Operating in the Intelligent Enterprise
Maximize Asset Performance with Real-Time Insights, Predictions, and Simulations

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By transforming asset management to smart maintenance with SAP Intelligent Asset Management solutions, Swiss Federal Railways SBB attained operational excellence and is now able to access real-time information, predict potential operational problems, and empower the workforce with the information needed to run processes smoothly.
Executive Summary

An intensive search for differentiated customer experience and services is quickly replacing a traditional focus on efficient asset operations and cost reduction. Now more than ever, companies, like you, are looking to take advantage of the digital potential of Industry 4.0 methodologies for asset management with technologies such as digital twins, the Internet of Things (IoT), machine learning, and advanced analytics.

To get more value from your assets, you should adopt best practices for risk mitigation and reliability-centered maintenance with asset performance management. Furthermore, all of these capabilities should be tightly integrated with maintenance execution and real-time sensor data from smart assets.

For example, leading companies are adopting ISO 55001 and industry standards together with environmental and government regulation compliance as a key part of their strategy and brand. The boundary between suppliers and asset operators are also blurring while businesses differentiate themselves through new collaborative processes, digital content, enabled by connecting assets across networks with Industry 4.0 and IoT-technologies.

The time is perfect for a digital transformation in asset management

Your asset management function can catch up with the achievements of other organizational areas such as sales, marketing, supply chain, and procurement. By using the latest technologies, your assets can become critical contributors to business growth and profitability.

SAP is uniquely positioned to enable operational excellence. Our technologies eliminate the siloed nature of an asset’s lifecycle throughout the end-to-end digital supply chain – from design and planning to manufacturing, logistics, and operations. You can then integrate asset investment planning and procurement, as well as unite maintenance operations and asset performance, to close the loop between design for quality and change requests.

Adhering to Industry 4.0 principles, our technologies allow smart assets to share intelligence. Connecting assets for sensor-based condition monitoring with predictive maintenance, simulation, and machine learning capabilities supports prescriptive maintenance, expands asset life, improves overall equipment effectiveness (OEE), and reduces maintenance costs.

25%
lower maintenance cost where majority of maintenance work orders are generated predictively or condition-based.

SAP Performance Benchmarking n = 94
Operating in the Intelligent Enterprise

Executive Summary

Asset intelligence can be centralized in real time to advance processes and best practices such as risk and criticality assessment, reliability-centered maintenance (RCM) and failure modes and effects analysis (FMEA) methodologies. This approach helps ensure an optimal strategy across the asset base. Meanwhile, internal collaboration enables efficient asset management shared services, supporting key stakeholders across different lines of businesses.

When extended beyond the organization, these capabilities allow your manufacturers, operators, and service partners to collaborate through asset networks. This advantage enables manufacturers to provide value-added services and digital content to grow revenue and enhance overall equipment effectiveness (OEE) for their operators.

47%
lower recordable accident frequency where standardized regulatory reports are available and there is full visibility into all regulatory violations.

SAP Performance Benchmarking n = 81
Operating in the Intelligent Enterprise

Design to Operate for Operations

SAP® Digital Supply Chain solutions are empowering companies to deliver on their unique Industry 4.0 aspirations. From design to manufacturing, logistics, and asset management, you can provide positive customer experiences by integrating across traditionally siloed business areas that include R&D, manufacturing, supply chain planning, logistics, and aftersales service and maintenance.

By connecting every aspect of the supply chain digitally, your business can perfect your operational reality as much as possible.

The Benefits Beyond Cost Reduction
The operations phase of the design-to-operate product lifecycle is ripe for transformation. Companies are moving away from a traditional focus on cost reductions and standardization of maintenance operations. Instead, innovative business processes powered by digital technologies, such as those supporting Industry 4.0, are sought-after to strengthen the customer experience and increase efficiency.

Product differentiation alone is no longer sufficient for assets such as pumps, compressors, and industrial robots. B2B customers expect value-added services, applications, digital content, and products as a service that deliver outcomes that help them run better. Assets are not just another cost; they are also smart, connected enablers of competitive advantage and superior customer service.

Implications for companies moving towards the design-to-operate cycle
To stay competitive, asset manufacturers must extend their operational focus downstream – from design and manufacturing to the entire design-to-operate product lifecycle. Similarly, asset operators want to link more closely with manufacturers to influence design, product improvements, and new services.

As the boundaries between design-to-operate phases continue to blur, so does the delineation of organizational responsibilities. From the earliest stages of design, through planning, manufacturing, installation, and operations, manufacturers and operators need closer collaboration. The heartbeat they share is the connected asset, providing both with new intelligence in real-time to drive collaborative processes.

Take, for example, the following business scenarios:

1. Design
Industrial assets produced today are engineered with computer-aided design (CAD) tools. Historically, the data from CAD drawings was confined to R&D activities. But this is now changing as companies make the same data available downstream, creating

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fully functional digital twins of a product that can be rendered with 3D imaging and combined with contextual business intelligence.

This tactic brings together the entire history of the asset, including manufacturing configuration, installation date, maintenance performed, serial numbers for replaced parts, and performance data over time. These digital twins are then networked, so your suppliers, service companies, and operators share relevant data and information, such as digital manuals, installation documents, and 3D instructions to optimize maintenance and operations.

2. Planning
The planning process typically starts with demand and ends with shipments to customers fueling sales opportunities. It can be extended to the asset itself, with new collaborative approaches and IoT technology that capture and analyze historical and forward-looking operational asset data to better integrate planning processes across both organizations. Doing so can help reduce inventory costs for spare parts and improve planning for future product enhancements and upgrades.

3. Manufacturing
Asset intelligence in the operations phase stems from connected assets that use IoT technology to transmit condition-monitoring data on machine status, performance, and health. Manufacturers can outfit assets with sensors to communicate with systems that ingest and analyze machine data in real time.

Increasingly, products also include software services and apps that should be installed during manufacturing and updated throughout the lifecycle. Combined with IoT sensors, these services and apps offer incredible potential for value-added services, such as predictive maintenance or farm management systems with connected agricultural machinery. In the past, aftermarket revenues were driven by spare parts. But in the future, this approach will likely shift toward digital services.

4. Delivery and service
While the initial delivery and installation of an asset are important, even more critical throughout the operations phase is the logistics involved in helping to ensure spare parts are delivered and made available when needed. Predictive maintenance scenarios, for example, can synchronize with logistics activities. By sharing data between operations and logistics, requests for replacement parts can automatically trigger replenishment and delivery processes.
Integrated digital supply chains run like networks – from design to operate

Ultimately, the goal of the design-to-operate approach is to break down silos within the entire business and better integrate functional areas. To date, many companies have benefited extensively from shared services in their procurement, HR, and finance organizations, which integrated and streamlined processes. Maintenance teams can also take advantage of shared service experiences for assets to enable best practices and provide all stakeholders with the asset intelligence they need.

However, collaboration and integration throughout the design-to-operate product lifecycle should not be viewed as an exclusively internal concern. Increasingly, the value chain from the customer’s perspective comprises multiple organizations where different companies design, make, deliver, and maintain the same asset. Hence, these shared services need to be network-enabled.

Consider the product-as-a-service model. Instead of selling a product such as an air compressor, the manufacturer provides the air compressor for free and charges the customer for outcomes such as cubic meters of compressed air delivered, based on a mutual service level agreement and usage. For this model to work, seamless collaboration across all phases of the design-to-operate lifecycle is required. The IoT plays a critical role by keeping manufacturers connected to their assets operating at their customers’ locations. It helps ensure asset performance and uptime for the supplier, which now acts as the operator under the deep scrutiny of their customers.

Work and data flows span functional silos to provide greater flexibility and consistency – leading to benefits such as reduced financial and operational risk and higher rates of customer satisfaction.
Operations in the Intelligent Enterprise

The big imperatives for asset management have not changed: you still need to balance cost, risk, and performance, while complying with ISO 55001 and other new management standards. Moreover, you should focus on cost reduction and efficient operations when optimizing capital expenditure, avoiding incidents, and coping with revenue objectives and ever-evolving regulatory and compliance challenges.

What has changed are the massive amounts of asset data that are generated every day, minute, and second and are already available to safeguard mission-critical business processes. This data provides a wealth of potential insight that can transform asset management in ways that derive more value from assets. Nevertheless, to harness it, conventional maintenance management systems and processes are not enough. Asset managers need new ways to turn Big Data into information and enable information transparency throughout the entire asset lifecycle and within the ecosystem of operators, equipment manufacturers, and service providers.

SAP Intelligent Asset Management solutions are a critical part of becoming such an intelligent enterprise. Your company can connect IoT-enabled smart assets, people, and processes across the enterprise and networks and help to break down siloes to better collaborate across all related business functions such as supply chain, finance, and HR.

Maximize asset performance with real-time insights, predictions, and simulations

Effectively connecting the enterprise to a complete end-to-end portfolio of intelligent asset management solutions and leveraging leading-edge technologies, including the Digital Twin, IoT, machine learning, and advanced analytics. All of these innovations provide the underpinnings of Industry 4.0 transformation.

SAP Intelligent Asset Management delivers on the vision of the Intelligent Enterprise by extending and enhancing core asset management processes. The solutions enable cost control along the complete asset lifecycle and native integration with the suites of Intelligent Enterprise solutions from SAP to provide decision support that helps increase equipment performance while reducing risk. You can improve processes, predict and simulate outcomes, and enable prescriptive maintenance. Additionally, collaboration across networks can help create differentiated services to generate new revenue streams and develop new ways to compete and disrupt your industry.

“This new network helps our customers and partners, as well as our company, to be more efficient and reduce the risks of operating equipment.”

–Michael Sigl, Team Lead, IT Infrastructure and Communications, NETZSCH Pumpen & Systeme GmbH
The rise of the Industrial Internet of Things (IoT) technology from SAP is building up the promise of advanced computing and processing power to set the stage Industry 4.0 innovation.

Groundbreaking digital capabilities enabled by IIoT solutions include:

- Intelligent technologies such as advanced analytics, artificial intelligence (AI), Big Data, blockchain, the IoT, and machine learning – all enabled by SAP Leonardo technologies
- Previously unimaginable levels of asset-related Big Data – structured and unstructured – generated through the IoT and sentiment analysis
- A unique and up-to-date digital twin for any particular product or asset as it has been designed, made, delivered, and operated over time to predict and simulate system behavior
- Smart assets and products enabled by AI and machine learning to elevate the user experience and enhance predictive analytics
- Stronger data security and user trust by adopting blockchain technology to increase transparency, auditability, and regulatory compliance
- Real-time engineering simulation by using physics-based digital twins for predictive engineering analysis in product development and operations
- 3D visualization and augmented reality that provide unmatched situational awareness and perception for better decision-making

SAP Intelligent Asset Management takes advantage of these leading-edge technologies and complements SAP S/4HANA® and other ERP applications.

"Predictive maintenance and augmented reality glasses hugely simplify machine inspection. We have now virtually eliminated unplanned downtime."

—Karl Denz, Head of Manufacturing Tools, GEBHARDT Fördertechnik
There’s often an astounding disparity between a company’s perception of what customers think about their products and services and how customers actually feel about those offerings.

Operational data (O) – like costs, revenues, and sales information – shows what is happening in your business. But you also need experience data (X) to understand how people engaged with your brand feel and why certain outcomes happen.

The SAP Experience Management solution combines X-data and O-data. By collecting experience data at every meaningful touch point, you can analyze and understand experience gaps, and determine the best way to resolve them. Your company can then automate actions across business functions to drive improvement in customer, employee, product, and brand experiences.

Collaborative asset excellence – SAP Asset Intelligence Network meets SAP Experience Management

For your operations, such innovation leads to asset excellence in specific areas such as asset delivery, installation, documentation, and services. The SAP Experience Management solution can help you maximize asset performance by leveraging the asset network to allow feedback-based business optimization between operators, manufacturers, and service providers.
The design-to-operate approach seamlessly connects business processes, takes advantage of intelligent technologies, and creates a digital mirror of the entire value chain. This digital mirror enables consistent visibility and execution across all phases.

Moving forward with quick wins in asset management
Models such as the design-to-operate approach do not require a global, enterprise-wide digital transformation initiative to realize value. A smarter approach is to think about practical steps – at least, at first – that can lead to a bigger mid- or long-term vision.

Quick wins can serve as proof points for moving forward with more ambitious projects, such as:

• Set up an asset intelligence repository: Consolidate data from many sources of asset information and make that intelligence available to groups within the organization and third-party partners. Serving as a foundation for better asset intelligence, this repository enables a shared services model for asset management enterprise-wide. It can also be expanded when new use cases are identified.

• Implement best practices for reliability-centered maintenance (RCM): Reduce risk and improve reliability with RCM processes that increase uptime. This strategy considers asset characteristics such as risk, reliability, and failure mode and effects analysis (FMEA).

• Connect assets for condition monitoring and predictive maintenance: Assess machine condition in real-time, anticipate failure, and take action before they go down. With data from IoT sensors increasingly available for assets and modern analytics applications, companies can focus on critical high-risk assets that can kick-start significant benefits.

• Go mobile: Deliver asset intelligence directly to engineers in the field. Mobile delivery of work instructions and engineer feedback reduces administration and enables real-time visibility into work status and critical tasks. It boosts productivity and safety by empowering engineers to access digital content for machines and 3D instructions on how to address specific problems.

The road to success
The time is perfect for reimagining asset management. The opportunity exists to extend and enhance core asset management processes with leading-edge technologies, such as digital twins, the IoT, machine learning, and advanced analytics.

SAP Intelligent Asset Management enables cost control along the complete asset lifecycle and native integration with our suite of intelligent solutions to facilitate decision support that helps improve equipment performance while reducing risk. You can advance processes, predict and simulate outcomes, and enable prescriptive maintenance.

LEARN MORE
To find out how your business can meet any asset management challenge, visit us online.