Industrial digital transformation that's grounded in the real world

A playbook for digitalization at scale

You think big, we get practical

In today’s complex, hyper-connected and globalized world, technology has outpaced business processes, putting pressure on companies to constantly improve day-to-day performance.

This playbook for digitalization at scale is written for industry, by industry experts in the trenches. Experts, who are already seeing evidence that transformation is working and demonstrating enormous value to the business when driven by a single digital strategy across the enterprise.

So, wherever you are on your digital transformation journey, if you are ambitious about Industry 4.0 and ready to scale, with ABB's structured approach, broad digital portfolio and deep domain expertise, you'll cut through the hype to the core of how to actually achieve it.

Let’s talk

The trends driving industrial transformation

Trends such as 12% average productivity gain from smart factories are driving your competitors into action

Industry moves

- 12% average productivity gain from smart factories (1)
- Process industries have already made one third of their factories smart, and plan to transform 40% more over the next five years (2)
- Predictive analytics is the #1 use case for manufacturing (3)
- 70% of companies expect increased demand for AI-enabled products and services (3)

Challenges faced

- Achieving performance improvements at scale
- Unclear vision and KPIs
- Old infrastructure with legacy systems and lack of sensors
- Inadequate data readiness, cyber security status and measures
- Lack of skills necessary for implementation

Priorities

- Seize Industry 4.0 opportunities by leveraging digital capabilities across cloud-based applications, AI-based optimizations and 5G network - enabled pilots
- Implement smart factories to gain competitive edge
- Increase revenue while improving productivity

All this makes one thing clear: **digital transformation is not optional – it's a must.**

1. Deloitte and MAPI Smart Factory Study Data (2019).
2. Capgemini Research Institute, Smart factory survey (2019).
3. The Economist Intelligence Unit, Intelligent Economies: AI's transformation of industries and society (2018).

Data: industrial operation's most valuable asset

Information Technology (IT), Engineering Technology (ET) and Operational Technology (OT) have lived in separate worlds for decades.

Industrial transformation makes it possible for them to work together seamlessly on a common platform and generate accurate key performance indicators (KPIs).

In the past, industrial technology management has been split between Information Technology (IT), Engineering Technology (ET) and Operational Technology (OT).

In recent years, advances in connectivity, big data, and the expansion of the industrial internet of things (IIoT) have led to a new breed of intelligent manufacturing technology.

As IT, ET and OT become more independent, their convergence opens the door to previously unseen opportunities. Focus is shifting from administrative systems to a core business imperative to data integration at all levels, for bottom and top-line growth.

Integrating the varied data from equipment, processes, plants and business systems gives business leaders **organization-wide visibility and control.**

Management can quickly evaluate how production is impacted by rising material costs, adapt pricing strategies, better manage supply chains and assets.

"Demand for streamlined and automated data is expected to grow by 19.7% annually - driven by smart manufacturing platform requirements" (1)

1. Global Forecast to 2024 by MarketsandMarkets™ https://www.marketsandmarkets.com/Market-Reports/smart-manufacturing-platform-market-66129711.html

Business value from digital transformation

Integrating IT/ET/OT is the starting point for the digital enterprise

Industrial transformation allows data to flow seamlessly between operational and business systems. This enables new capabilities such as energy, safety, sustainability and process optimization, predictive maintenance, asset management and data-driven decision making.

A system that effectively leverages data regardless of its source is a key differentiator. Horizontal integration (a joined-up flow of digital information from machine to machine) empowers your people to achieve objectives with a clear picture of operations. Enabling vertical integration (information flow from a device/machine to your systems) also helps circumvent siloes and create new insights.

Challenge:

More than **60%** of operational excellence programs fail because of poorly defined transformation plans.

Solution:

ABB's tried-and-tested partnership approach brings together complementary capabilities to help customers bridge both sides of their business. Our ready-to-deploy, highly flexible production solutions built on proven cloud technologies facilitate higher return on investment and lower total cost of ownership.

Challenge:

Many companies lack a comprehensive cyber security approach, leaving their most valuable assets vulnerable to attack.

Solution:

Our approach uses the hard-won, long-fought lessons of IT to leapfrog to an advanced state of IIoT security – expertly architected and deployed to meet OT's differentiated requirements.

Typical improvements

(via World Economic Forum, Fourth Industrial Revolution Beacons of Technology and Innovation in Manufacturing, 2019)

35%

improvement in overall equipment effectiveness (OEE)

25%

reduction in downtime with predictive maintenance

For deeper insight into the real-world challenges of IT/ET/OT integration, see p12

Your framework for success

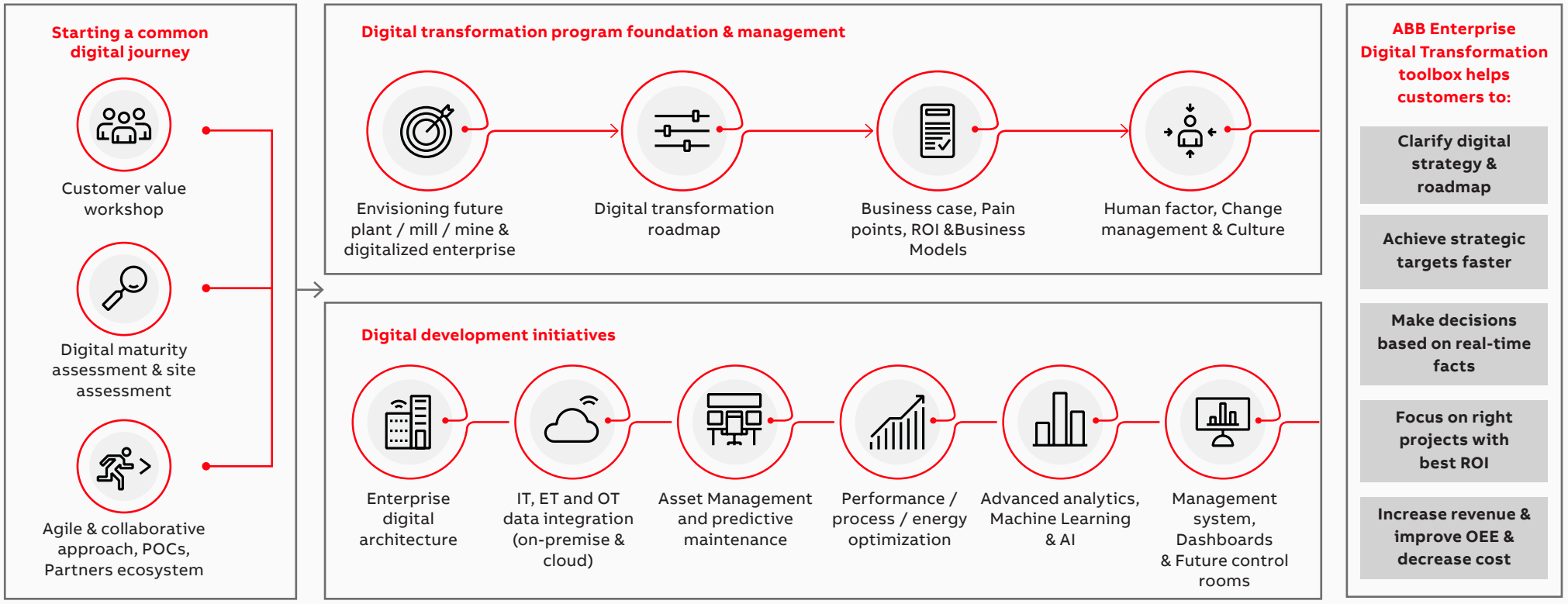
When embarking on a digital transformation journey, it is important to balance both short and long-term targets, driving rapid change while keeping sight of the larger vision.

To ensure your digital transition progresses smoothly, ABB has built a framework to drive and manage the process around the three focus areas.

1 Starting a common digital journey, agile quick wins

2 Building digital culture, program management

3 Implementing digital initiatives, delivering results, scaling up



Understanding your starting point

Defining critical pain points will help identify clear objectives for your transformation initiative

Set a solid base by assessing the existing data architectures, IT systems and communication networks in the context of your business as a whole (operations, people, maintenance, safety). Create a shared understanding of how to maximize your digital competitiveness.

Digital maturity assessment

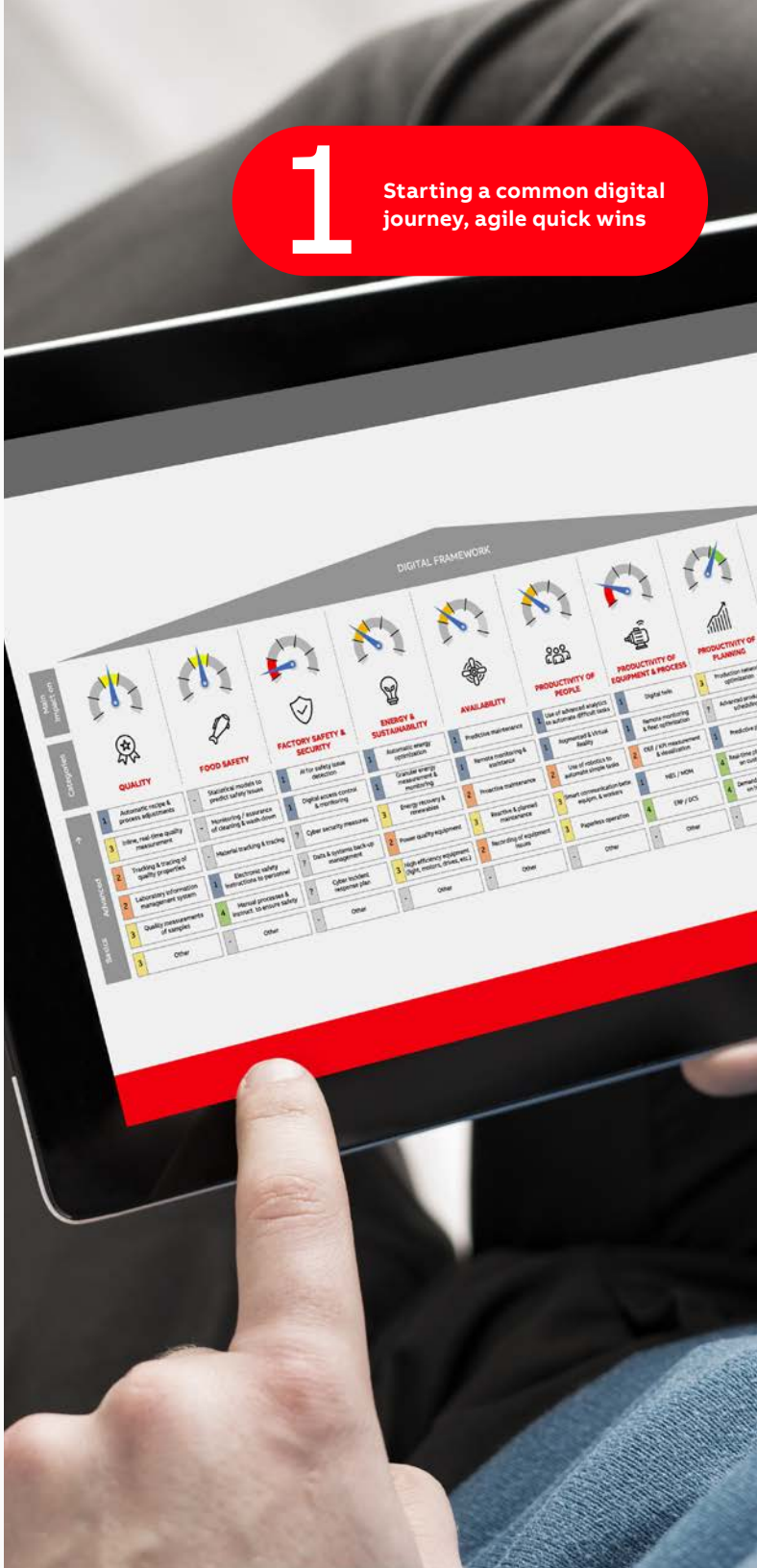
Assessment consisting of interviews and plant walk-through maps, key functionalities in your plant and value chain. Benchmarking your plant's digitalization level helps engage in digital initiatives in the right order & evaluate work required. Understand required digital building blocks

Value discovery workshops

Various formats of on-site or virtual events to ideate potential digital solutions for concrete challenges and quantify estimated customer value.

Outcomes

- Prioritized list of potential digital solutions for improving plant availability, quality, safety, security, sustainability and productivity
- Solutions mapped according to their impact on performance and ease of implementation



1 Starting a common digital journey, agile quick wins

Establishing an agile and collaborative approach with quick wins

The combination of business and solution expertise

Large-scale transformation requires a truly collaborative approach but cultural management can also be the greatest challenge of the entire process.

ABB's approach orchestrates collaboration not only between the different parts of your enterprise, but also between enterprise and ecosystem partners.

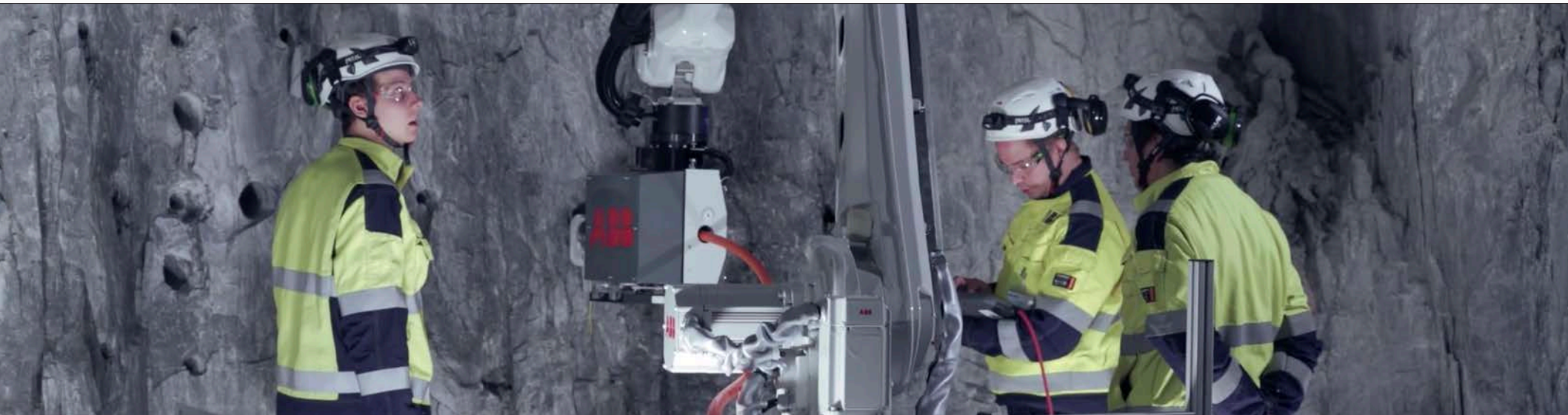
Your ecosystem may include partners that compete in some areas while cooperating in others. It's this deep understanding of domain complexities that enables ABB to unlock extra value.

Our longstanding experience has taught us that dynamic collaboration is how transformation happens – bringing together complementary strengths for the good of the customer.

ABB also places cross-functional innovation teams at the heart of the process. This model is well-suited to prioritizing fast and tangible solutions that build broad support for the overall strategy. This ongoing collaboration will help explore the full potential of transformation in a shared risk environment.

Best practices in delivering an agile program

- Initial benefits come fast and produce increased efficiency and productivity
- Quick wins are identified to demonstrate value creation and motivate further investment later in the journey
- Results from initial projects are evaluated and fine-tuned for larger scale transformation projects



Defining your digital goals and skills necessary for implementation

2 Building digital culture, program management

Having established an agile approach, explored initial possibilities and formed partnerships, the next steps are creating the vision, launching the larger road map and fostering the right culture for the new digital enterprise

Your goals could include

- Creating new value in existing customer relationships
- Identifying new business opportunities outside traditional ones
- Demonstrating digital leadership within the industry

Examples of the three steps to realizing your digital vision

360-degree evaluation

- IT/ET/OT integration
- Performance, KPIs, dashboards
- Infrastructure and architecture, including cyber security
- Quick-win solutions

Modeling & analyzing operational data

- Data aggregation
- Production optimization
- Asset & energy management

Deploying advanced analytics

- Prescriptive models & AI
- Scenario planning
- Functional modeling & optimization

Refining the transformation roadmap and business cases

2 Building digital culture, program management

Clarity, pace and control over digital developments

ABB can help you create future scenarios, describe practical and tangible digital use cases and put them on a fast-track, adaptable roadmap.

Digital adoption

Reflecting on future experiences and a common roadmap helps better communicate transformation goals and direction to all people involved, creating buy-in within every department.

Fit for purpose

Envisioning the key technologies involved in future scenarios allows us to evaluate what is feasible with existing solutions and what needs to be newly co-created - without added complexity.

Value creation

We help organize optimal work streams and action steps for concrete value creation goals, prioritizing low hanging fruit to realize quick wins and milestones in targeted improvement areas - designing for transition.

Business case

We help identify new business models, match the timeline and budget with a clear financial plan, optimized cash flow and commit key stakeholders to the plan. Our business case estimations are based on an iterative approach - building the digital vision, site assessments, priorities and roadmap - as they are affecting each other.

Enterprise digital architecture and infrastructure blueprint

3 Implementing digital initiatives, delivering results, scaling up

Best practices for core infrastructure and architecture

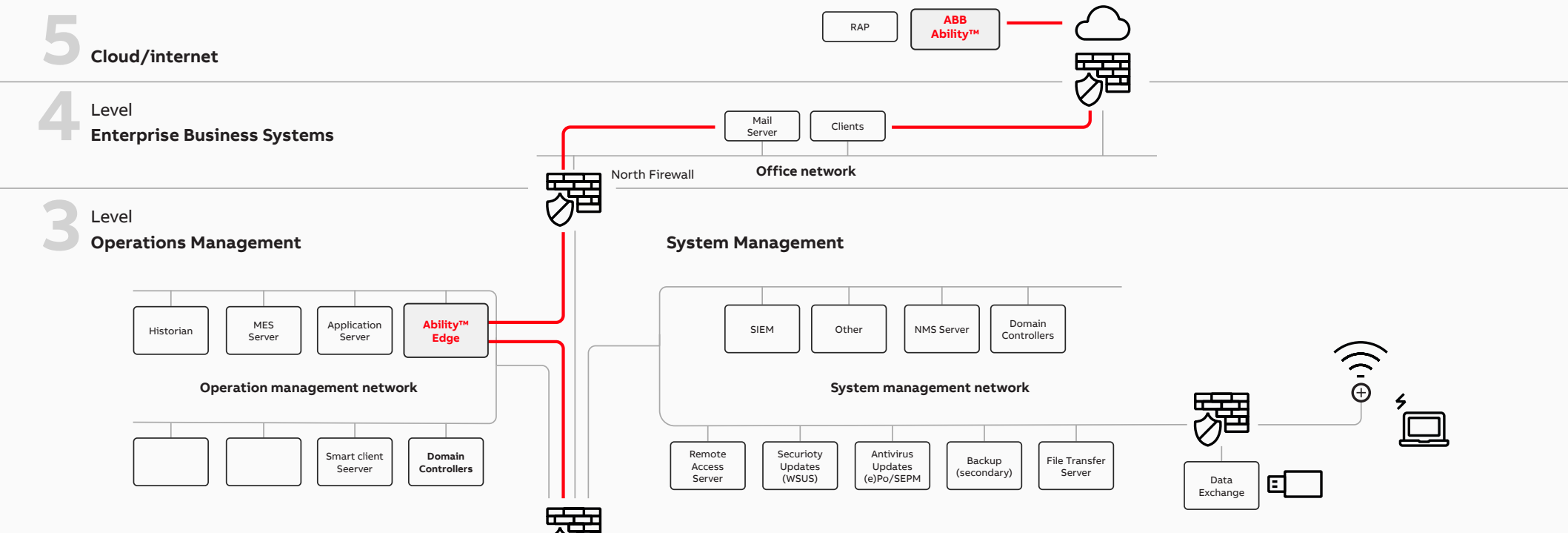
In real-world scenarios, IT/ET/OT integration can be challenging, especially when enterprise information infrastructure includes heterogeneous information systems. Most industries also live with incompatible legacy OT systems which can become a massive hurdle to integration.

The integration process therefore requires expertise on both the domain and system level, and specific connectivity solutions. ABB's pragmatic and efficient approach is grounded in proven expertise, deep understanding of industries and utilities, and the experience of digitalizing its own factories.

Applying modern design principles provides a modular overall architecture based on functional blocks. Edge devices or servers collect data, normalize them, and provide data flow mechanisms for bulk as well as transactional data. Serverless computing allows you to focus on working with data instead of infrastructure. Storage components allow you to store structured, highly relational data, and work with unstructured data.

Special emphasis goes to time series transactional data – essential in OT systems. Specific solutions are used to store, evaluate and analyze high volume time series data.

Considering all components of solution architecture together allows us to deliver greater and sustainable value throughout your Digital Transformation.



3 Implementing digital initiatives, delivering results, scaling up

Managing data integration

IBM Research estimates that up to 88% of Industrial Internet of Things (IIoT) data goes unused

The Economist suggests that 99% of the value of manufacturing data is lost, with only 3% tagged and analyzed. Not all data is valuable. Distilling the most valuable data on premise can speed up and improve the value that you can extract from it.

Many OT systems produce a huge amount of semi-transactional data across a range of wholly separate information systems, like enterprise resource planning systems (ERP), manufacturing execution systems (MES), or manufacturing information systems (MIS).

Most industries also have a long legacy of OT systems from different manufacturers and of varying types and ages. These incompatible systems can become a massive hurdle for IT/ET/OT integration.

Your goal

Valuable process data seamlessly retrieved from fragmented control systems, interfaced with other data sources, ready to communicate towards the Cloud and the shop floor in real time.

ABB has the right combination of domain-specific expertise and knowledge of IT, ET and OT infrastructure to ensure that your data management approach is closely aligned to your business strategy.

We know how to properly label, model and structure industry-specific data, how to store, compute and stream high volumes of data securely and cost effectively. Traffic between layers can be secured and controlled to the smallest detail.

Transformational use cases

3 Implementing digital initiatives, delivering results, scaling up

Digital transformation reaches across your entire organization, impacting every aspect of business

Creating meaningful change requires an holistic view of the business landscape, covering process optimization, utility, energy, supply chain and logistics, the mobile workforce, and health and safety.

Operations planning
Allows for improved profitability, optimized asset use and full transparency.

Energy optimization
Reduced energy costs through optimized production, power purchasing, and captive power generation.

Process optimization
Increased yield and product quality with reduced production costs.

Automation and robotics
Reduce HSE risk. Autonomous, flexible manufacturing with shorter batches and optimized production planning.

Supply chain management
Full control allows just-in-time delivery, traceability and reduced inventory.

Logistics
In-transit tracking of product's location, temperature and vibration secures end-to-end availability and quality.

Control room / remote operations center
Optimized performance via visualized access to asset and operational data.

Mobile workforce
Connected, mixed reality technologies improve workforce communication and information sharing.

Health and safety
Alarm analysis, continuous SIL system verification, video analytics and mobile information improve environmental safety. Crisis management service enhances planning and situational awareness.

Asset management and predictive maintenance
Asset health predictions improve availability and reduce maintenance cost.

Sustainability
Reimagining production processes from scratch, redesigning existing sites for a low-carbon future.

License to operate
Remote operations to protect people in places they belong to. Greenfield designs with social responsibility in mind.

Advanced analytics and visualization

3 Implementing digital initiatives, delivering results, scaling up

Get the most from your data to maximize business benefits

Analytics is a separate module that uses real-time and stored data. Machine learning (ML) components are integral to the analytics layer and AI is fast becoming a major disruptor in digital transformation. AI and ML based applications can provide great results in areas where standard mathematical and physics models fail.

Customers that are not yet ready to invest in developing their own analytics can tap into our best practices – proven applications that solve specific problems in similar scenarios. We provide them with end-to-end analytics solutions adapted to their needs, as well as continuous remote support.

Customers with their own expertise who want to self-diagnose problems, develop and test new applications can benefit from a powerful enterprise-grade industrial analytics and AI platform, whilst also reducing their IT costs.

With the domain expertise of ABB, you obtain immediate benefits through end-to-end solutions and services for achieving operational performance, asset integrity, energy efficiency, sustainability and safety leading to improved productivity, quality, optimum utilization of plants and assets, process improvements and cost savings.

Users at all levels across the enterprise can also engage with ABB's industrial analytics and industrial AI platform using a suite of pre-built applications, with the capability of self-service analytics.

Whatever the solution, models improve as more data is added, maximizing business benefits over time. And the ready-made solutions also support a phased implementation approach, with investments in infrastructure generating immediate positive business value.

Are you ready for a game-changing partnership?

Engaging in digital transformation realistically and usefully, together

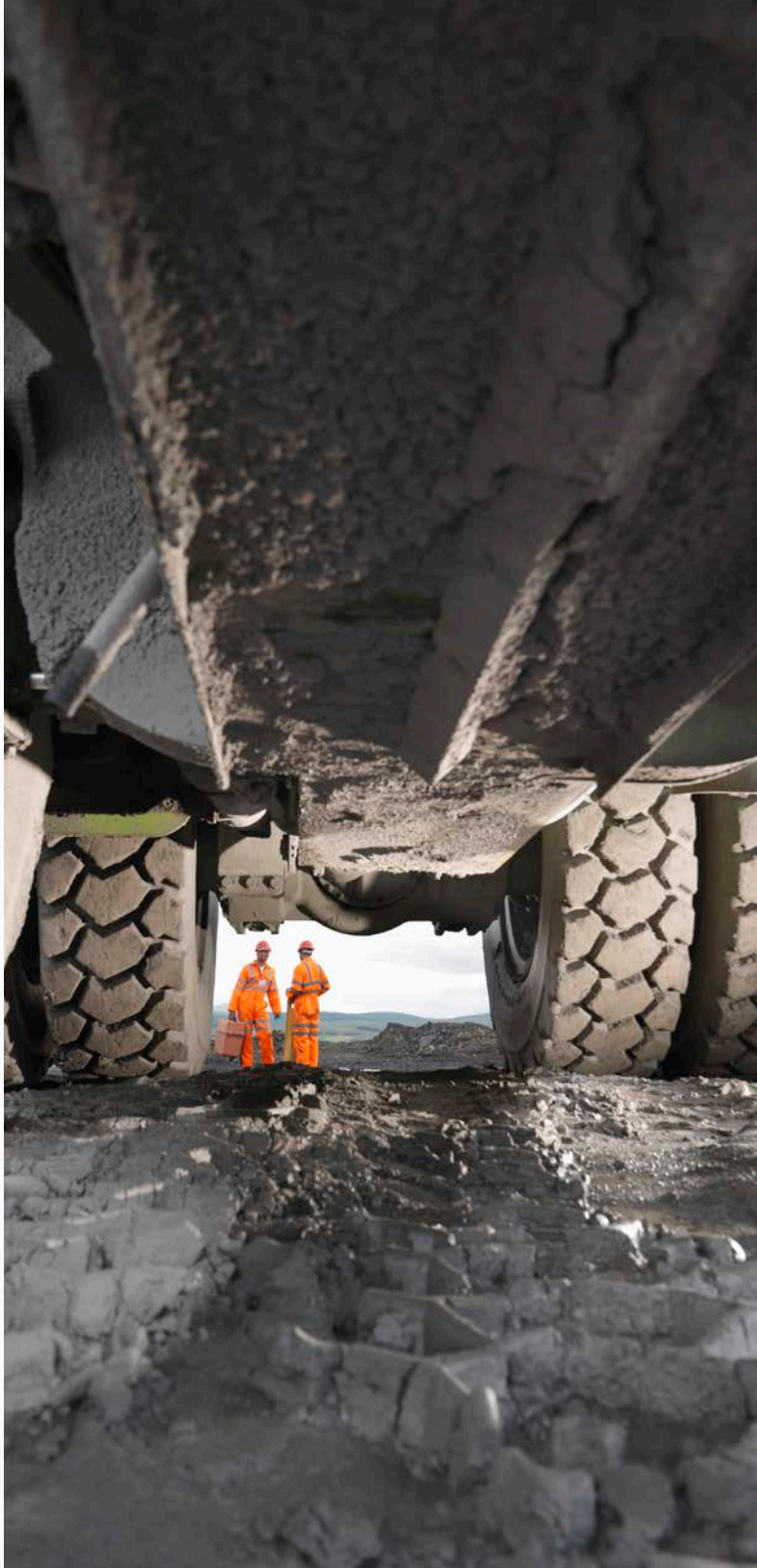
Let's face this fast-changing, multidirectional, computer-intensive world with better measurements, better predictions, and better accountability. Let's harness the power of possibilities and focus on what matters to people and your business.

Our decades of experience have taught us that technology without purpose will never create sustainable results. That's why we're committed to encouraging your people to bring their ideas to the table. We combine these with our own tailored solutions, whilst also leveraging carefully selected partners to provide a broader view and speed to the final solution.

Person by person, team by team, project by project, we'll form relationships, learn and adapt, applying the right methodology for the job at hand around common, strategic goals.

Together, we can help you manage the complexity of large digital transformation initiatives, rethink customer experiences, operational and business models and reduce time to value.

Partner with problem solvers and implementers.



Let’s talk

new.abb.com/process-automation/industrial-transformation