



SEP 06, 2019

Industry 4.0 Digital Transformation

Force Multiplier for Growth

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ABB: Writing the future of industries in a changing world



2nd industrial revolution

(19th century)

- + Electrification
- + Motion

3rd industrial revolution

(20th century)

- + Industrial automation
- + Robotics

4th industrial revolution

(21st century)

- + Digitalization
- + Autonomous

Industry 4.0 Digital Transformation

Key Takeaways

1

WHY

Digital is proving major impact on Operational Excellence, Quality Productivity, Safety, Reliability and EBITDA

2

WHAT

Holistic Approach with Well defined Digital transformation strategy aligned with business processes and overall goals is key.

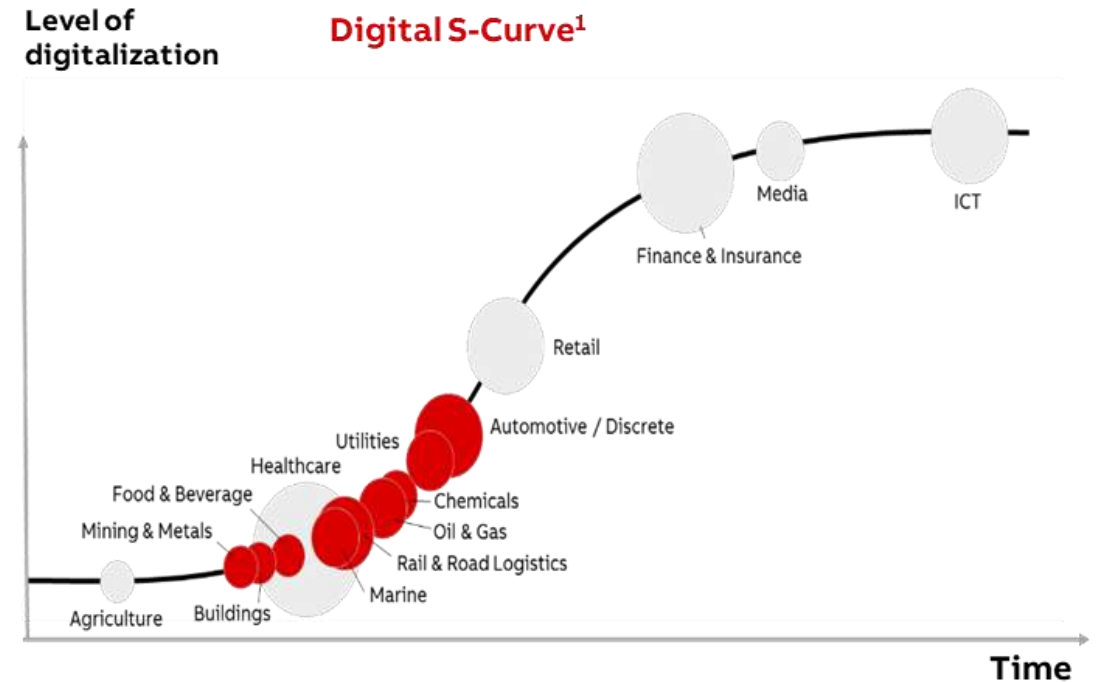
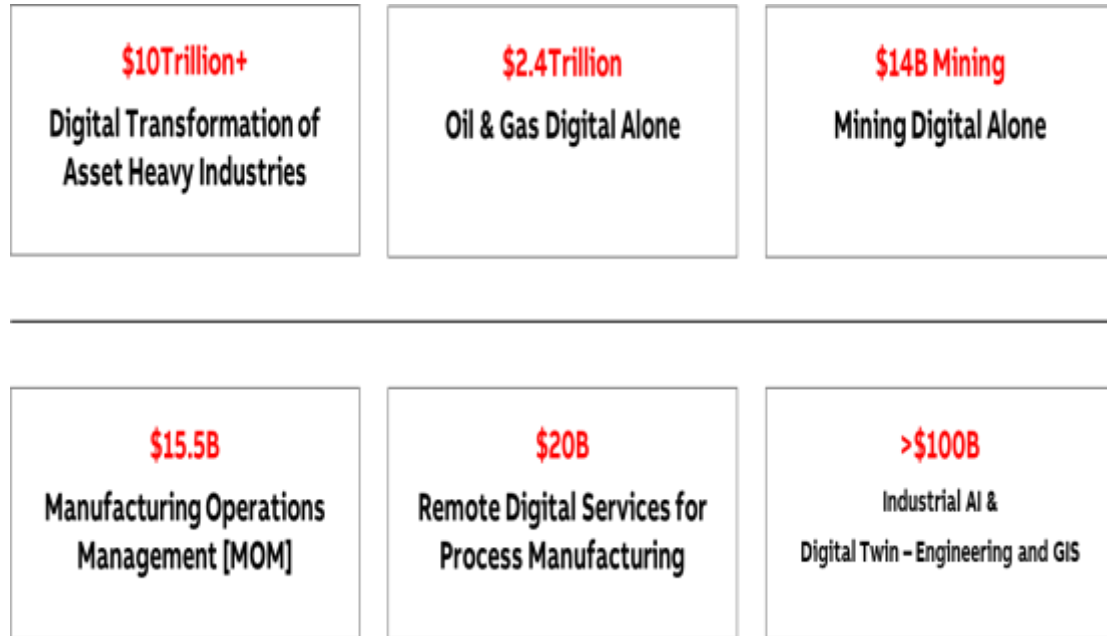
3

HOW

Industry Value Engineering provides a proven approach to achieve predictable outcomes with higher ROI and quicker Payback

#1 Industry 4.0 Digital Transformation Marketplace

Huge, Real and Growing



#2 Industry 4.0 Digital Transformation

Key Characteristics

Data is the New Oil & New Currency. Life Cycle and Value Stream Dimension of Industry 4.0 (RAMI 4.0) is all about turning Data into Insights.

Digital has proven impact on Operational and Business Excellence, Productivity, Safety, Maintenance, Reliability, Quality, Supply Chain and Sustainability

Well defined Digital Transformation strategy aligned with business processes and overall goals is the key. Ad-hoc deployment of Digital Solutions do not help on their own

OT/IT/ET/Spatial Convergence combined with Industrial AI and Analytics helps to optimize both operations and asset loop providing significant opportunities

Expanded Information Landscape demands new Topologies for the scale and Economics. Edge and Hybrid Cloud are becoming standard. With digitization there is a strong need for security

Industry Value Engineering provides a proven approach to achieve predictable outcomes with higher ROI and quicker payback

#3. I4.0 Intelligent Enterprise is Disruptive

IIoT Disrupts Traditional Way of Looking Data Landscape and Insights

Visualize a plant...

1

Where every component is intelligent

Smart factories & proactive assets
Manages core operations, utilities, by-product gases

2

Where asset tracking from ladles to coils ensures effective planning and precision

Higher operational efficiency | minimal production loss

3

Where every single piece of data across the value chain is visualized and visible

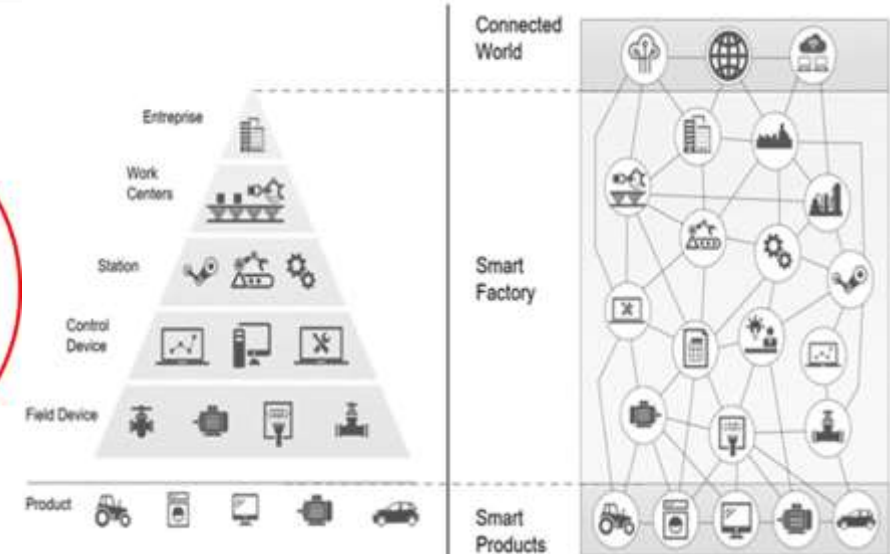
Unparalleled control through visibility

4

Artificial Intelligence & analytics driven system self-diagnoses to inform you of its optimization needs

Real-time insights for quick response

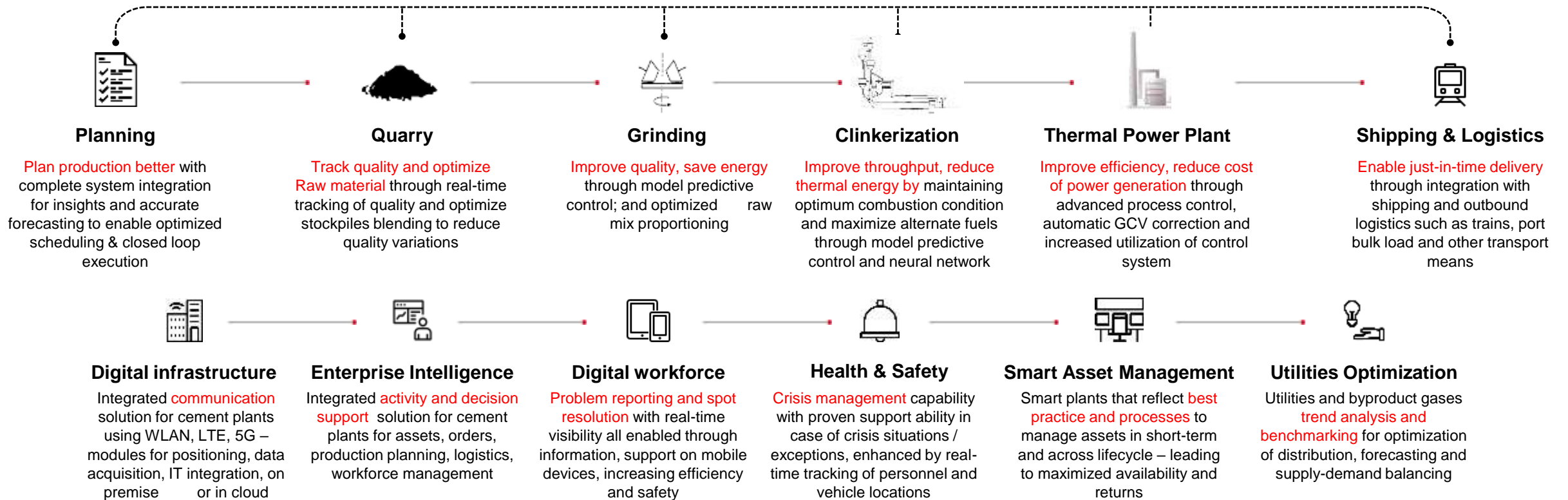
**Industry 4.0
Digital
Enterprise**



#4 Digital Transformation Driving Integrated Value Chain

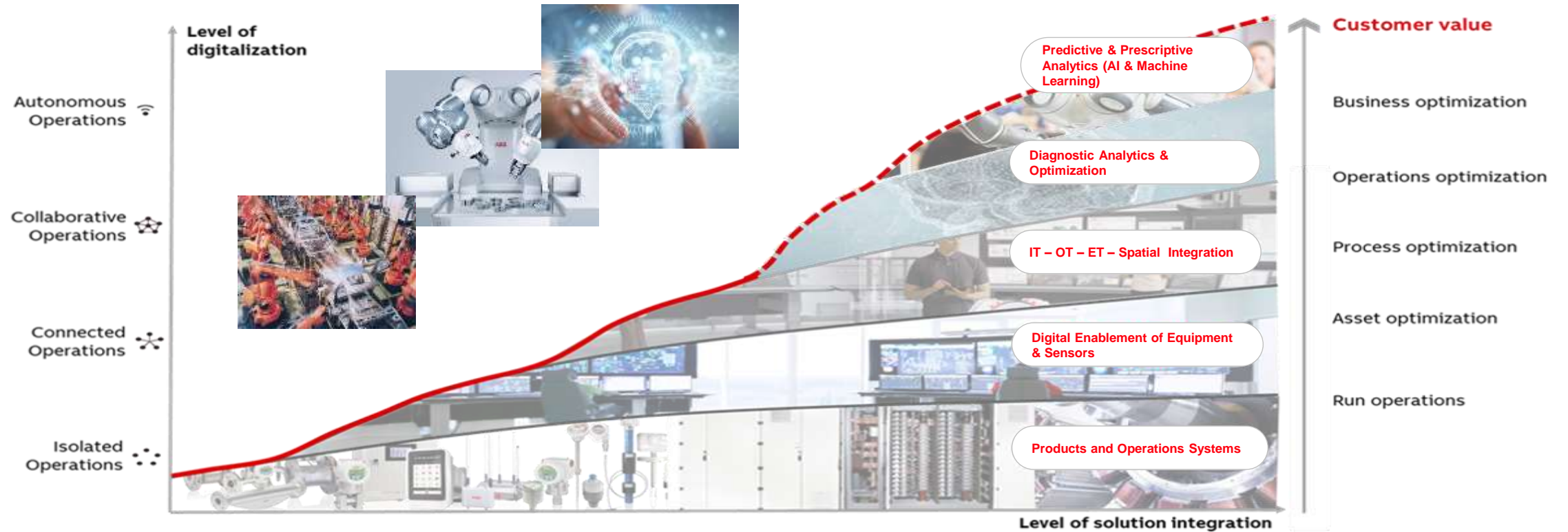
Process – Asset – Plant – Enterprise Ecosystem Loop

Data Driven Wisdom for Process-Asset-Plant- Enterprise optimization



#5 Driving to the best of I4.0 Digital Value Chain

Achieve next productivity leap with digitalization; substantial and sustainable competitive advantage




Holistic Approach

Typical Business Benefits of Digital Transformation in Process Industries

Bottom line and Top line Impact

~5%

Process Optimization

 Productivity Improvement


 Energy Optimization





Optimize the process by usage of advanced model predictive control (MPC) and AI/ML

~20%

Asset Optimization

 Predictive Maintenance

 Performance Improvement


 Reliability




Improve OEE of assets by reducing (unplanned) downtimes

~5%

Quality Improvement

 Data driven Quality Control


 Online Process Validation




Improve product quality by in-line quality control incl. feedback loops to process parameters

~10%

Planning Efficiency

 Fleet level Enterprise Planning

 Dynamic Production Scheduler for Mills





Improve planning accuracy by comprehensive planning across fleets

~20%

Logistics Productivity

 Automated Replenishment

 Material Handling and Transportation

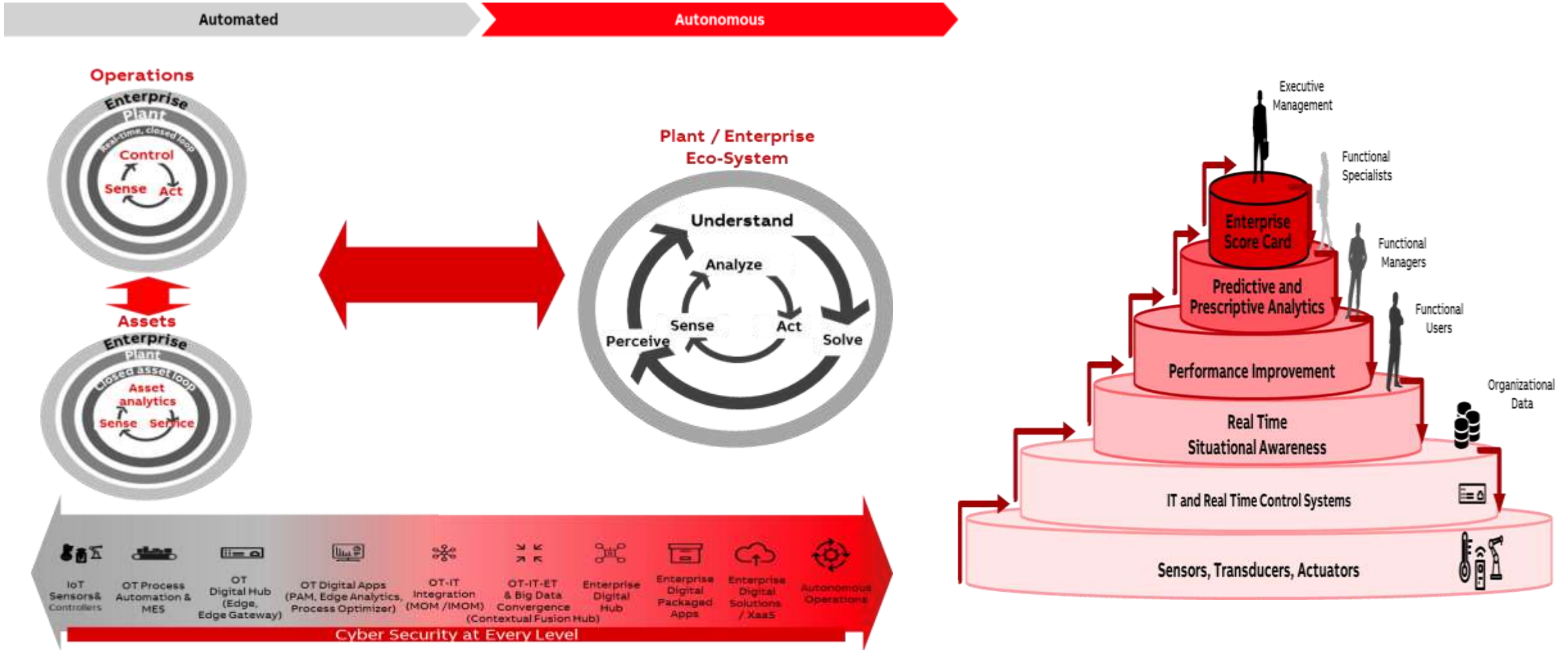
 Smart Warehouse



Improve Workforce efficiency in in-plant logistics and warehousing

..and Intangible Benefits including Process and Personal Safety, Value Stream, new Products and Solutions tailored for Market

#6 I4.0 Digital Enterprise Continuum



#7 I4.0 Digital Enterprise needs Digital Enablement at All Levels

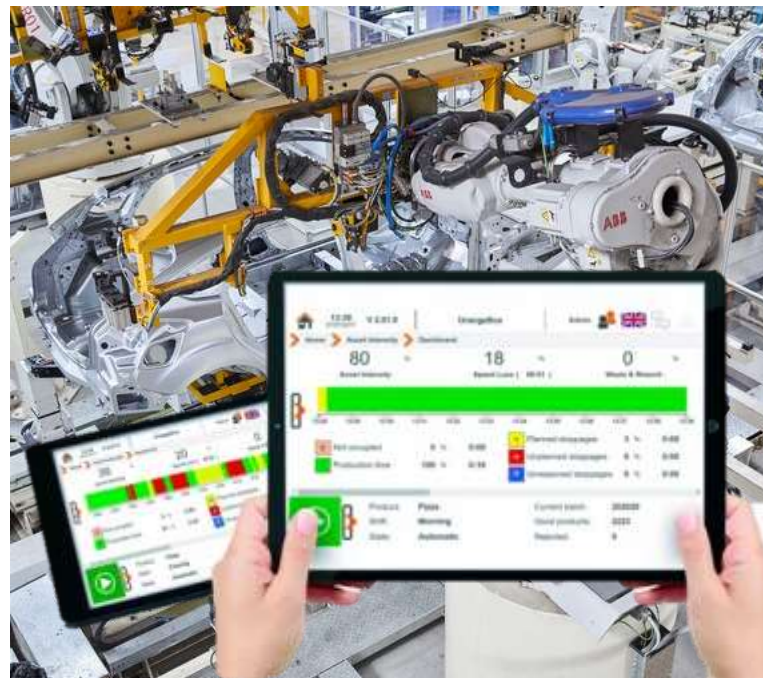
Devices, edge gateways, or the cloud

Digital on the Device



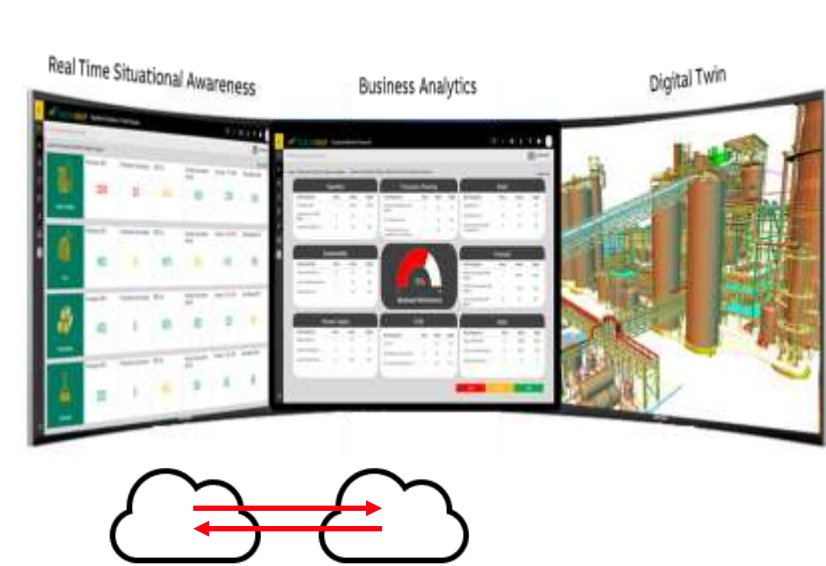
e.g. Quality Management

Digital on the Edge



e.g. Digital Operations

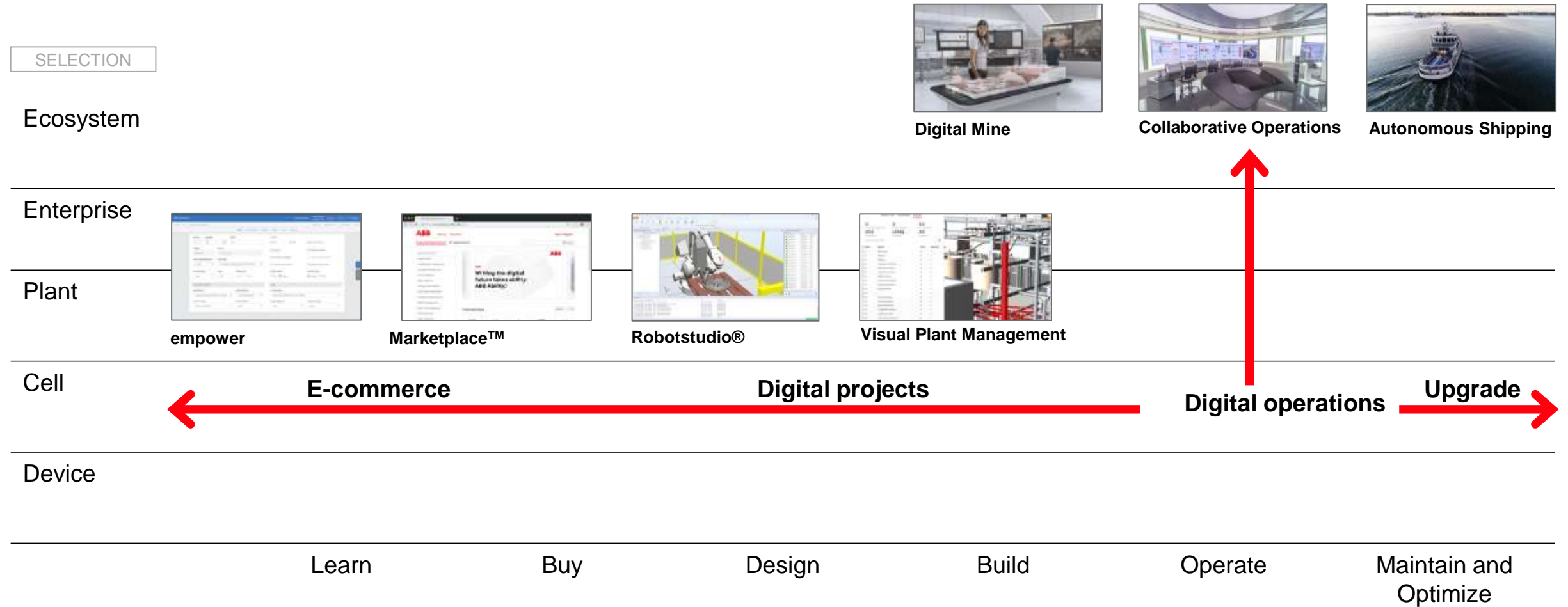
Digital in the Cloud



e.g. Enterprise / Fleet Optimization

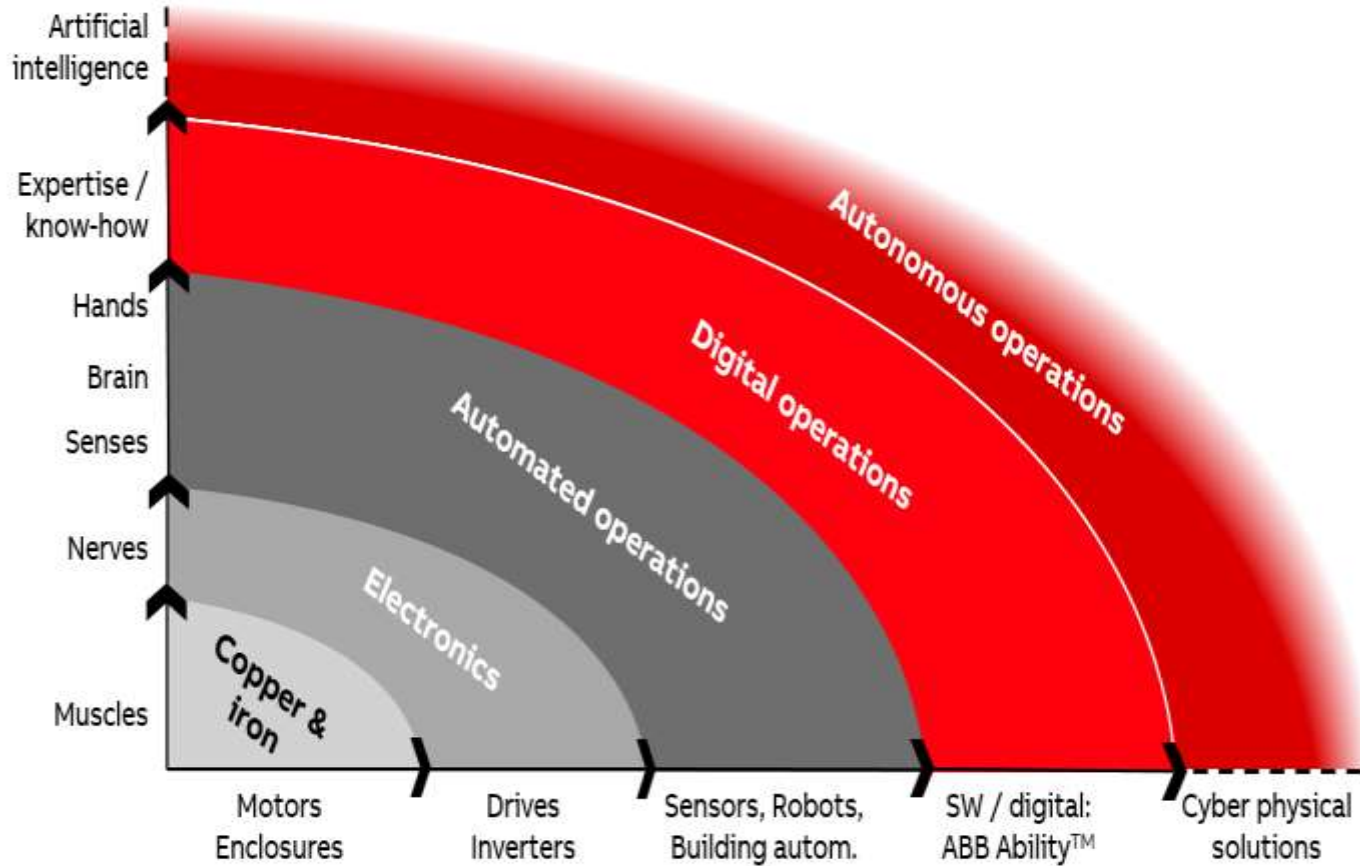
#8 Applying digital across the entire value chain

Customer Experience, sell, design, operate and optimize—all digitally



#9 Industrial AI – Driving Automation to Autonomous

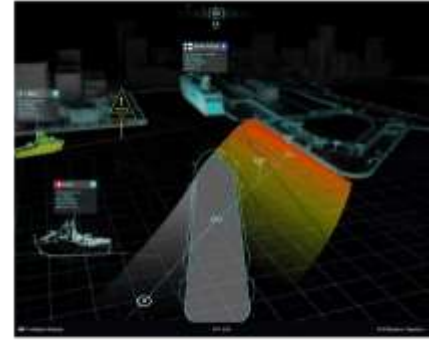
Writing the future of innovation: towards autonomous operations



From...



To...



Changing the view of the captain

Industry Specific Robotics



"Data center sheriff"

"Motor crawler"

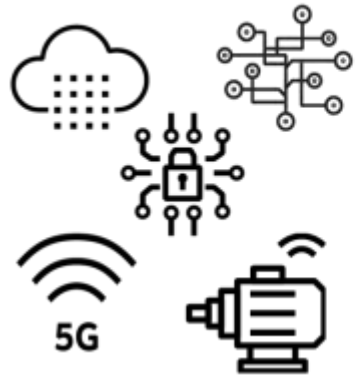
"Transformer diver"

"Plant Drones"

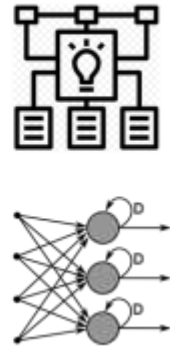
Holistic Approach - Augmenting Humans + AI = best results

Moving towards Autonomous

Big data



Algorithms



Computing power



Artificial Intelligence



ABB Ability™
Collaborative
Operations™



Human

- + Intuition
- + Creativity
- + Expertise
- Computation

HumAI

Experts supported by algorithms



Amplifying human potential



AI

- Intuition
- Creativity
- + Expertise
- + Computation

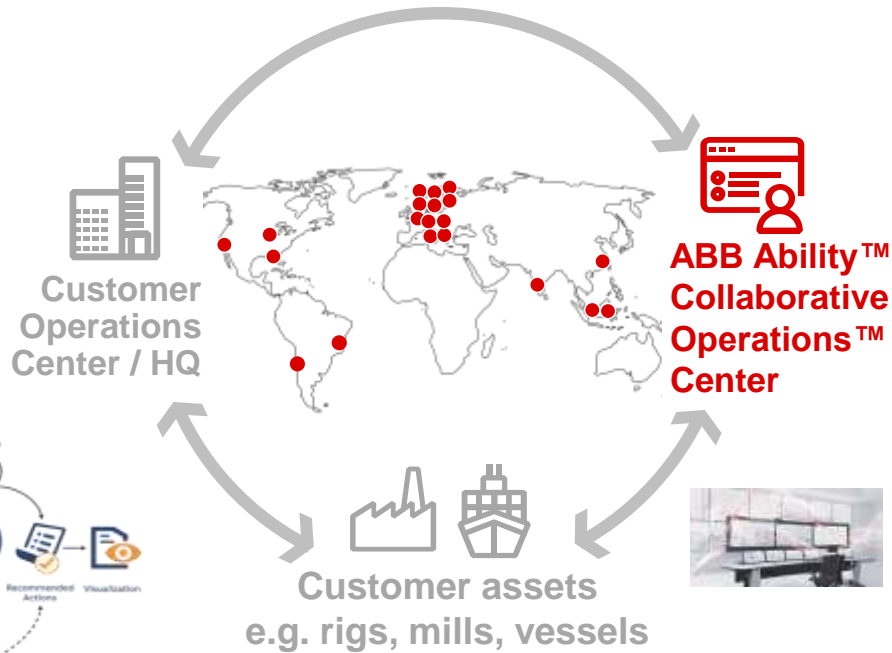
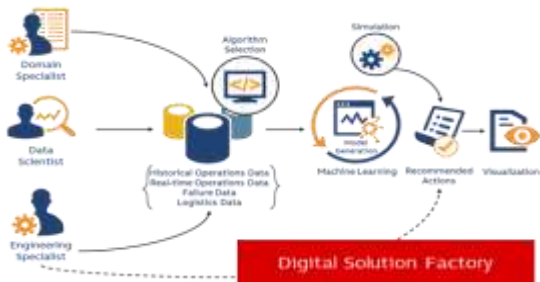
ABB Ability™ Collaborative Operations™

Transforming the way we work with customers with 24/7 access to ABB experts



For operations improve...

- ▶ Safety
- ▶ Productivity
- ▶ Energy efficiency
- ▶ Asset Lifecycle Extension



of customers connected¹

- 900+ industrial plants
- 1200+ marine vessels
- 40+ mines

Key benefits (selection)

- Increased productivity
- Higher uptime
- Lower maintenance costs
- Improved operational performance
- Reduced Energy and Fuel Costs

Key results (selection)

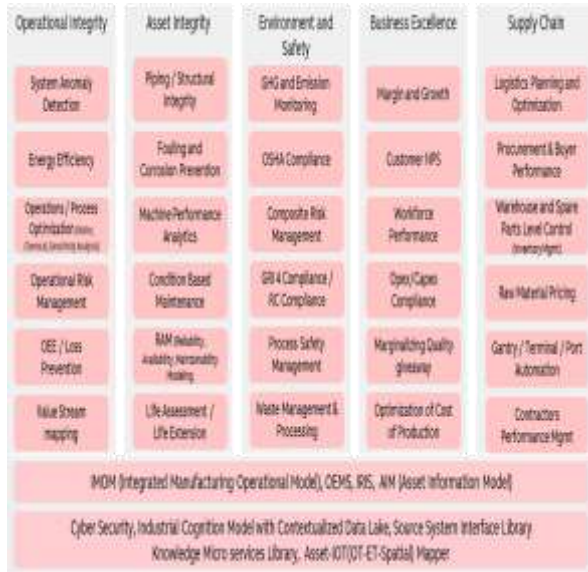
- Oil & Gas: -30% op. expenditures
- Mining: \$5 mn of op. savings p.a.
- Pulp & Paper: -55% maintenance
- Power Generation: +20% machine life
- Marine: \$350k savings per vessel
- Cement : ~3% Savings in Energy & Ops

#10 Driving Success of Enterprise Digital Transformation

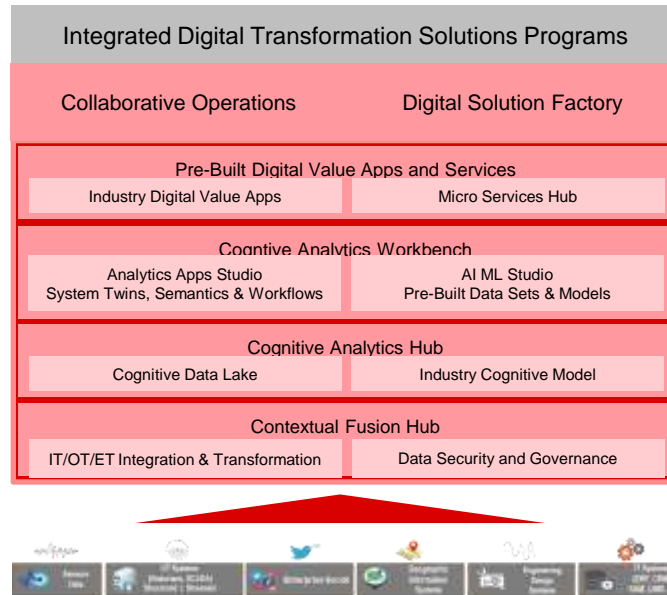


Accelerating the journey to Digital Enterprise

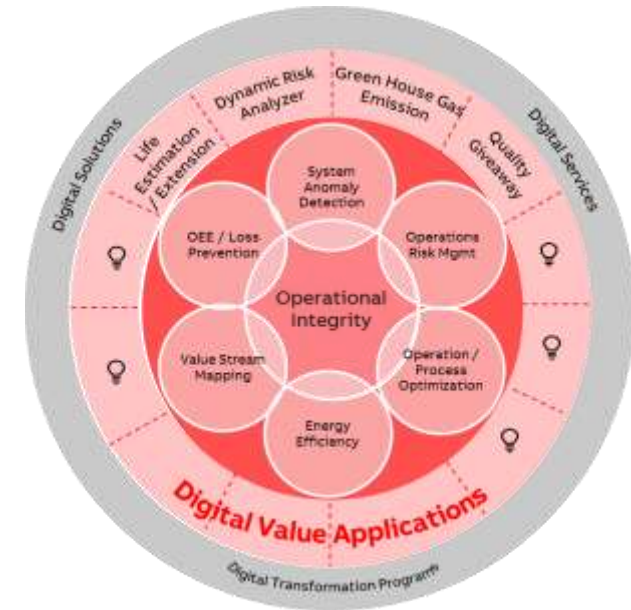
Three Pillar Approach



Digital Industry Value Engineering

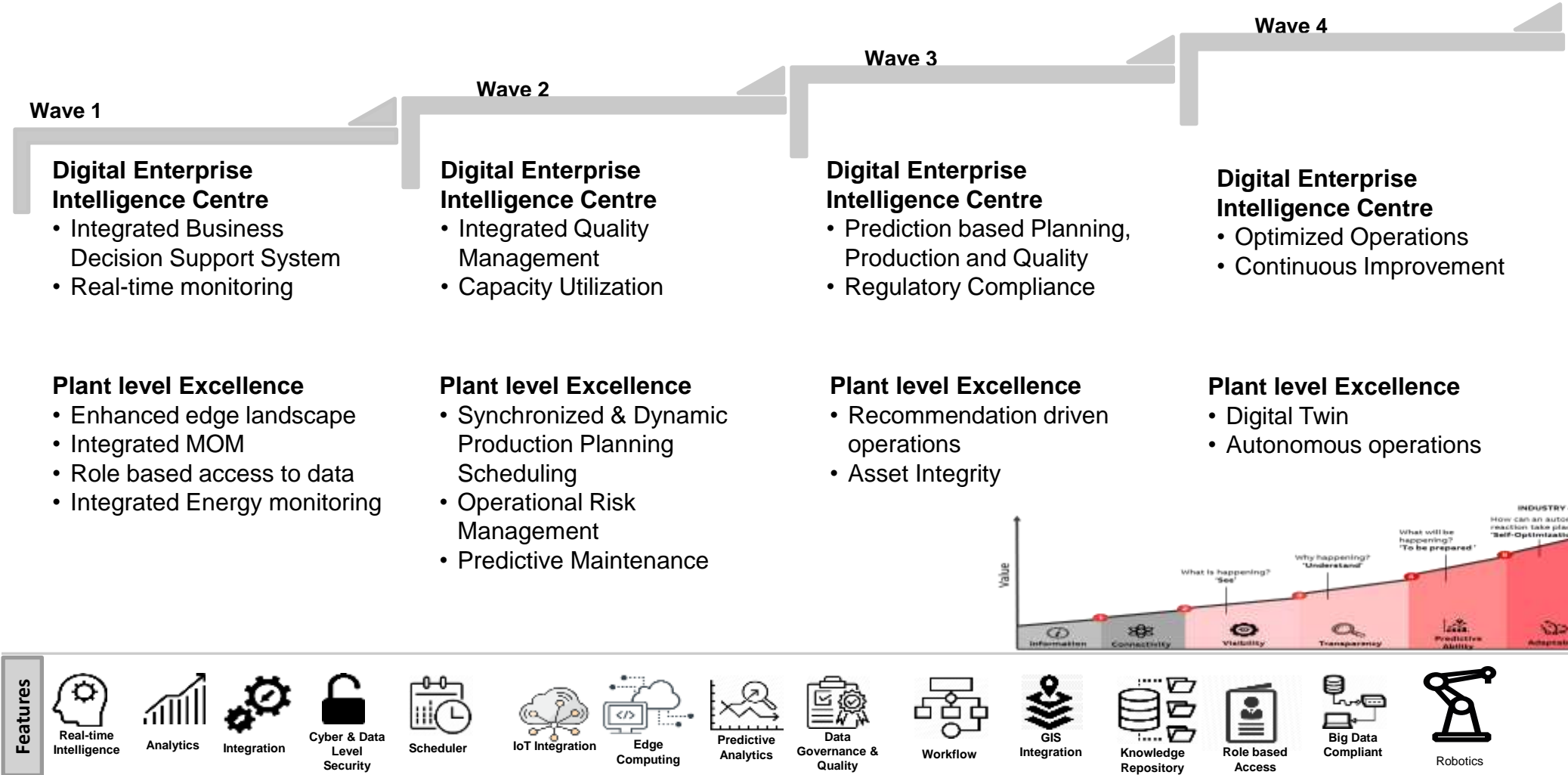


Economics and Scale through Digital Platform Edge and Cloud



Transformation Agility through Rapidly Deployable Digital Solutions

Example -Wave based I4.0 Implementation for Enterprise and Plant Level



Industry 4.0 Digital Transformation

Summary

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Digital is proving major impact on Operational Excellence, Quality Productivity, Safety, Reliability and EBITDA

2

Holistic Approach with Well defined Digital transformation strategy aligned with business processes and overall goals is key.

3

Industry Value Engineering provides a proven approach to achieve predictable outcomes with higher ROI and quicker Payback

**Let's write the future of safe and smart operations.
Together.**