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Industry 4.0

Digitalizing the Process Plant

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Siemens Ltd.

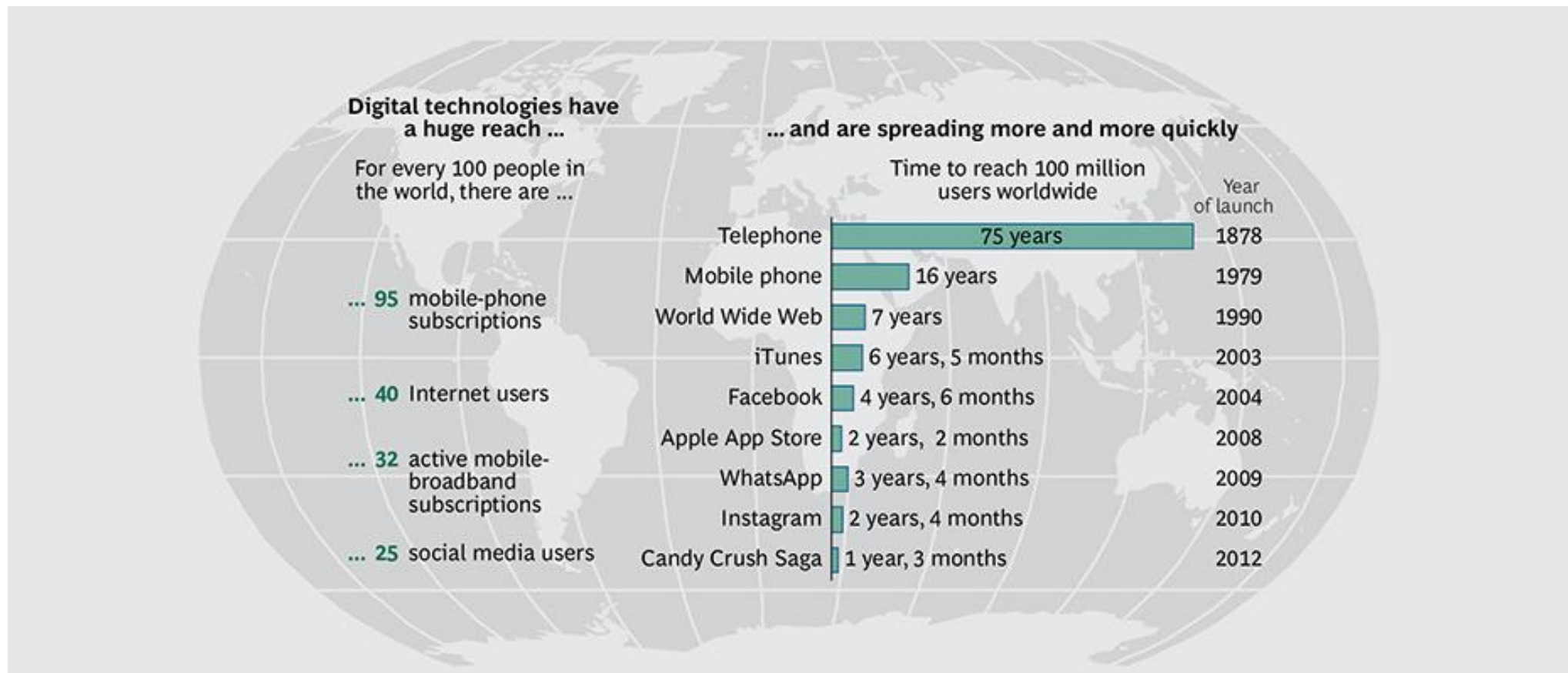
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<https://www.siemens.com/digital-plant>



The pace of disruption has increased exponentially

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Source: BCG - https://www.bcgperspectives.com/content/articles/digital_economy_technology_strategy_digital_imperative/



Megatrends and technological trends are driving the transformation of the Chemical Industry

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Megatrends

Resource availability



Emerging and opening markets



Greater operational efficiency



Developments: Demographic and society structure



Opening of new frontiers



Green Chemistry



Technology Trends

Adapting to Disruptive Technologies



Real-time Data Analysis in Chemical Processing



Digital Revolution



Integrated Lifecycle



Success Factors

- Time-to-market to occupy the market first
- Innovations as differentiator in Specialty Chemicals
- Cost position of operations is essential for Conti and Batch



Industries have to cope with five fundamental drivers

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HSSE



- Regulations and Standard
- Health
- Safety and Security
- Environmental Protection

Costs



- CAPEX Efficiency
- OPEX Reduction
- Organizations and Processes Optimization
- Standardization

Flexibility



- Different feedstocks (fuels/renewables)
- Individual products
- Modularization
- Volatile markets
- Technology Lifecycle

Time to market



- From Idea to Product and Process
- Ramp-up of Plant
- Demand Predictability
- Responsiveness

Output



- Increased Performance and Effectiveness
- Asset Efficiency and Reliability
- Production and Resources Efficiency

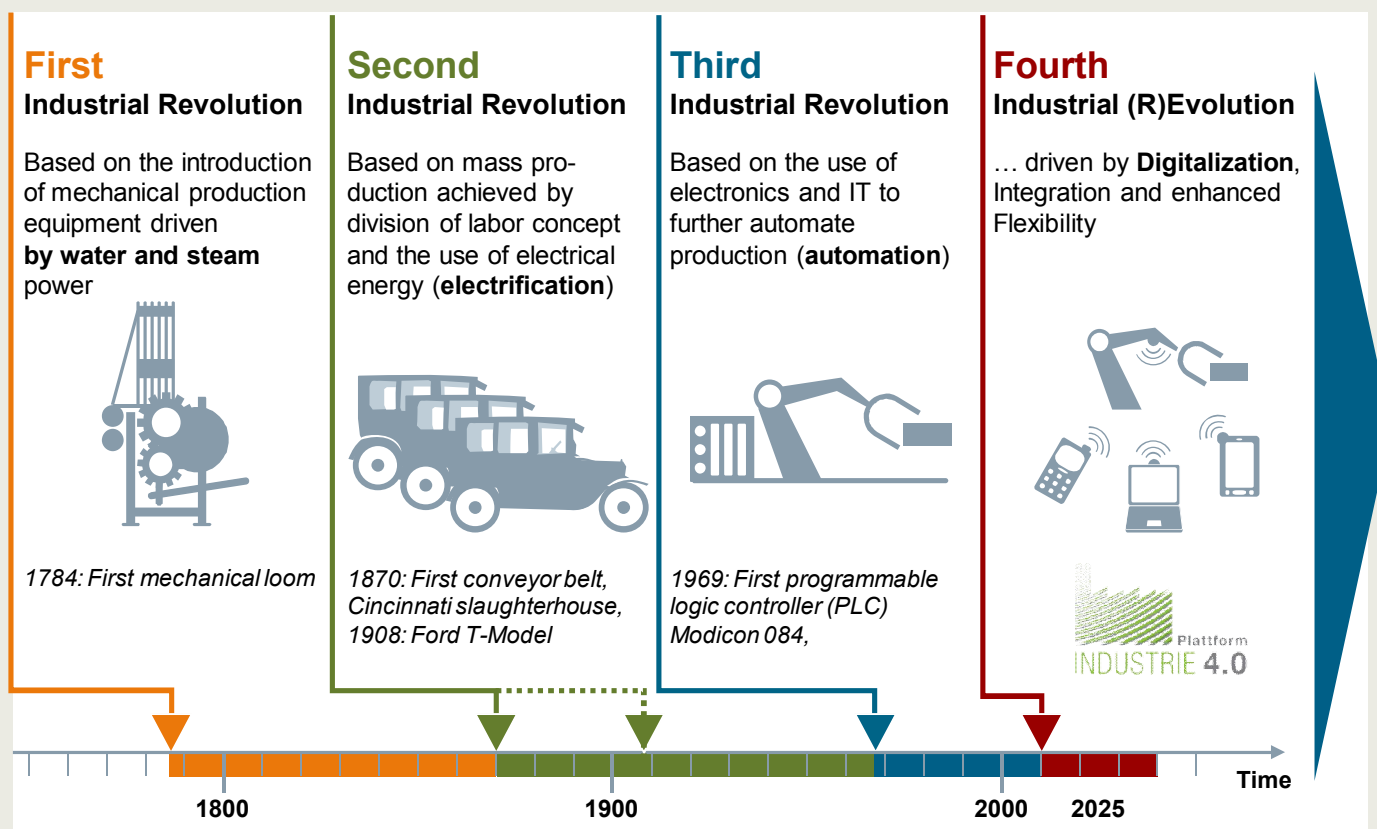
- Long plant lifecycles with highly fragmented data landscape
- Continuous, safe, secure and reliable operations
- Suppliers need to address evolving market and production lifecycle
- Ageing workforce and “digital natives” as next generation

Digitalization is the
Step towards
Next Revolution



The Digital (r)Evolution

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Characteristics

- Humans, devices and systems are connected along the entire value chain
- All relevant information is available in real-time – across suppliers, manufacturers and customers
- Parts of the value chain can constantly be optimized with respect to different criteria, e.g., cost, resources, customer needs

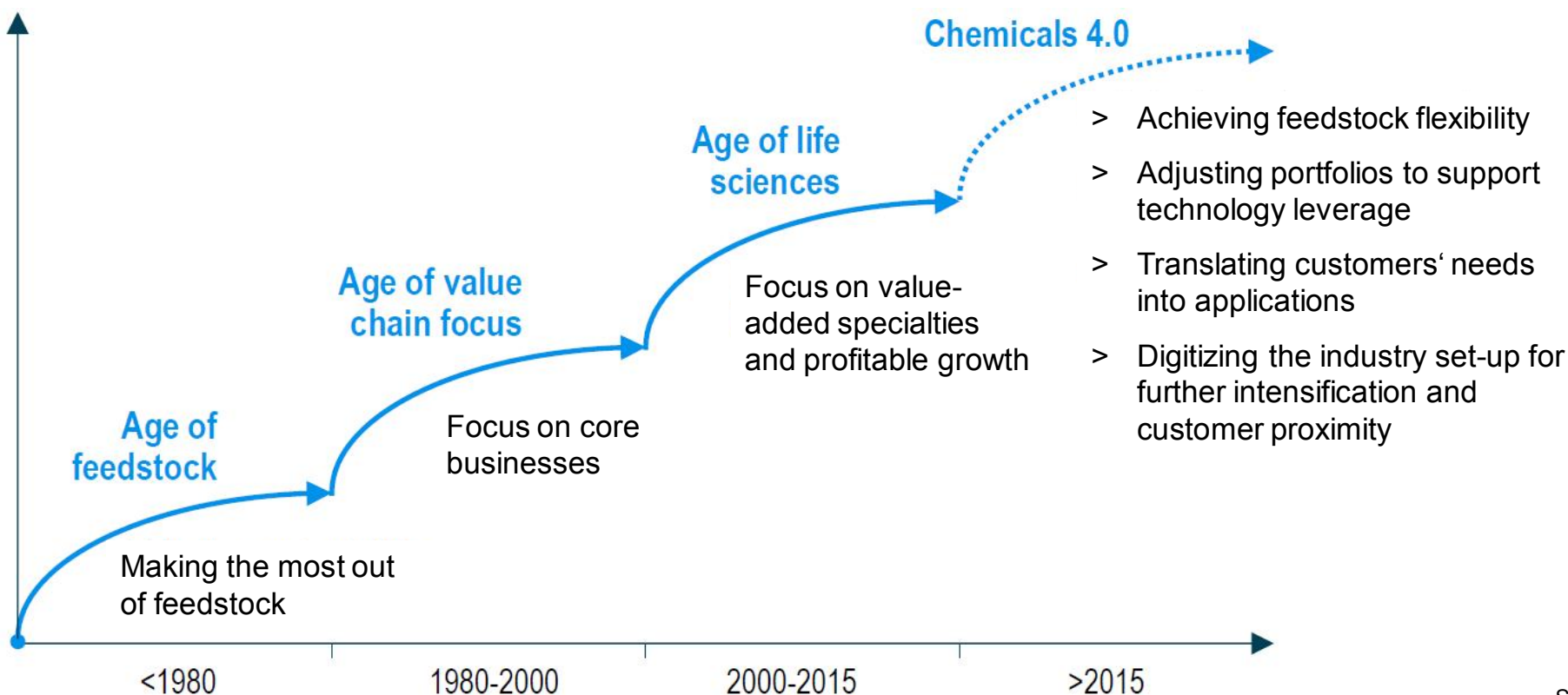


What to do – “Age of application” can contribute to growth and further improved sustainability

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Long term view on chemical industry transformation



Source: Roland Berger



What is digitalization !



Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business (Gartner)

The impact of Digitalization:

- Increase productivity of production processes
- Transform existing business (new channels, new approaches)
- Enable new business models



There are lots of definitions and meanings
for the same topic

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Digitalization

Cloud Computing

Internet of Things (IoT)

Industrie 4.0

Industrial Internet Consortium (IIC)

Digital Enterprise

Digital India

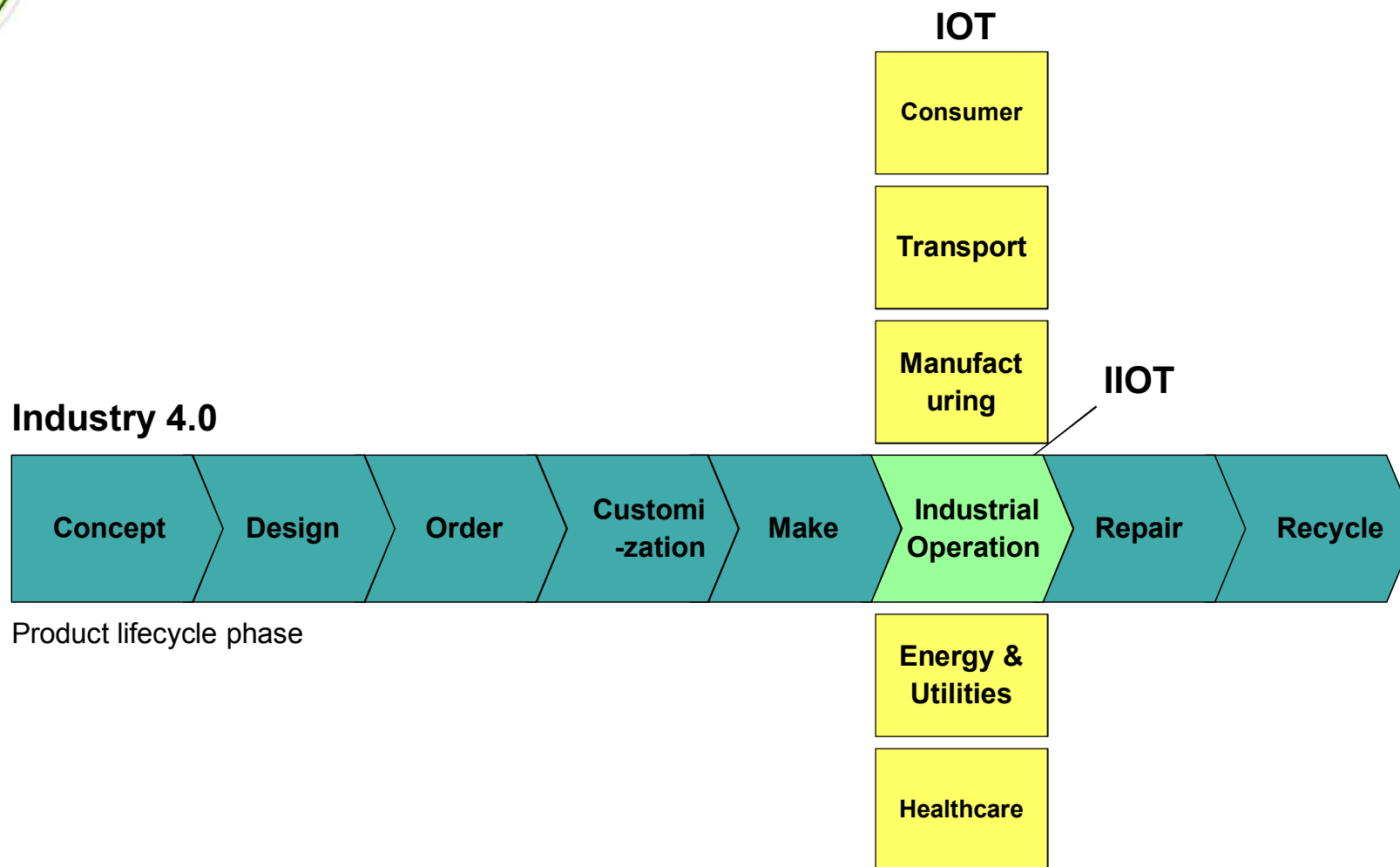
Big Data

Smart Industry - Smart Data



‘IIOT’ is not the same as ‘Industry 4.0’

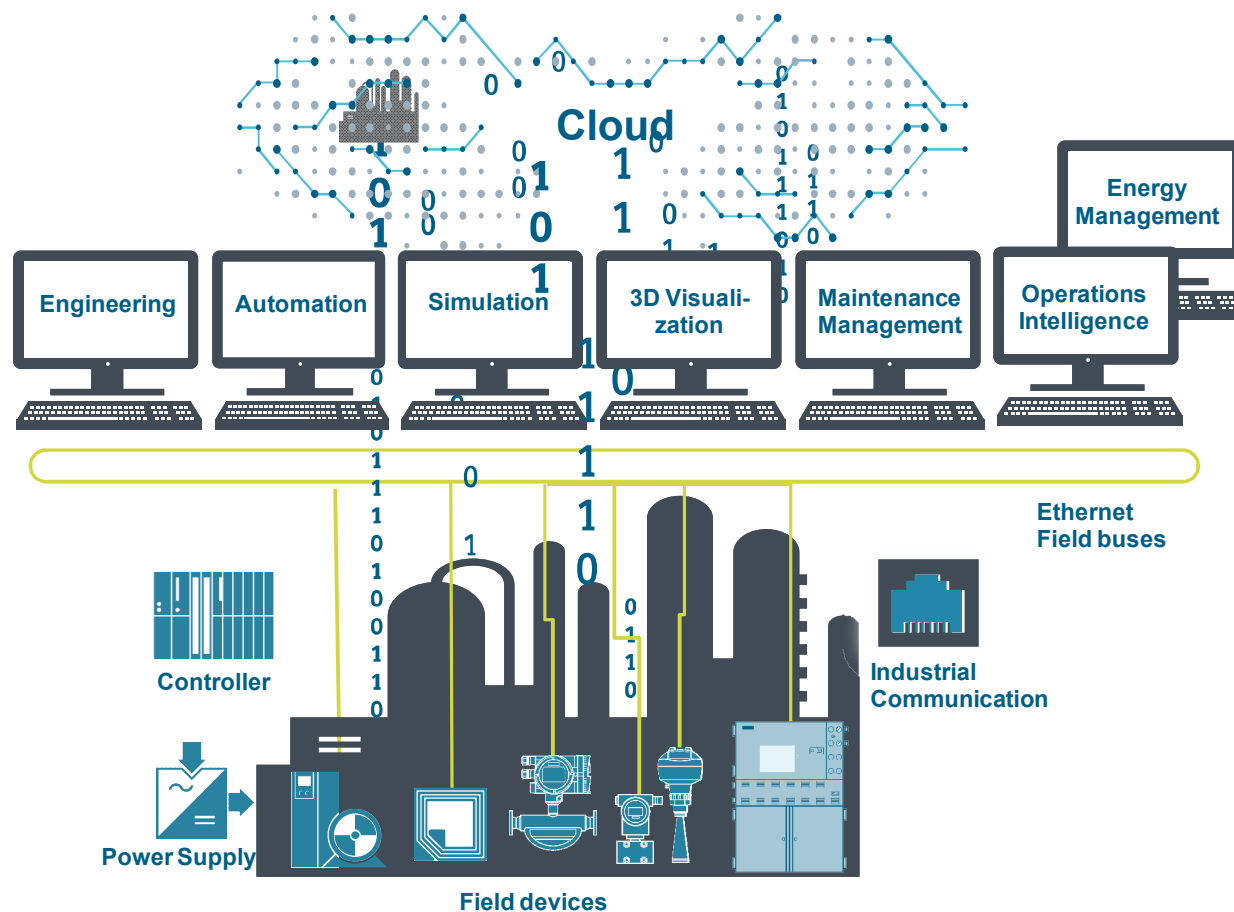
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The Digital Enterprise in process industries – Intelligent data through all levels

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How to realize the Digital Enterprise for a process plant?

How to turn data into
information?

How to realize and maintain the
digital infrastructure ?

How to ensure consistent data
in engineering and operation?

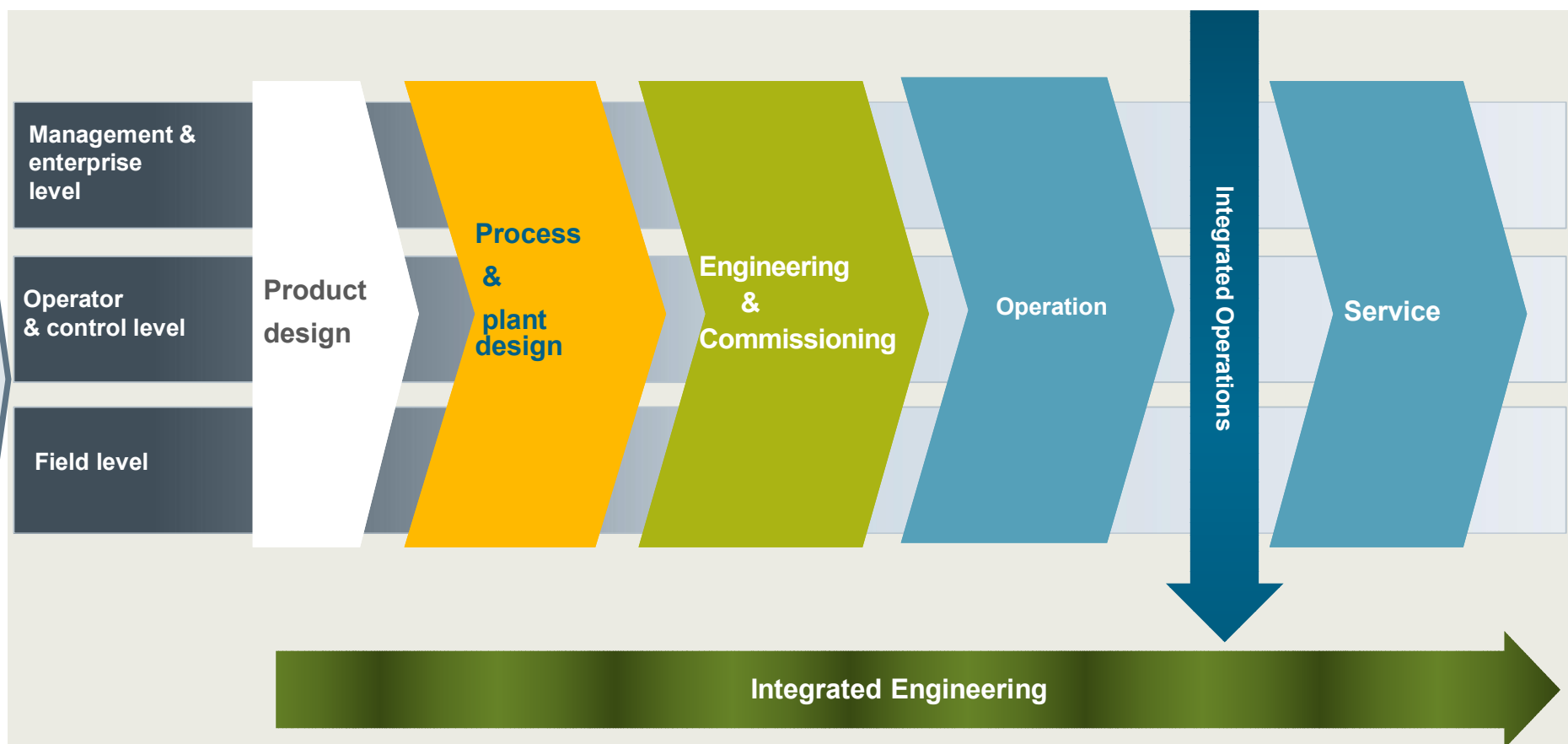
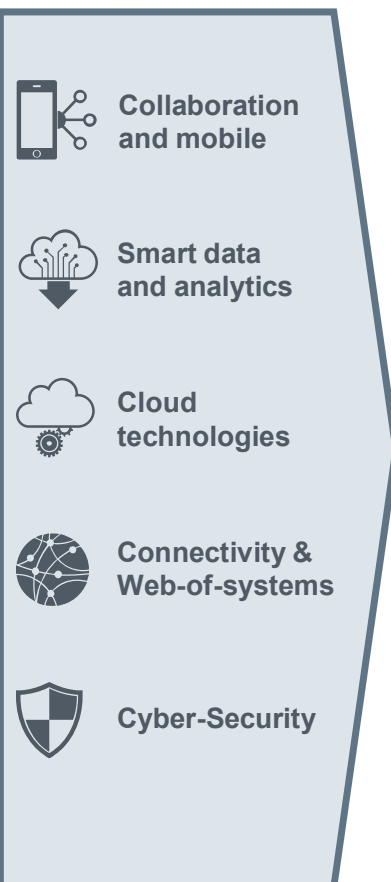
How to connect all devices
safe and secure?

How to reap the benefits of
fully integrated workflows?



Newer technologies are creating opportunities in the entire landscape of a process industry

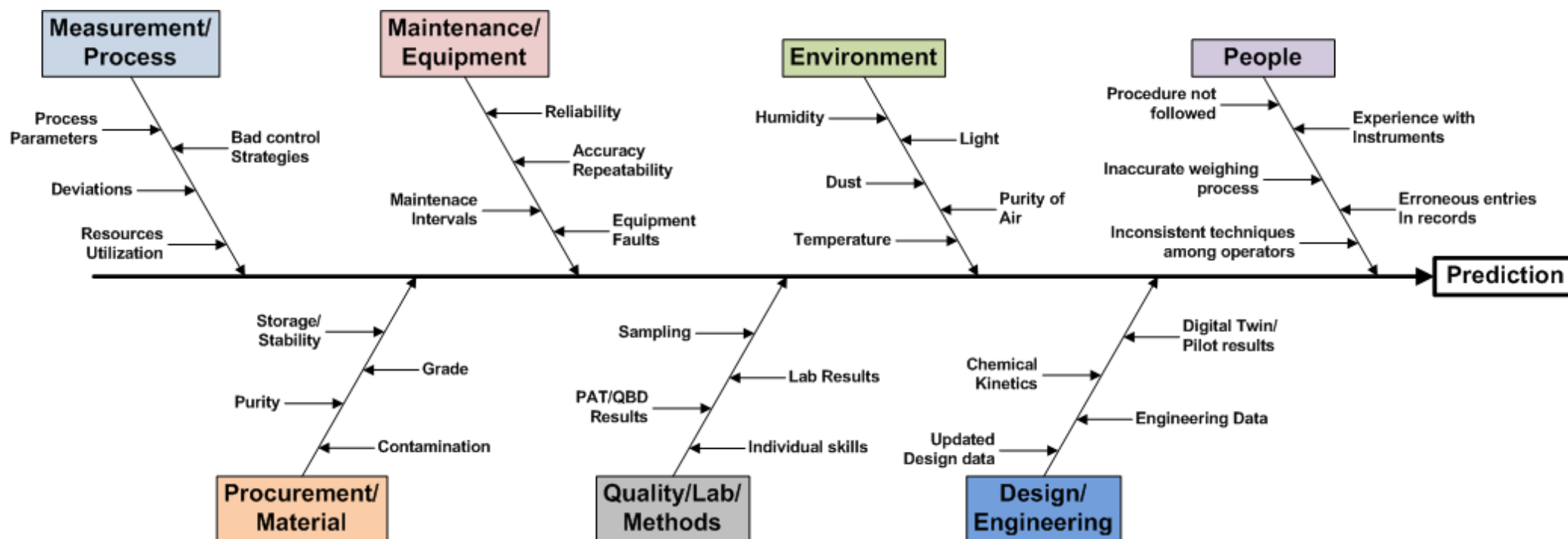
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Many direct and indirect measurable influencing factors – Big Data

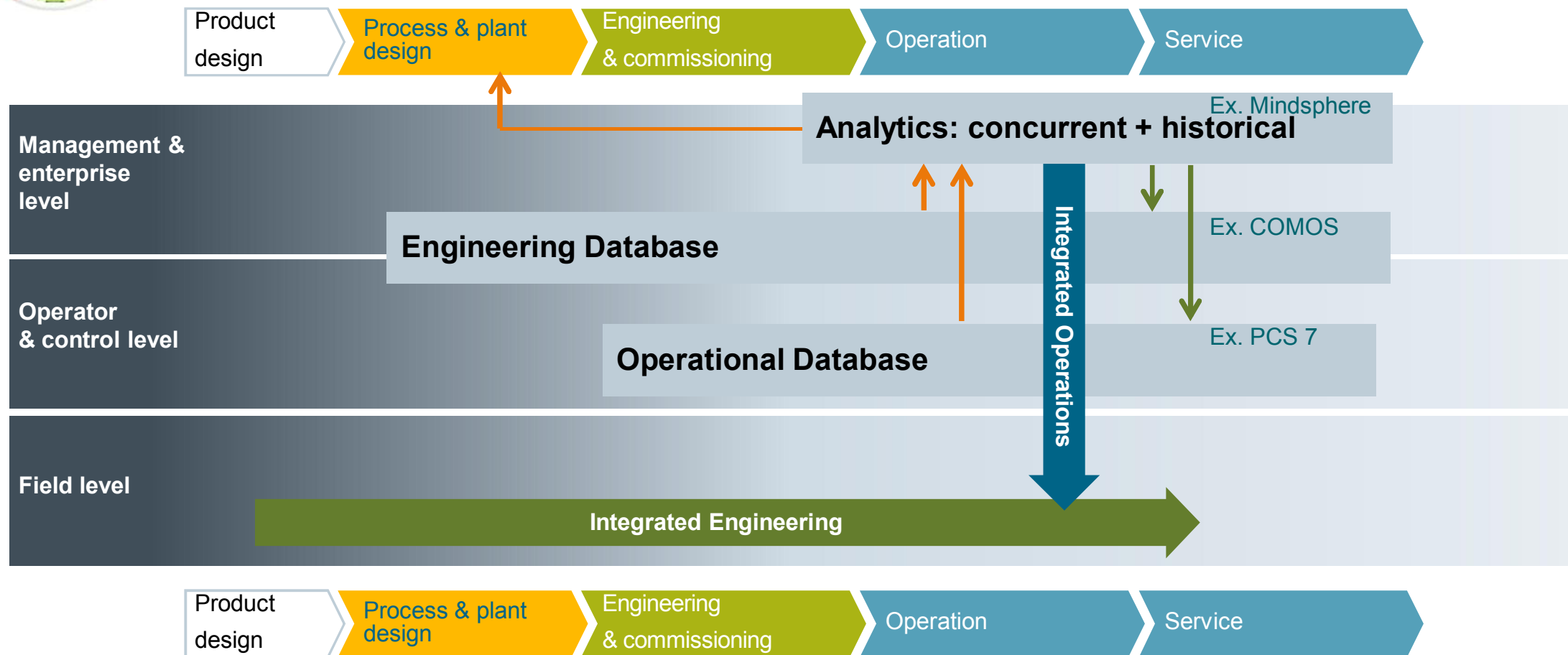
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New insights will give opportunities for quantum improvements

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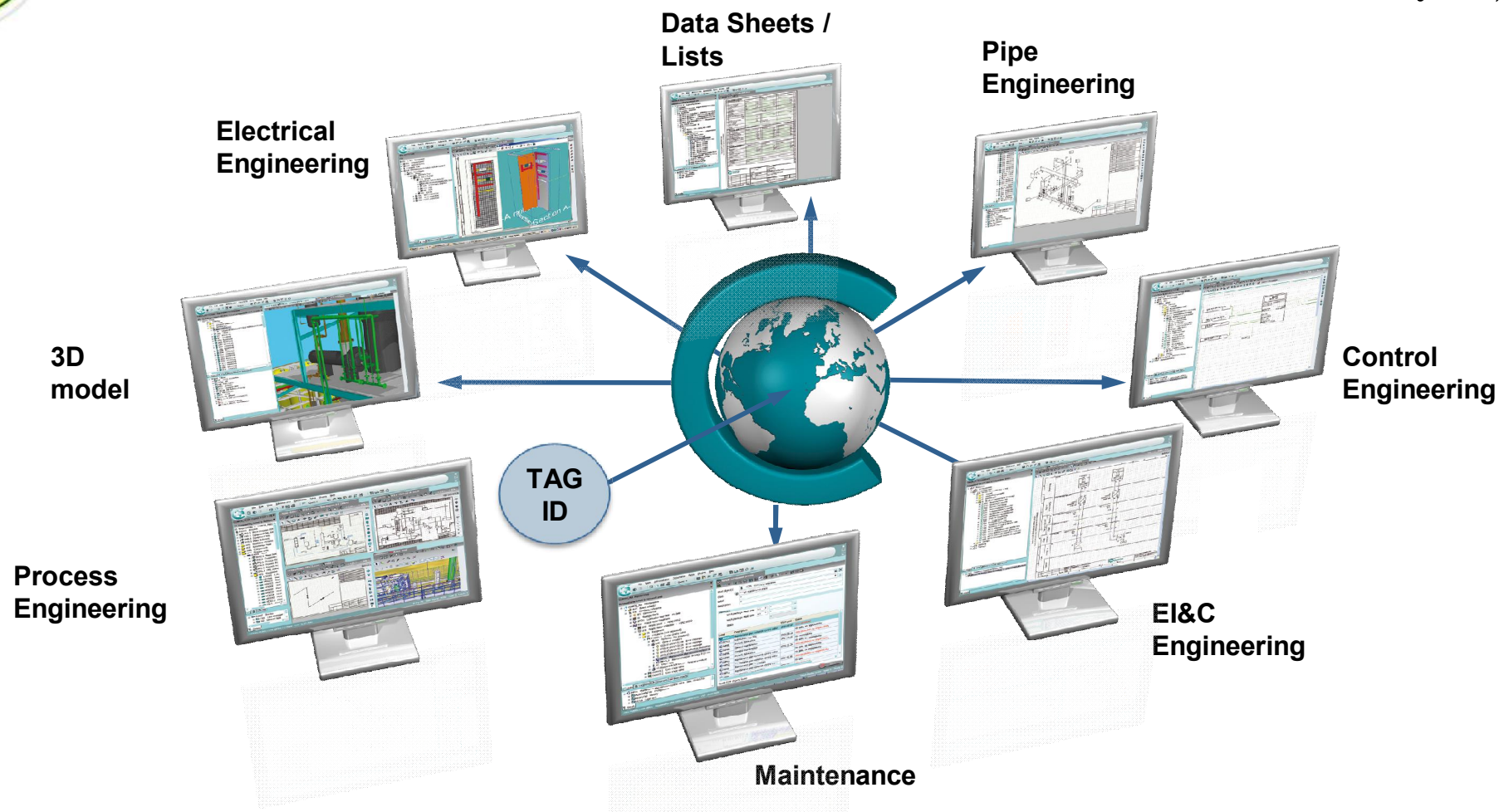




Common Data model for Plant Management

ex. - COMOS

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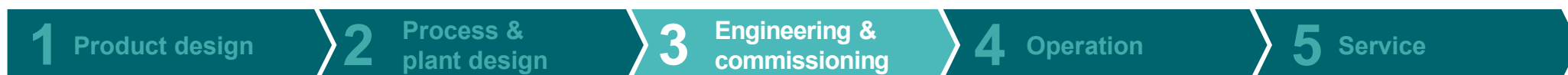




Integrated Engineering for process plants: The common data hub and consistent data flow enable faster engineering

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Workflows can be executed in parallel, which saves valuable time and thus reduces costs





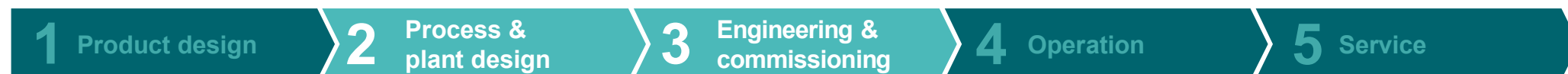
Integrated Engineering for process plants: Digital Twin and 3D visualization of the plant

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During engineering, the Digital Twin of the plant is created, even before the real plant exists...

... this offers the possibility of

- 1) an early 3D visualization of the plant, e.g. for training of service staff
- 2) Virtual commissioning
- 3) Maintenance
- 4) Virtual asset mgmt.

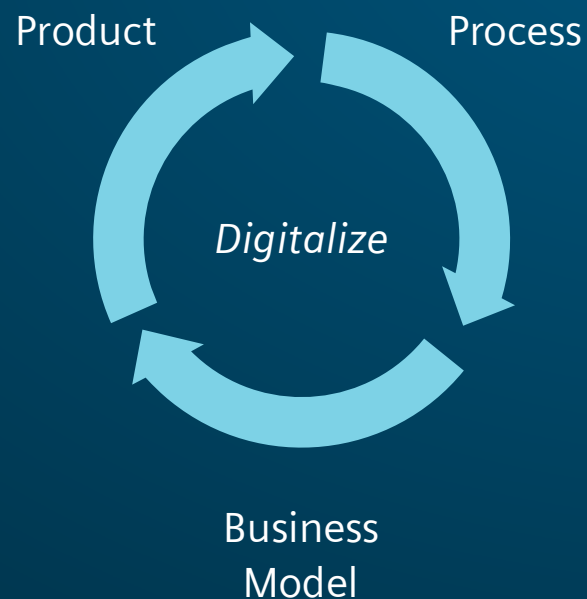




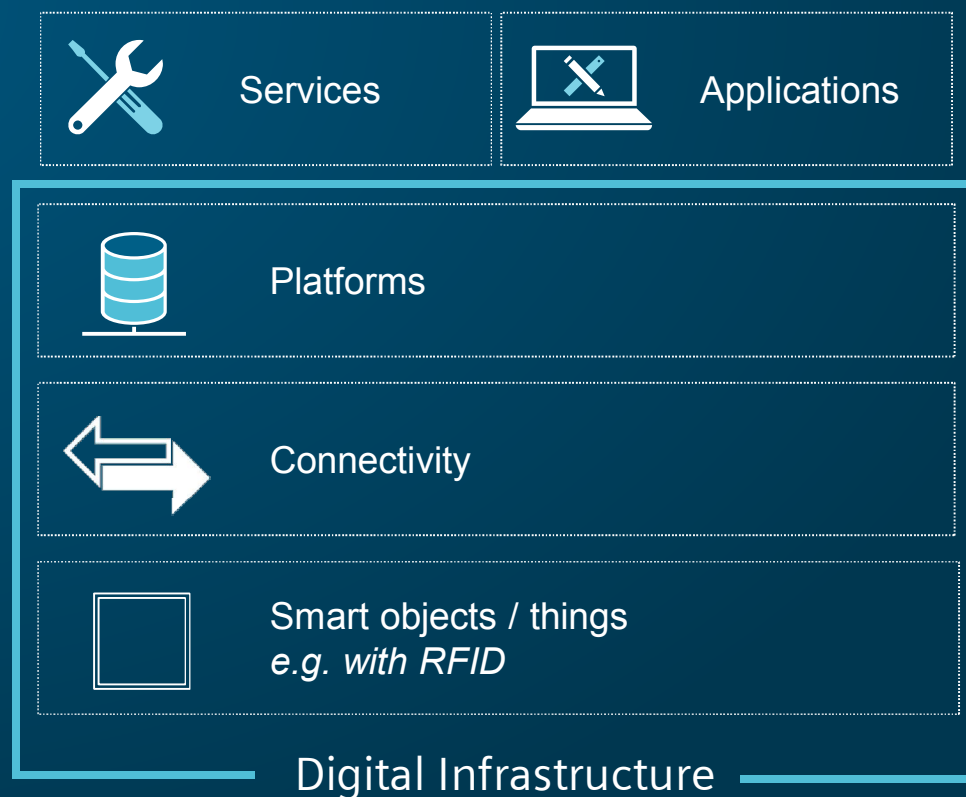


Digital Infrastructure is a key enabler for Vertical Integration

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always
requires





Horizontal integration of Data across the Organization

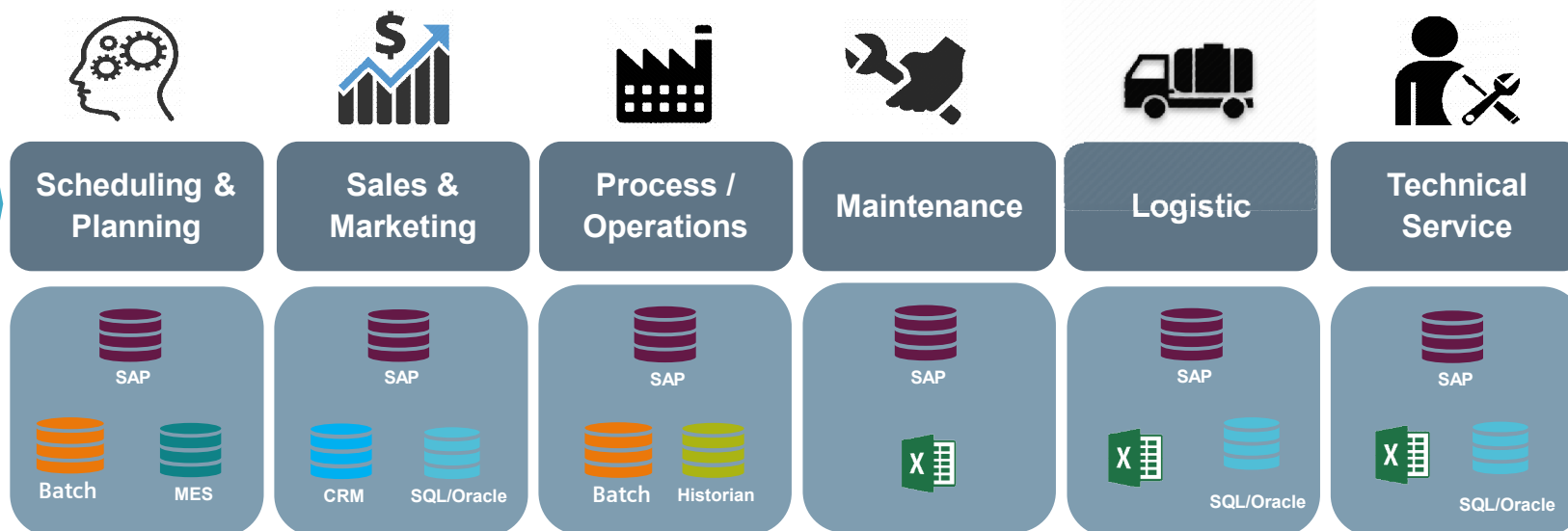
ex. XHQ

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XHQ as Digital Enablement Platform
Visualize, Contextualize, Aggregate & Integrate

Technical Disruption

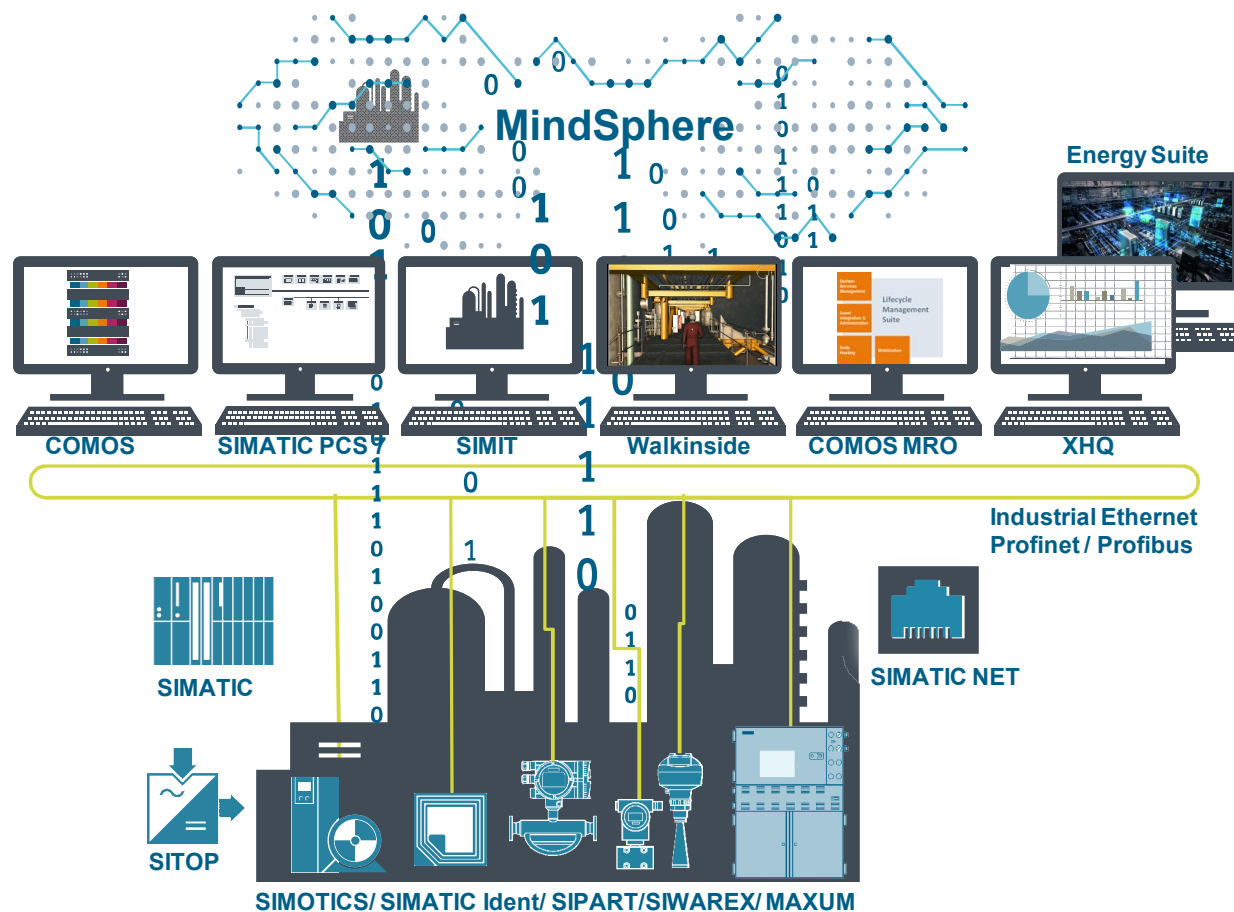


Market Competition



The Digital Enterprise in process industries – Intelligent data through all levels

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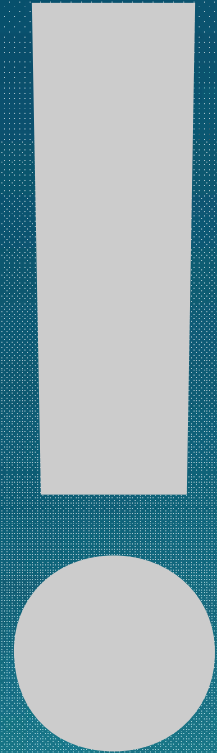
The Siemens offering for the Digital Enterprise in process industries

- ✓ Field data turn smart in the cloud
- ✓ Optimum digital infrastructure for all requirements
- ✓ Consistent and always up-to-date data across the entire plant lifecycle
- ✓ Comprehensive connectivity
- ✓ Optimal interplay with all levels

Industry 4.0 –
have we already arrived?

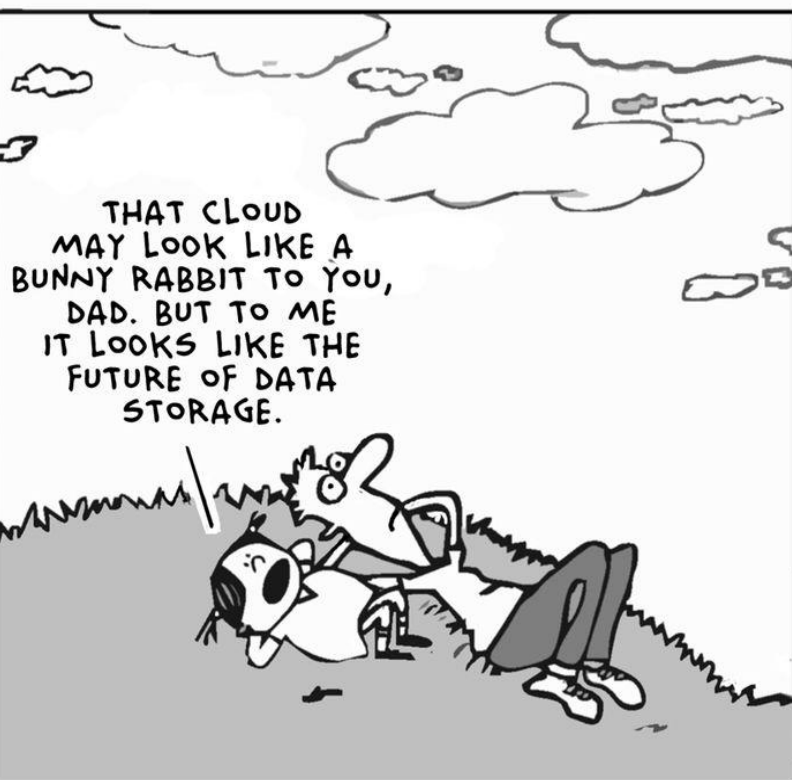


We're on the way!





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