The Digital Life Sciences Industry
Unlocking New Business Value with Intelligent Technology
“Life sciences companies have long been focused on the development and delivery of life-saving and health-focused products and services. Patients are now more proactive and focused on wellness. In response, healthcare providers, payers, and producers are exploring ways to collaborate across the digital health sciences network to reduce costs while improving patient safety and quality of care by shifting to a digital model.”

Joseph Miles
Global Head
Life Sciences Industry
SAP SE
Life Sciences Companies Face New Challenges and Opportunities Amid Digital Disruption

Leading life sciences companies use continuous innovation and M&A to create and capture new business opportunities.

Regulatory pressures
Existing regulations around HIPAA, 510(k) certification, GxP, and pricing – and new ones around data requirements, serialization, and product data submissions – need careful strategizing.

Regulatory requirements often bring about opportunities. The large moat around pharmaceutical and medical devices is mainly due to their competence in regulatory compliance. Digital solutions help life sciences companies better comply with regulatory obligations.

Competition
The complex life sciences industry faces intense competition. Incumbents feel the competitive threat at various levels from generics, biosimilars, and, increasingly, from technology companies.

Whether it is mobile apps, predictive analytics, or Internet of Things (IoT)-based data analyses, life sciences companies are increasingly turning to technology companies for partnership in finding that competitive edge to stay ahead of their competition.

Continuous innovation and M&A
New medicine-discovery technologies such as CAR-T cell therapy and CRISPR gene editing are forcing companies to reimagine their R&D processes. Life sciences companies are constantly innovating and looking for acquisitions to find new therapies to treat highly complex and elusive diseases, such as diabetes and Alzheimer’s.

Connected devices, powered by analytics, will help life sciences companies find the next patient need, leading to the discovery of new devices and therapies. Innovative technology solutions will help companies manage the business processes for new treatment models such as CAR-T.
With Huge Opportunities and Challenges, It Is Essential to Focus on the Right Strategic Priorities to Drive Digitalization

Connectivity and the resulting intelligence from access to data is helping life sciences companies find new ways of discovering new therapies and providing new services to their patients.

Life sciences companies are increasing their collaboration with technology companies. Whether it is a diabetes app or oncology data input software, pharma companies are seeing great benefits in aligning with technology. The IoT technology helps in greater product visibility and securing highly expensive and quickly deteriorating biologics shipments. Blockchain helps ensure product safety and trust of information. Through digitalization, innovative life sciences companies respond effectively to competitive and regulatory challenges.

The connected patient
Patients can be connected through an app that connects a device (wearable or implant) to their physician, or by consuming a therapy that is serialized and shipped directly to them. In either case, the benefits are huge: uninterrupted lifestyle, real-time information collection, and allowing for just-in-time remedial measures.

The connected product
When a product package has an IoT sensor as it is being shipped, manufacturers gain tremendous business benefits. The product is secured and visible at all times, and incursions and exceptions along the route are noticed in real time, enabling the possibility of intervention. Companies can save valuable shipment data regarding the route and delays, allowing for route optimization.

Reimagined product quality
Life sciences companies can now leverage cutting-edge technologies to preserve the quality of highly potent and expensive products. Companies can react in real time by responding to mobile alerts for temperature incursions, possible exposure to light, and shock to fragile medical device shipments.

Analytics-based product discovery
Through connected health, tracking serialized pharmaceutical products, and monitoring social listening, life sciences companies can discover new therapies, new markets, and possible alternative uses for their products.

Business optimization and extending the value of key processes continue to be key priorities for innovative life sciences companies to simplify and reimagine their business and free up resources to invest in transformative programs.

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1. Number of Retail Prescription Drugs Filled at Pharmacies by Payer, KFF.org, 2017.
2. "Background and Summary of the California ePedigree Law," California State Board of Pharmacy.
Our Point of View: To Achieve These Strategic Priorities, Leading Life Sciences Companies Are Becoming Intelligent Enterprises

An intelligent enterprise enables employees to focus on higher-value outcomes and invent new business models and revenue streams.

By applying intelligent technologies such as the IoT, artificial intelligence (AI), machine learning, and advanced analytics, leading life sciences companies transform into event-driven businesses. These event-driven businesses automate repetitive tasks, enable employees to focus on higher-value tasks, and allow the invention of new business models and revenue streams by monetizing data-driven capabilities and applying core competencies in new ways.

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Optimize and extend the value of current processes

Transform with next-generation business processes

Optimize existing processes for more efficiency or reliability.

Extend current business processes beyond efficiency gains to capture new sources of value.

Transform the company’s value chain or business model to capture new revenue streams.
SAP Enables Life Sciences Companies to Become Intelligent Enterprises

SAP helps life sciences companies transform into intelligent enterprises through integrated business applications that use intelligent technologies and can be extended on SAP® Cloud Platform. This enables next-generation business processes to deliver breakthrough business value on our customers’ journeys to becoming intelligent enterprises.

Intelligent Suite
The set of applications provides the business capabilities that life sciences companies need to run their business. End-to-end business processes span multiple applications, so processes and data must be integrated for automation, a seamless user experience, fast adoption, and ease of operations.

Intelligent Technologies
Several innovative technologies have matured to practical use:
- The IoT makes business applications interact with the physical world.
- Big Data makes large data sets accessible for advanced analytics and intelligence.
- Machine learning and AI automate repetitive processes and learn from human exception handling and decision-making.
- Advanced analytics find data patterns to support decisions and predict the future.
- Blockchain distributes collaborative processes across the entire value network.
- Data intelligence finds new value in data assets for new business models.

Digital Platform
The digital platform, which is powered by SAP HANA®, extends intelligent, end-to-end processes and connects to these data sources:
- Cloud platform that allows customers and partners to extend their intelligent suite to run additional business processes
- Data management to handle and organize data, a key asset of an intelligent enterprise
SAP Leonardo

SAP Leonardo technologies bring the power of intelligent technology to your platform and applications to streamline existing workloads, reveal optimal decisions, maximize revenue and profits, improve customer satisfaction, and capitalize on digitally transformed business models.

In addition, companies can use SAP Leonardo Services, delivered by world-class innovators that combine industry and emerging technology expertise, to help drive innovation and business impact at scale.
SAP Leonardo: Intelligent Technologies Optimize, Extend, and Transform the Business

Intelligent scenarios in life sciences
SAP Leonardo technical capabilities are embedded in business-core and industry applications to optimize and extend business processes. Companies can also use them together with innovation services to build and assemble next-generation business processes. For life sciences companies, we support more than 15 intelligent scenarios to optimize, extend, and transform their business. Below are a few highlighted ones that will be further explained on subsequent pages.

- Cash application
- Service ticket intelligence
- Customer retention
- Resume matching
- Serialization in pharmaceutical supply chain
- Predictive maintenance and service
- Asset intelligence network
- Digital manufacturing insights
- Digital boardroom
- Cold chain logistics
- Clinical trial supply management

Optimize existing processes for more efficiency or reliability.
Extend current business processes beyond efficiency gains to capture new sources of value.
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SAP Leonardo: Applications Optimize Business Processes

Optimizing business processes results in achieving the same business outcome more efficiently and reliably. We begin with scrutinizing current practices: What can be automated using machine learning and AI? How can we make processes aware of the real world by connecting them to the things around them? How do we give people the right analytical tools to make sense of vast amounts of data and to handle exceptions?

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<tr>
<td>Labor-intensive and error-prone processes for invoice matching</td>
<td>Slow resolution of customer service tickets during field service ops</td>
<td>Lack of insight into root causes of customer attrition</td>
<td>Difficulty in hiring specialized and skilled employees quickly</td>
<td>Challenges in complying with different, global serialization regulations</td>
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SAP Cash Application software uses machine learning intelligence to boost automatic matching rates and frees up finance professionals to focus on strategy and service quality.

The SAP Service Ticket Intelligence application efficiently processes inbound social media posts, e-mails, and other channel interactions. It automatically determines classifications, routing, and responses.

The SAP Customer Retention application anticipates customer behavior – such as product cancellations or renewals – with instant insights from transactional data and digital interaction points.

The Resume Matching service automates the talent screening process and enables recruiters to identify candidates with the best skills and education match for a specific job description.

The SAP Advanced Track and Trace for Pharmaceuticals application can help serialize and track a product through its lifecycle, even after its sale to wholesalers. This helps with product visibility, regulatory compliance, and surgical recalls.

- Increased productivity
- Reduced error rates
- Increased productivity
- Higher customer satisfaction
- Increased productivity
- Increased customer retention
- Increased productivity
- Reduced recruiter bias
- Increased productivity
- Preserved product quality
- Protected revenues

SAP Leonardo: Capabilities and Services Extend Current Processes to Capture New Sources of Value

Extending business processes aims at generating more value and new outcomes. Begin by challenging the status quo: Are we doing the right things in managing assets and ensuring quality products? Innovators use digital technology to extend business processes to create new value: asset downtimes that have been predicted and prevented, and ensuring product quality and manufacturing efficiency.

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<th>Predictive maintenance and service</th>
<th>Asset intelligence network</th>
<th>Digital manufacturing insights</th>
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<td>Costly outages due to asset downtime</td>
<td>Costly asset downtime and risk of safety and compliance incidents</td>
<td>Inefficient manufacturing operations and compliance issues with current good manufacturing practice (CGMP)</td>
<td>Difficulty narrowing down causes of issues (supply chain, financials, quality, and so on) and resolving such issues</td>
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With IoT-based connectivity, SAP Leonardo makes machinery and packaging lines more operationally efficient by enabling maintenance to be performed on the component requiring maintenance at the time it needs it. Using sensor and condition data, life sciences companies can predict and prevent failures, thus optimizing performance and availability. The SAP Leonardo innovation kit for Life Sciences offers a fast implementation path to just-in-time maintenance.

- Increased asset uptime
- Lower repair costs

SAP Asset Intelligence Network is a cloud-based business network used for managing assets collaboratively – internally and together with business partners across companies along the asset lifecycle. Thus, it allows life sciences companies to improve overall operating asset efficiency, including the reduction of outages, safety and compliance incidents, and effort to manage asset data.

- Increased asset uptime
- Fewer safety and compliance incidents

The SAP Digital Manufacturing Insights solution is a centralized, cloud-based, data-driven manufacturing performance management solution that enables key life sciences stakeholders of manufacturing operations to make tactical and strategic decisions that help them achieve top manufacturing performance. It provides real-time, end-to-end visibility of manufacturing operations, physically connected assets, and production efficiency in one intuitive and scalable solution.

- Production efficiency gains and savings in operations cost
- Better, easier quality compliance

Equip C-level and line-of-business executives with real-time contextual information and ad hoc analysis using SAP Digital Boardroom. Built on the SAP Analytics Cloud solution, this next-generation board portal uses line-of-business data from SAP S/4HANA® and other applications to provide a single source of truth for the company.

- Quick response to new business challenges and customer needs
- Support for stakeholder expectations for innovation and growth

US$300 billion
Annual value added to the healthcare sector if U.S. healthcare were to use data analytics for efficiency and quality.¹

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SAP Leonardo: Intelligent Technologies and Innovation Services
Transform the Life Sciences Value Chain and Business Models

Transforming the business starts with ideas to conquer new markets with current products or delivering new value on your home turf. It often goes along with a renewed view on who is the ultimate customer and what kind of value they really need.

### Cold chain logistics

Historically, temperature controls were managed “after the fact” – so, after the shipment reached the destination, there would be a “logistics quality” release of product.

With SAP Leonardo capabilities, we can track temperature during the logistics process and time out of refrigeration during manufacturing to ensure quality drugs are delivered safely to the patient.

SAP Leonardo for Life Sciences, cold chain logistics option, proactively alerts production batches that are approaching tolerance limits for time out of refrigeration to prevent quality rejection and loss of costly batches.

- **Costly batch rejection prevented**
- **Increased yield**

### Clinical trial supply management

Longer clinical trials to prove efficacy and patient-feedback loops (including e-health scenarios) are increasingly the norm, and additional complexity arises as studies span global, multisite locations, including medically underdeveloped locations.

With SAP Leonardo, we can deliver cloud-based integrated business planning for clinical supply chain management, including serialization and cold-chain monitoring. Redress the ordering process through chatbots and an interactive voice response system.

Clinical trial supply management capabilities provide visibility of clinical kits down to the patient level using analytics.

- **Correct drug quantity at the right time and place**
- **Right quality meeting compliance and patient safety**

>2x
Rate of growth of temperature-controlled products compared to nontemperature-controlled

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SAP Leonardo: Transformational Scenario – Cold Chain Logistics

One of the most challenging tasks in the pharmaceutical supply chain is preserving the potency and quality of a drug or its active ingredient during manufacturing and transportation.

With more than 50% of drugs estimated to be biologics, ensuring against temperature incursions not only becomes crucial to supply chain excellence but also for financial reasons.

SAP Leonardo technologies reimagine these critical business processes in manufacturing and the supply chain and help companies move away from siloed, reactive, and inefficient ways of working.

SAP Leonardo helps deliver intelligent, efficient, and informative supply chain management, including serialization and cold-chain monitoring, both in manufacturing (time out of refrigeration) and in the supply chain.

When supply chain management is coupled with mobility and real-time alerts, companies can save highly expensive biologic shipments and also ensure timely dispatch of life-saving therapies to patients who need them now.
SAP Leonardo: Transformational Scenario – Clinical-Trial Supply Management

SAP customers and SAP experts collaborate to design and build complete use cases using innovative technologies – fully tailored to the specific customer situation and supported by SAP Leonardo Innovation Services.

- In life sciences companies, the clinical trials process plays a major role in product discovery. While at a scale far lower than that of a finished product, these supplies still need to go through the entire gamut of a product lifecycle, such as planning, procurement, quality inspection, manufacturing, packaging and labeling, distribution, dispensing, and then record collection and documentation.

- Companies have traditionally managed these low-volume transactions and processes outside of their commercial transactional ERP systems.

- SAP Leonardo Innovation Services helps deliver intelligent, efficient, and informative technologies to reimagine clinical trials processes, primarily bringing insights from the commercial side – including patient behavior and prescription information – back into R&D.

- This benefits life sciences companies by enabling them to discover drugs faster and pursue areas where customer need has been determined. Patients benefit through exceptional clinical-trials management and much-needed new therapies.
Bringing It All Together: Roche’s Journey to Becoming an Intelligent Enterprise

SAP has developed a proven innovation methodology, working closely with customers during the innovation process. This co-innovation approach is designed to deliver faster innovation with less risk by combining the expertise of customers and SAP. Below is a customer example.

Where There Is a Mobile App, There Is Prevention – Roche Diabetes Care

Hoffmann-La Roche AG is a Swiss multinational healthcare company that operates worldwide under two divisions: pharmaceuticals and diagnostics.

A diagnostics device from Roche – Accu-Chek 360° View – connects doctors and patients through a mobile app, enabling real-time virtual interactions and increasing therapy adherence. The device captures a patient’s vital signs and blood-sugar levels, which can be watched in relation to the patient’s physical activity. Meanwhile, a doctor can monitor the patient remotely, and the patient can communicate with the doctor’s office.

Health link app
Preconfigured app for people with diabetes II or pre-diabetes conditions; monitoring is based on the SAP Patient Management application

Solution
Builds on wearables that collect and visualize behavioral data on a smartphone

Analytics
Predictive analytics that inform physicians about emerging risks, allowing them to uncover patterns that can improve patient care

Collaboration
Patient-specific, individualized healthcare management to trigger patient-specific recommendations and treatment strategies

Care Circles
Care Circles mobile app, which currently connects patients to 60 physicians from 24 centers using one platform

Learn how Roche, in collaboration with SAP, develops innovative solutions to face the changing market of tomorrow in life sciences.
How to Get Started with SAP Leonardo

Whether you’re still exploring new ideas or have defined one idea in detail already, SAP Leonardo brings together world-class innovators, industry and emerging technology expertise, proven use cases, and design thinking methods to help you optimize your business and drive innovation and impact at scale – faster and with less risk.

SAP takes a holistic approach to innovation. Because digital transformation isn’t just about installing the latest technology, we also address the readiness to receive a new idea. From human capital to infrastructure, we bring best business practices across your organization to improve communication, plan for employee training, review technical and regulatory feasibility, and consider other cross-functional needs to drive change and truly scale your innovation.
SAP Is the Innovation Partner for Life Sciences Companies

Ten-year innovation vision
Deliver fully intelligent business solutions and networks that span across company boundaries and promote purpose-driven businesses. These solutions will be the most empathic symbiosis between machine intelligence and human ingenuity.

- Self-running enterprise systems
- Self-organizing business ecosystems
- New markets and business models

Comprehensive industry coverage
SAP enables the comprehensive coverage of the complete life sciences value chain across the enterprise. With its clear industry road map, SAP is the partner of choice for the life sciences industry.

- More than 3,800 life sciences companies in 87 countries run SAP solutions.
- Our customers distribute more than 76% of the world’s healthcare products.
- All lines of business are supported on a single platform.

Proven services offering
By bringing together world-class innovators, industry and emerging technology expertise, proven use cases, and design thinking methods, we help life sciences companies develop innovations that deliver impact at scale.

- Use proven methodologies to drive innovation, from reimagining customer experiences to enhancing operations
- Fuel your innovation through a managed innovation ecosystem from SAP
- Build your own innovation capability and culture

SAP delivers support for becoming an intelligent enterprise in the life sciences industry – providing integrated business applications that use intelligent technologies and can be extended on SAP Cloud Platform to deliver breakthrough business value.

Learn more
- SAP.com for life sciences
- SAP Leonardo
- SAP Digital Business Services
- SAP Design Thinking