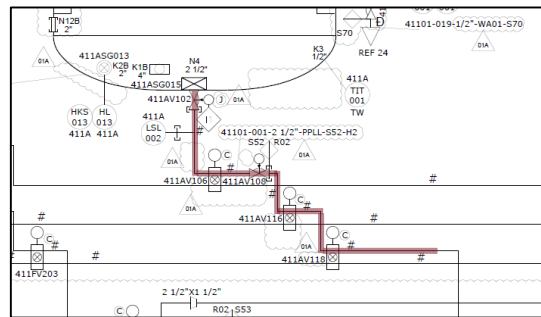
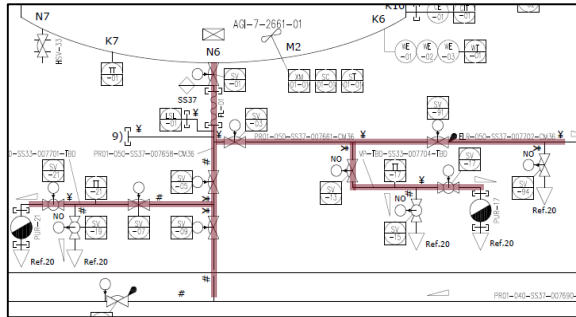
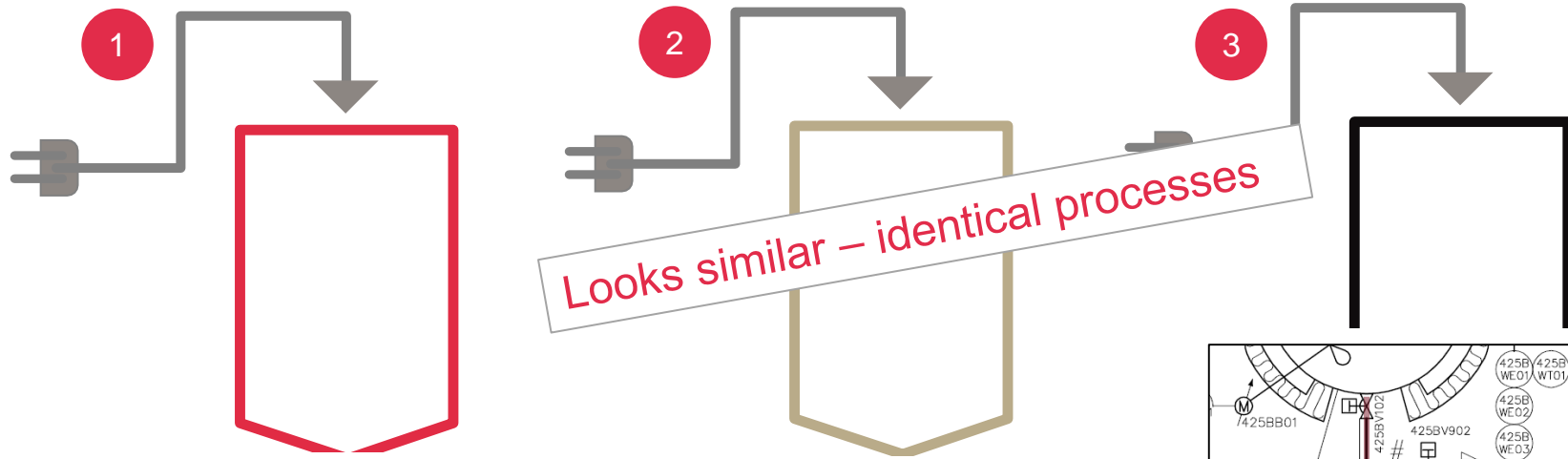


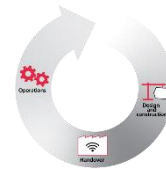
# Collect best practices

1	A	B	C	D	E
2	Equipment Module	Suggested standard EM	NN Typicals	Project examples	Project 3
	Outlet from tank; non-sterile, possibly steam sanitisable		<p>Outlet from Process Tank with CIP DST-PROC-ET-00003.docx GO: COIBB-00030</p> 	<p><b>Project 1</b> BRA04-B07-XX-PR010-651 CCCF Hold Tank (before Crom skid) - steam sanitisable</p>  <p><b>Project 2</b> KA ED2 EXP T 23 25201 001 Z2 Application tank - steam sanitisable</p> 	<p>KA JC T 23 T100</p> 
3	Process air overlay, pressure control, sterile	<p>Pressure Control, Static</p> 		<p>BRA04-B07-XX-PR010-361 Buffer Storage Tank 10,000 L 1</p>  <p>KA ED2 T 23 22001 020 Basic Media Storage tank, 20,000 L</p> 	



# 3 product tanks with different solutions

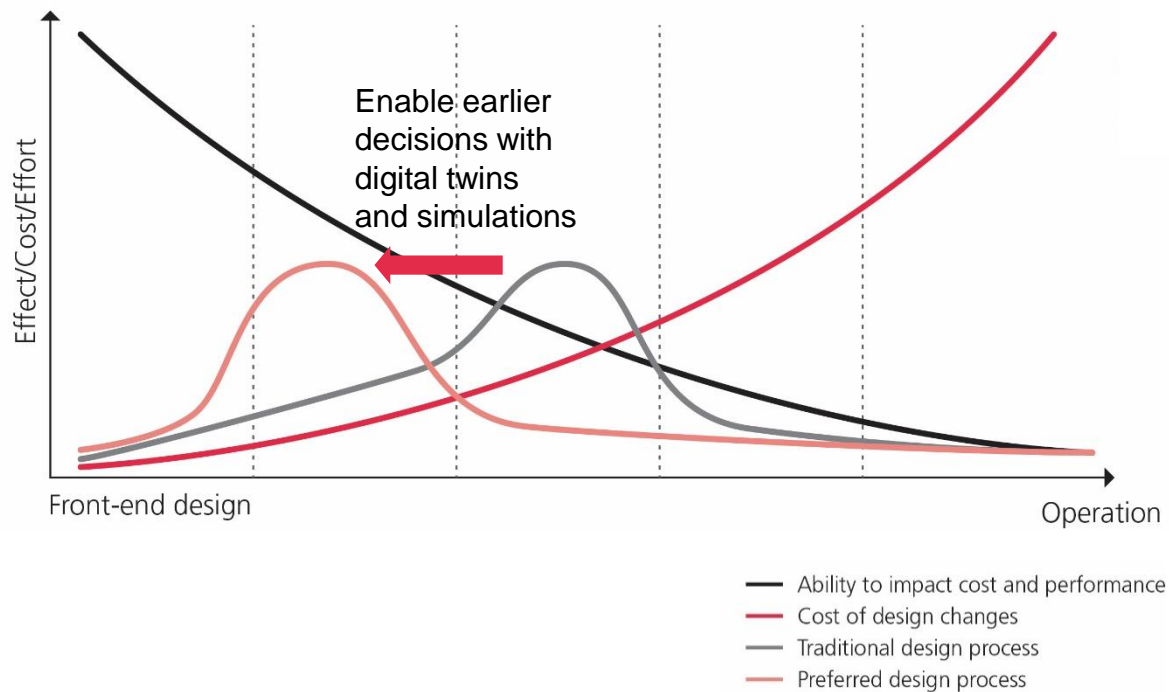




# OUR MISSION

We want to enable our customers to make **right first time decisions** by providing them with deep insight into:

- Capacity
- Flexibility
- Total investment cost in the early conceptual phases.



# Scale of digitalization/digital readiness of our customers

NNE is in full swing digitalizing internal processes  
so we are prepared for the future scenarios  
we expect to see in the coming 1-10 years

Full digitalization



As-is



Kom forbi vores stand  
for at se noget af det,  
vi allerede har gang i

