

# Transform Research and Development with SAP

The Business Value for Research and Development with SAP S/4HANA, Cloud/ Line-of-Business Applications and SAP Leonardo



PUBLIC

# Varian Medical Systems Drives Full Product Cost Control with SAP Product Lifecycle Costing



See how Varian Medical Systems of Palo Alto, California, a manufacturer of medical devices and software for treating cancer and other medical conditions is using SAP Product Lifecycle Management costing tool to fully control costs of their product development. Varian is currently implementing SAP S/4HANA.

# White Paper Background and Key Definitions

The information outlined below will help you understand the contents of this value proposition white paper. It gives details on the objectives and scope of the paper. Key definitions are also provided for select sections of the paper.

## DELIVERABLE OBJECTIVE

Provides information on the value in moving from an ERP on a traditional database to SAP S/4HANA, Cloud/ Line-of-Business (LoB) applications and SAP Leonardo solutions.

## KEY DEFINITIONS

Within the **process and subprocess deep dives**, there is detailed content in table format articulating the following:

### Typical Pain Points

Major customer business and IT challenges.

### Current State with ERP on Traditional Database

ERP capabilities that are available on a traditional database.

### SAP S/4HANA (including standard SAP Leonardo capabilities)

Capabilities shipped with the latest release of SAP S/4HANA, including apps that are optimized for SAP Leonardo, such as an app for contract consumption.

### Cloud/ LoB and SAP Leonardo Solution Capabilities

Solutions that can be integrated with SAP S/4HANA and provide business value – for example, the SAP Integrated Business Planning solution or SAP Connected Goods software. These solutions are not embedded in SAP S/4HANA but they can be integrated.

### 2018: Planned Innovations\*

New functionalities planned for the 2018 release of SAP S/4HANA, Cloud / LoB applications and SAP Leonardo solutions.

## Business Benefits

Key value drivers that are impacted by the adoption of SAP S/4HANA, Cloud and LoB applications and SAP Leonardo solutions.

With the **value proposition section**, all quantified benefits are conservative, estimated improvement ranges tied to the top value drivers. They are based on early adopters or new developments and enhancements of SAP S/4HANA, Cloud/ LoB and SAP Leonardo solution capabilities that can drive value. Keep in mind that these benefits should be used as a guide. We recommend working together to assess your current maturity and the value of moving to SAP S/4HANA, Cloud/ LoB applications and SAP Leonardo solutions to develop a personalized business case.

## Last Update

SAP S/4HANA 1709 release. All Leonardo capabilities are highlighted in bold.

## \*Detailed road map available on [SAP.com](https://www.sap.com)

*(customer login required)*

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# Research and Development in a Digital Economy

## TRANSFORM RESEARCH AND DEVELOPMENT WITH SAP

The market is experiencing a disruptive shift in customer demand for new, extensive, smart, and personalized products. The journey of a new product initiates from the research and development (R&D) department, where significant difference can be made to improve features and reduce cost. A successful R&D department brings new formulations and designs to life with speed and accuracy based on inputs from the marketplace, customers, and latest technologies. R&D integrates with downstream departments to manufacture, sell, and service products with higher quality and lower cost while continuously iterating formulations and designs to create more profitable, desirable, and reliable products.

Our industry-leading portfolio of cloud and industry-specific solutions is uniquely positioned to enable our customers' digital transformation across all key aspects of their business value chain. SAP Leonardo capabilities combined with SAP S/4HANA as the digital core provide an intelligent, integrated, fast, and visual product innovation platform with built-in compliance. The SAP S/4HANA R&D/Engineering solution enables informed decision-making in ideation and concept development, portfolio and project management, product development, and compliance management. Smarter products are brought to the market faster and with full compliance.

With the new Industry 4.0 capabilities, customers can now personalize the product design in real time to meet their needs through the variant configuration engine. The production order moves with minimal human intervention through downstream processes such as product engineering, production engineering, and manufacturing to serve a "lot size of one" to the customers. Another paradigm shift is the capability to deliver consumer-centric business models so that you can "uberize" your business before someone else does.



### Ideation and Concept Development

- Run innovation campaigns inside and outside the enterprise
- Central repository for ideas and feedback for development-to-concept stage
- Simulate costing of new products at the earliest possible stage



### Portfolio and Project Management

- Respond quickly to customer inquiries and requirements
- Plan, resource, and track a project through to completion
- Use performance metrics to make informed decisions
- Enable collaboration for engineer-to-order (ETO) projects
- Manage project cost and schedule deviations



### Product Development

- Collaborate with extended enterprise on product data
- Achieve requirement-driven product development
- Reuse existing components/ recipes
- Simulate costing of products across the lifecycle
- Calculate product cost estimates for quotes
- Enable tailored variants for customers with deep downstream integration
- Hand over to manufacturing and service with design authoring tool integration



### Compliance Management

- Design products that meet material, global, regional, and industry compliance
- Classify products and prepare safety data sheets and compliance documents for downstream use

## Volvo

Implementing a resource management process based on SAP HANA allowed the Volvo Group to gain insights into the demand and supply of development resources for current and new development projects across the entire organization.

**“Implementing SAP Portfolio and Project Management has greatly improved project and resource control for Volvo.”**

Stéphane Perrin, Director of Product and Project Management Solutions, Volvo Group

## Varian Medical

Varian Medical Systems Inc. strives to save lives by bringing innovative products to market faster, but paper-based processes stood in the way. Using digital supply chain solutions from SAP, Varian Medical digitalized its product design, development, and manufacturing environment end to end while strengthening regulatory compliance to boost its operational efficiency and profitability.

## SAP R&D VALUE PROPOSITION SUMMARY

SAP solutions enable companies to substantially enhance, simplify, and visualize the entire R&D process from idea to product.

### Increase revenue from new products by offering wider variants and personalized and smart products

Run design and development processes on live insights into product performance and customer needs. Enable individualized products with flexible and high-performing configuration, formulation, and classification capabilities.

### Accelerate time to market with real-time project control, informed product decisions, and streamlined compliance

Analyze live performance of the project portfolio with predictive insights at any stage of the innovation process. Reuse designs and recipes, work in an integrated development environment, handover to manufacturing seamlessly, and leverage embedded compliance to launch new products faster.

### Reduce R&D expense by informed product decisions, integration of formulation and design tools, and efficient supplier collaboration

**For discrete industries:** Design and simulate in an integrated development environment (supporting mechanical, electrical, electronics, and software disciplines). Synchronize all downstream processes internally and externally with harmonized and consistent integration of different design tools.

**For process industries:** Streamline development of recipes with full process support from first trials to definition-of-process parameters, efficient reuse of existing formulations and specifications, and synchronization of all downstream product development needs internally and externally.

### Improve profitability by having insights on cost of new products early on and across the lifecycle

Reduce existing product cost and launch new products with competitive pricing by simulating the impact of design decisions. Calculate cost and other dimensions for new products in the early stage of the product lifecycle to quickly identify cost drivers and compare alternatives.

### Improve profitability of customer projects, such as engineer to order

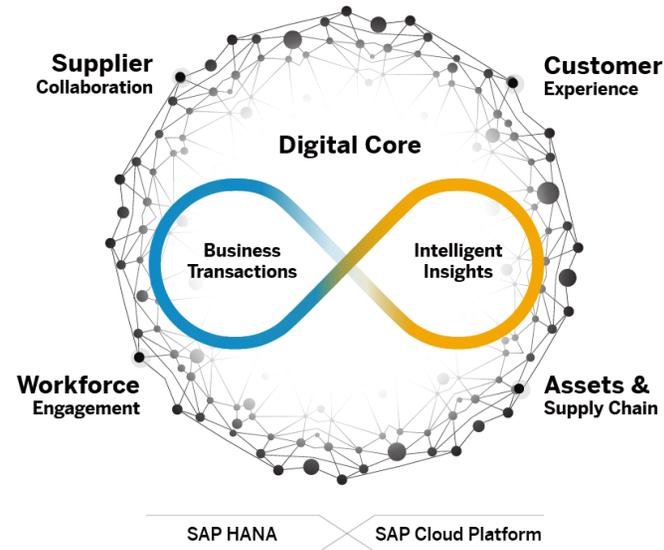
Detailed project cost controlling and forecasting, including issue and change management.

### Reduce compliance costs and recalls through embedded compliance in the R&D processes

Compliance checks are embedded in the system for R&D processes. The coverage extends to markets, industry, materials, and downstream processes.

# SAP's Digital Business Framework for R&D

SAP solutions enable organizations to drive business value across their end-to-end digital value chain



## SUPPLIER COLLABORATION



- Product Stewardship Network

## WORKFORCE ENGAGEMENT



- SAP Fieldglass solutions



- SAP SuccessFactors solutions

## S/4HANA DIGITAL CORE



- Innovation Management
- Portfolio & Project Management
- Commercial Project Management
- Product Lifecycle Costing
- Enterprise Product Formulation
- Enterprise Product Engineering
- Advanced Variant Configuration
- Product Compliance
- 3D Visual Enterprise Generator
- Engineering Control Center
- Intelligent Product Design

## ASSETS AND SUPPLY CHAIN



- EHS Regulatory Documentation

## CUSTOMER EXPERIENCE



- Configure, Price, and Quote

# End-to-End Business Scenarios

Some organizations measure value by the impact on their end-to-end processes. Outlined below are the primary end-to-end processes that are important to a R&D organization.

## 1. DEVELOP AND INTRODUCE NEW PRODUCTS

- **'Develop and Introduce New Products'** is an end-to-end R&D process to ideate, prioritize, design, develop, and introduce products faster to the market in order to satisfy consumers while meeting regulatory and quality requirements.
- SAP solutions provide complete, accurate and real-time view and analysis, into ideas and projects to gain better insights into product development processes, help ensure project budgets and product costs are on target, and improve the allocation of project resources.

## 2. PERSONALIZE PRODUCTS (FOR INDUSTRY 4.0)

- **'Personalize Products (for Industry 4.0)'** is an end-to-end R&D process to design and handover to production of personalized products at similar cost and lead time as for off-the-shelf products.
- SAP has successfully digitized the variant configuration engine (for discrete industries) and recipe development (for process industries) and integrated both solutions with downstream steps:
  - Variant configuration engine enables customers to personalize products
  - All variant possibilities have preapproved product engineering and production engineering (manufacturing process plan)
  - Recipe development enables quick provision of personalized formulations and products with efficient reuse of existing information, automated calculations, and end-to-end process support
  - Real-time compliance checks are provided for materials, product categories and markets
  - The product configurator improves information exchange between sales, engineering, production, and service
  - Product lifecycle costing helps ensure that target costs are met for product variants early on

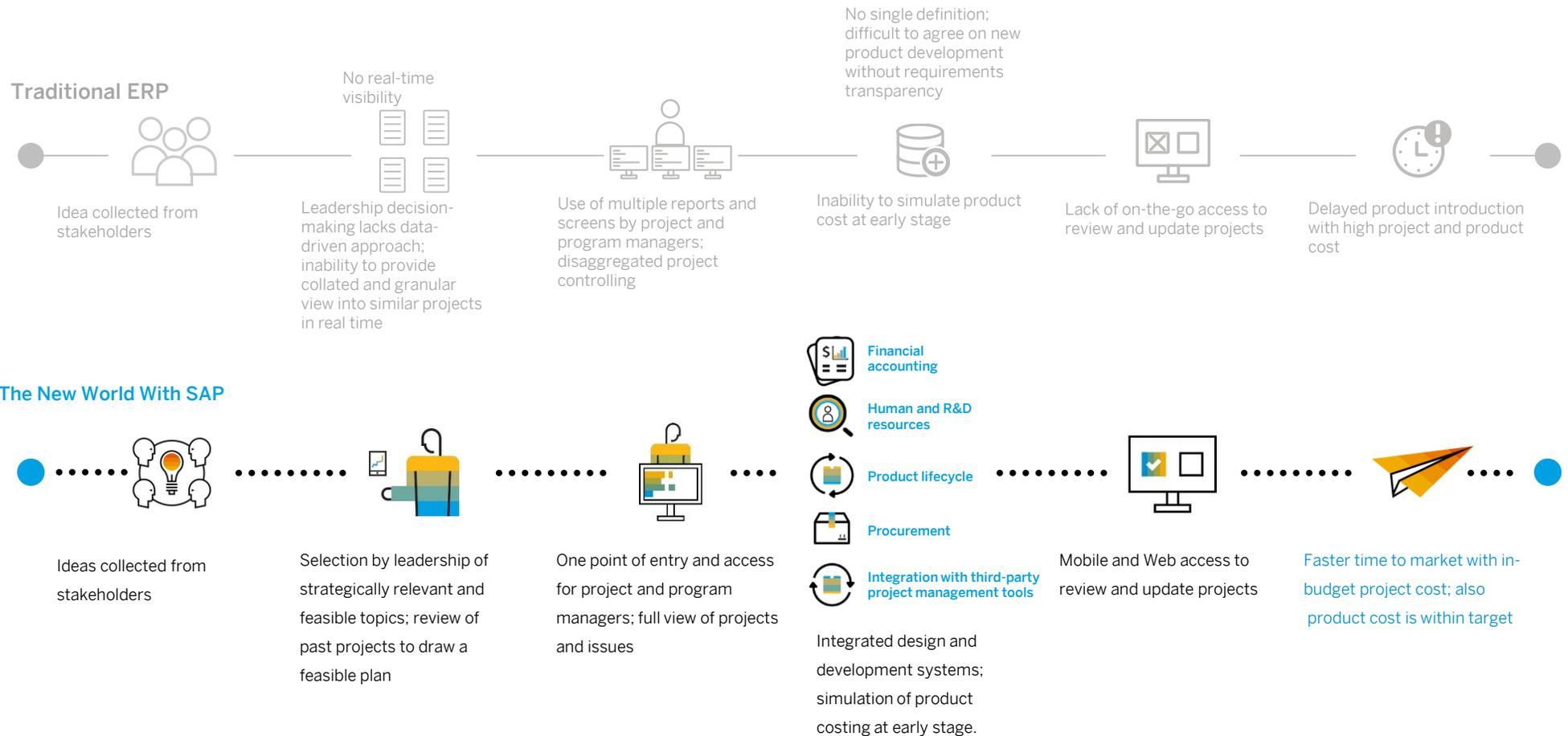
## 3. SUCCESSFUL CUSTOMER PROJECTS

- **'Successful Customer Projects'** is an end-to-end process to win, plan, and profitably deliver customer projects. Managing profitability of customer projects, such as engineer to order, requires an initial customer quote based on high-level project planning. If the company wins the project, the company needs to plan the project in detail and control the commercial aspects effectively during project execution.
- Design the customer requirements into a product in an integrated development environment (supporting mechanical, electrical, electronics, and software disciplines). Synchronize handover to manufacturing via harmonized and consistent integration of design tools.

# Reimagine Develop and Introduce New Products

SAP S/4HANA as the digital core provides R&D leadership a holistic view across the complex new product introduction process, including idea generation and concept development to select strategically relevant and feasible topics. A transparent stage-gate process enables continuous improvement in new product success.

## Develop and Introduce New Products



TOP VALUE DRIVERS

Reduce Time To Market

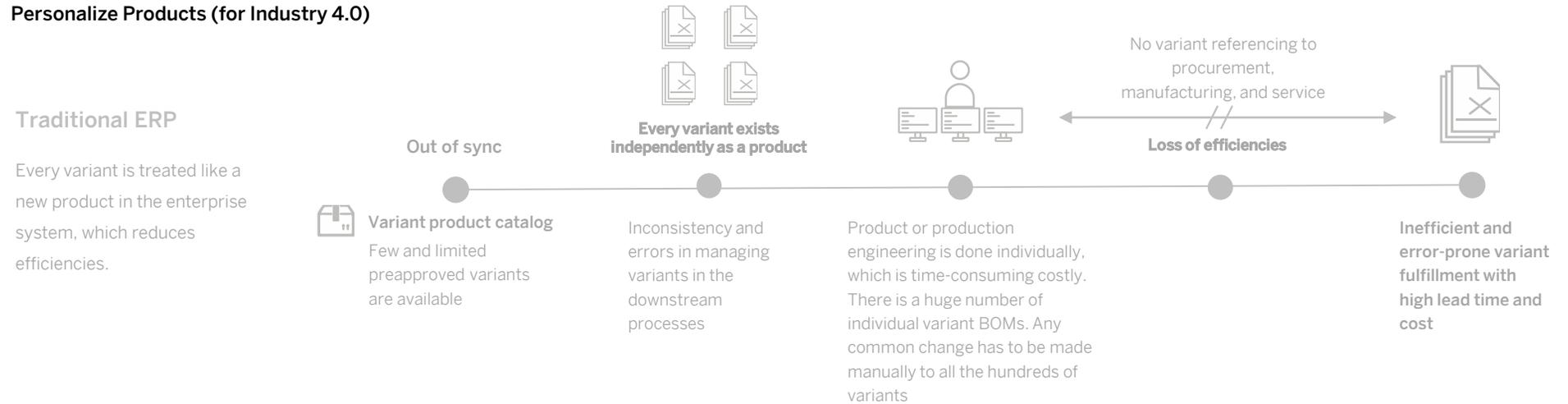
Reduce R&D Expenses

Increase Revenue From New Products

# Reimagine Personalize Products (for Industry 4.0)

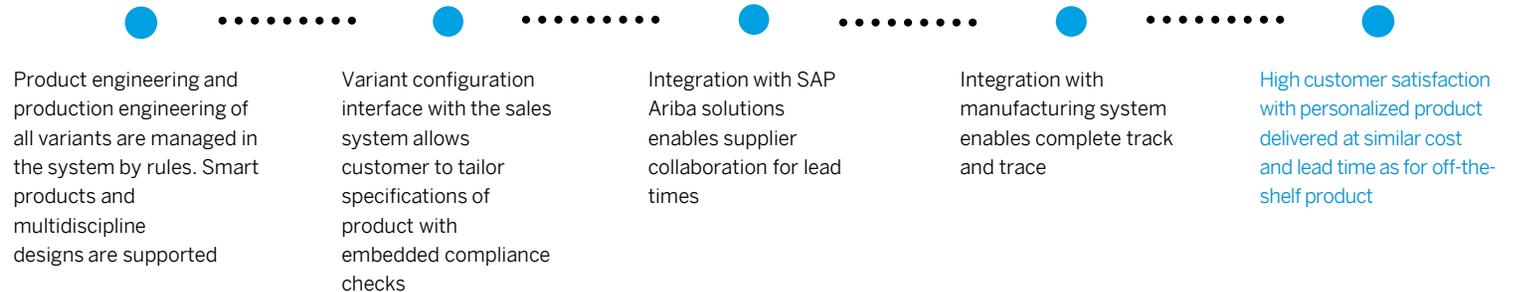
Achieve wider, faster, and more efficient variant management with high-level variant configurator and integration to procurement, manufacturing, and service.

## Personalize Products (for Industry 4.0)



## The New World With SAP

The bill of material (BOM) of a configurable material contains all the components, dependencies, and routings that are required to manufacture the material.



### TOP VALUE DRIVERS

Increase Revenue from New Products

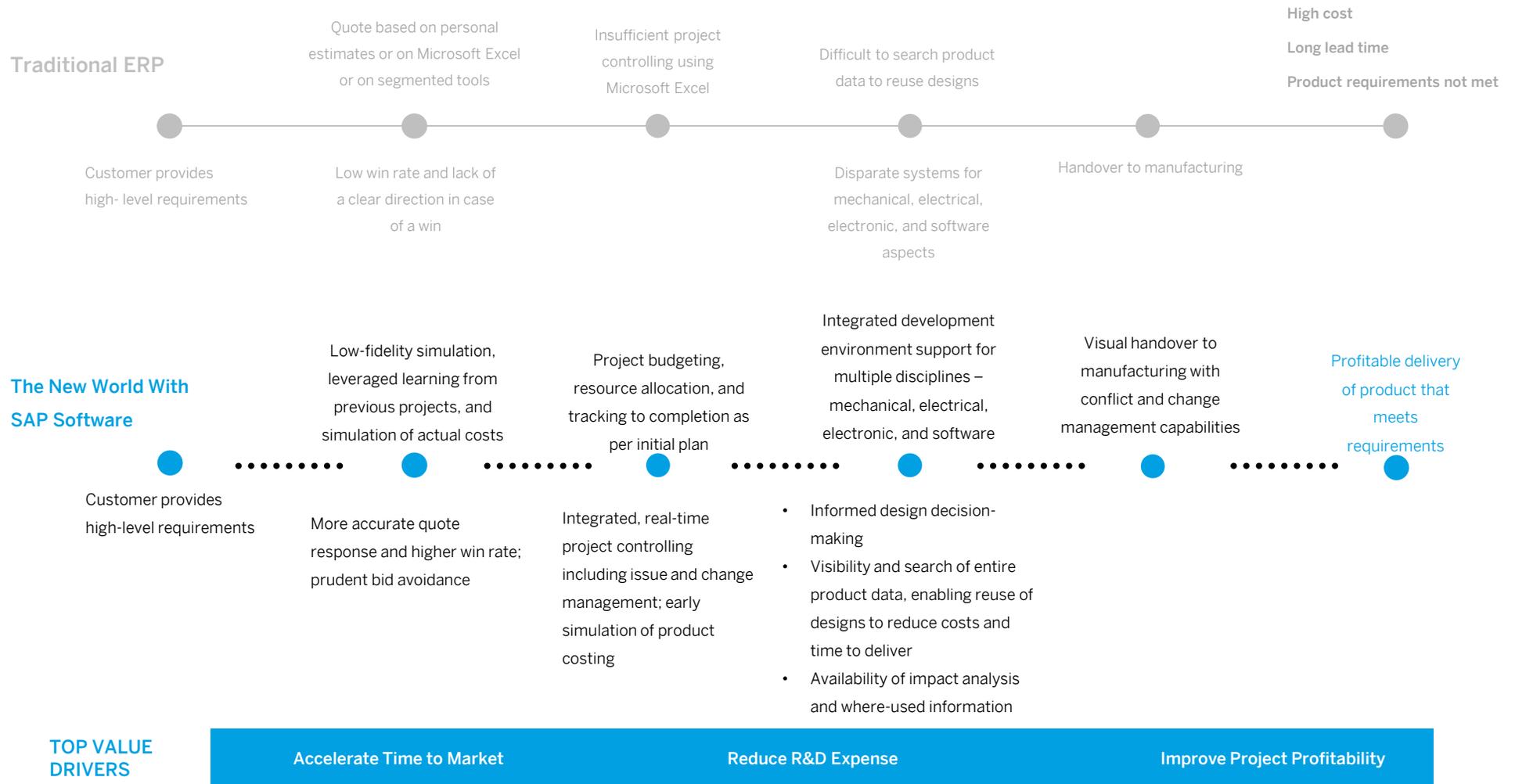
Increase Revenue growth

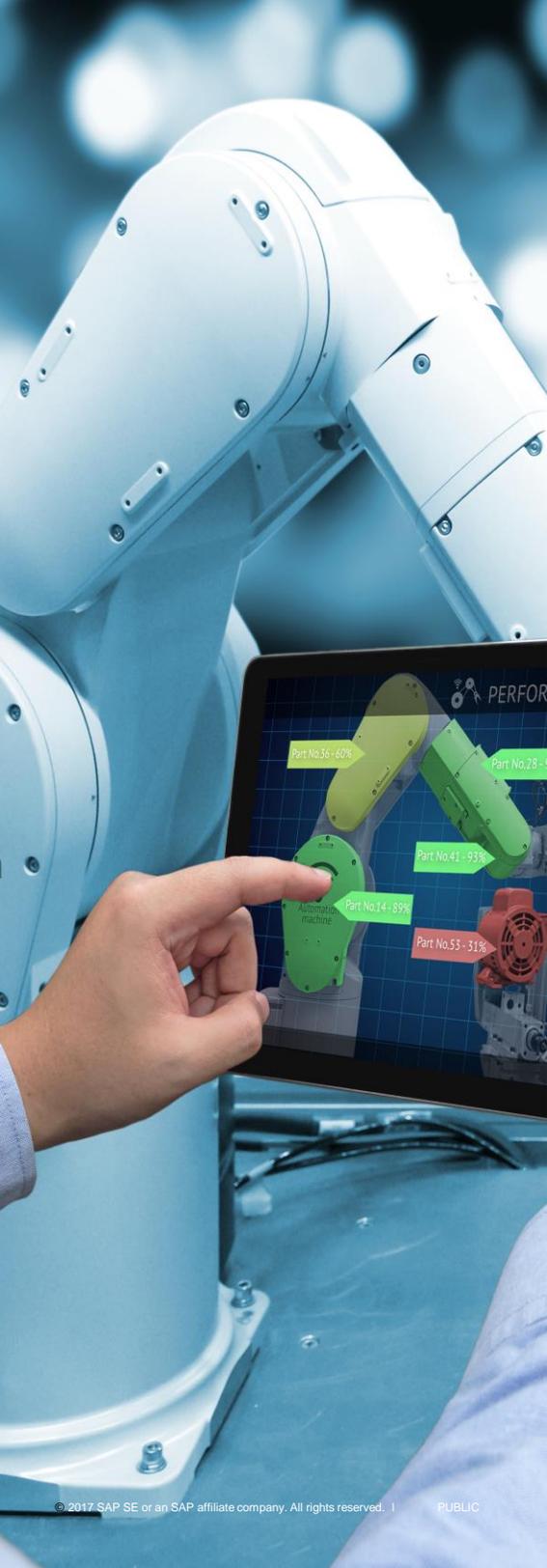
Reduce R&D Expense

# Reimagine Successful Customer Projects

The SAP Commercial Project Management application for SAP S/4HANA enables project controllers access to holistic project information. As the digital core, SAP S/4HANA enables reuse of designs, multi-discipline product engineering, and seamless hand over to manufacturing.

## Successful Customer Projects





## RESEARCH AND DEVELOPMENT (R&D) CAPABILITIES

Outlined below are the primary capabilities for R&D where value can be achieved through SAP S/4HANA and SAP Cloud/ LoB applications and SAP Leonardo solutions.



### Enterprise Portfolio and Project Management

- Idea management
- Portfolio management
- Project management
- Resource management
- Commercial project management\*



### Compliant Product Lifecycle Management

- Requirements management
- Intelligent product design – collaboration
- Integrated product development
- Integrated recipe development
- Product costing
- Advanced variant configuration
- Handover to manufacturing
- Product marketability and chemical compliance
- Safety data sheet and label management
- Dangerous goods management

\* Managing customer-specific engineer-to-order (ETO) projects typically in industrial machinery and components (IM&C), aerospace and defense (A&D), and automotive industries

# Enterprise Portfolio and Project Management



## Typical Pain Points

- Inability to collect and select relevant consumer-focused ideas from across the enterprise



## Current State with ERP on Traditional Database

- Collection and basic evaluation of ideas as a pre-stage of portfolio management



## SAP S/4HANA (including standard SAP Leonardo capabilities)

- Innovation campaigns throughout the enterprise with live expert collaboration and voting for ideas
- Discovery of promising ideas and handover to a stage-gate-driven portfolio process (SAP Innovation Management solution)



## Cloud/ LoB and SAP Leonardo Solution Capabilities

- Availability of innovation management in the cloud for shorter time to market



## 2018 Planned Innovations

- New SAP Fiori-based reporting capabilities that enable users to analyze key project figures in graphical views



## Business Benefits

- Increased revenue from new products
- Increased likelihood of new products meeting revenue and margin targets

- Inability to prioritize project portfolio and product development decisions in alignment with corporate strategy

- Visibility into complete project portfolio, profitability, and investment structure
- Batch runs for planning, progress, rollup, and analysis

- Live tracking of financial project KPIs by leveraging in-memory technology of the SAP HANA platform
- SAP S/4 HANA real-time project analytics for better product development decisions
- Role-based SAP Fiori user interfaces (UIs) that provide quick and easy access to accurate information about project progress and portfolio performance for project managers and stakeholders

- Aggregation and visualization of portfolio performance using cloud analytics capabilities for stakeholders and decision makers

- Greater transparency into key financial data across projects using advanced graphical reporting options

# Enterprise Portfolio and Project Management



## Typical Pain Points

- Delayed project milestones and missing required gate deliverables; inability to identify deviations until too late
- Lack of transparency into project resource requirements and allocation, leads to project delays and low resource utilization
- Slow access to project and task details, reduces productivity of project management resources



## Current State with ERP on Traditional Database

- Stage-gate-driven R&D projects along with scheduling, giving project management transparent and accurate view of true project status
- Capacity planning, detailed project role planning, and project staffing in a single application



## SAP S/4HANA (including standard SAP Leonardo capabilities)

- SAP Fiori UIs for project management roles like program and project manager, resource manager, and project team members with embedded analytics to enable insight to action
- Project progress monitored in SAP Fiori-based project Gantt chart with system-guided navigation to critical project tasks
- Real-time access to resource availability, skill sets, and organizational assignment during project staffing process
- Accelerated access to project and task details for project team members and casual users through SAP Fiori app



## Cloud/ LoB and SAP Leonardo Solution Capabilities

- Bidirectional synchronization of project information with external scheduling tool (SAP Enterprise Project Connection application)
- Cross-application, multi-resource staffing and scheduling availability (SAP Multiresource Scheduling application)



## 2018 Planned Innovations

- SAP Fiori-based project status report to improve visibility into project performance, and monitoring of project milestones across multiple projects
- Involve partners and suppliers into the project execution through project collaboration capabilities
- Seamless staffing and services procurement workflow with SAP SuccessFactors and SAP Fieldglass solutions, allowing for better utilization of project resources



## Business Benefits

- Faster time to market
- Early identification of project deviations
- Increased portfolio and project management resource productivity
- Reduced R&D expense
- Better resource utilization
- Increased efficiency of development teams

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# Enterprise Portfolio and Project Management



## Typical Pain Points



## Current State with ERP on Traditional Database



## SAP S/4HANA (including standard SAP Leonardo capabilities)



## Cloud/ LoB and SAP Leonardo Solution Capabilities



## 2018 Planned Innovations



## Business Benefits

- |   |  |   |   |   |
|---|--|---|---|---|
| <ul style="list-style-type: none"> <li>Inability to plan project costs and budgets efficiently and track actual versus planned costs, leads to budget overruns</li> </ul>                   | <ul style="list-style-type: none"> <li>Work breakdown structure (WBS) as basis for hierarchical project accounting; actual project cost visibility by using multiple applications</li> </ul> | <ul style="list-style-type: none"> <li>Status control of a WBS element through SAP Fiori apps; actual project cost visibility by using one integrated application</li> </ul>  | <ul style="list-style-type: none"> <li>SAP Fiori-based project status report to improve visibility into project performance and monitoring of project milestones and actual costs</li> <li>SAP Fiori-based project budget report, which provides insights into current availability of project budgets</li> </ul> | <ul style="list-style-type: none"> <li>Reduced R&amp;D expense</li> </ul>   |
| <ul style="list-style-type: none"> <li>Inability to forecast project costs and project timelines based on past data</li> </ul>  | <ul style="list-style-type: none"> <li>Manual maintenance of expected project start and finish dates</li> <li>Expected cost to completion estimated and store locally</li> </ul>             | <ul style="list-style-type: none"> <li>Possibility to track and store forecasted project cost in SAP S/4HANA, enabling project managers to easily identify expected deviations in timeline and costs</li> </ul>                                       | <ul style="list-style-type: none"> <li><b>Simplified project cost forecasting functions leveraging predictive analytics and machine learning capabilities powered by SAP Leonardo</b></li> </ul>  | <ul style="list-style-type: none"> <li>Reduced R&amp;D expense</li> <li>Early identification of project deviations</li> </ul> |
| <ul style="list-style-type: none"> <li>Unsecured communication of project documents and product sustainability data through unencrypted e-mails and other communication channels</li> </ul> | <ul style="list-style-type: none"> <li>Secure project document exchange with partners, suppliers, and customers</li> </ul>   | <ul style="list-style-type: none"> <li>Share and collaborate on project documents internally and externally (with suppliers and customers) in a secure cloud environment accessible anywhere, on any device (SAP Document Center solution)</li> </ul> |   | <ul style="list-style-type: none"> <li>Faster time to market</li> <li>Reduced R&amp;D expense</li> </ul>                      |

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# Enterprise Portfolio and Project Management



## Typical Pain Points



## Current State with ERP on Traditional Database



## SAP S/4HANA (including standard SAP Leonardo capabilities)



## Cloud/ LoB and SAP Leonardo Solution Capabilities



## 2018 Planned Innovations



## Business Benefits

Customer Projects*	<ul style="list-style-type: none"> <li>Inefficient and time-consuming search by project managers and project controllers for holistic project information</li> </ul>	<ul style="list-style-type: none"> <li>Fragmented tools and applications to manage different aspects of the project (financials, procurement, billing, schedule, resources, risks, and so on)</li> </ul>	<ul style="list-style-type: none"> <li>Integrated view on all aspects of a project.</li> <li>Easy access to data and processes in a project context with SAP Fiori apps providing multiproject and single-project overviews and for billing, receivables, and procurement</li> </ul>	<ul style="list-style-type: none"> <li>Framework for simplified project creation including automation of WBS generation</li> <li>SAP Fiori app to manage activities related to risks, issues, change requests, and checklist items</li> <li>Introduction of project reporting currency to simplify reporting in cross-border projects</li> </ul>	<ul style="list-style-type: none"> <li>Reduced time to market</li> <li>Reduced R&amp;D expense</li> <li>Improved project profitability</li> </ul>
	<ul style="list-style-type: none"> <li>Low project profitability due to inefficient project controlling</li> </ul>	<ul style="list-style-type: none"> <li>Detailed project controlling that is done outside the ERP system (often with Microsoft Excel)</li> </ul>	<ul style="list-style-type: none"> <li>Highly flexible and user-friendly application to plan and forecast quantities, costs, and revenues throughout the complete project lifecycle</li> </ul>	<ul style="list-style-type: none"> <li>Alternate project hierarchies for reporting and forecasting</li> <li>Web-based application for forecasting based on SAP Lumira software</li> </ul>	<ul style="list-style-type: none"> <li>Improved project profitability</li> </ul>
	<ul style="list-style-type: none"> <li>Inefficient handling of project changes, resulting in negative impact on project margins</li> </ul>	<ul style="list-style-type: none"> <li>Tracking of project changes outside the ERP system, resulting in limited control and visibility</li> </ul>	<ul style="list-style-type: none"> <li>Integrated solution for project risk, issue, and change management; native integration of change management with project controlling</li> </ul>	<ul style="list-style-type: none"> <li>Simplification of change request processing</li> </ul>	<ul style="list-style-type: none"> <li>Improved project profitability</li> <li>Reduced time to market</li> </ul>

\* Managing customer-specific engineer-to-order (ETO) projects typically in industrial machinery and components (IM&C), aerospace and defense (A&D), and automotive industries.

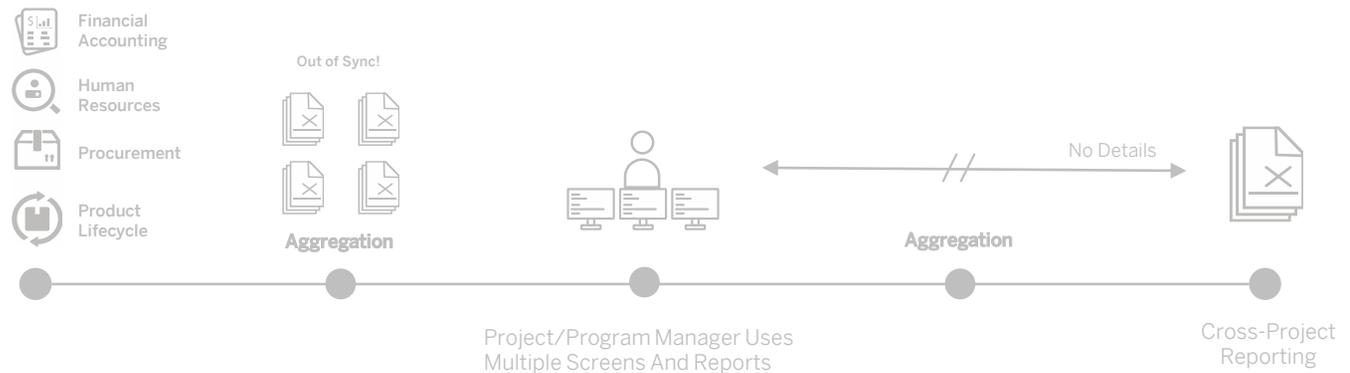
# Reimagine Project Management

Project and Portfolio Management on SAP S/4HANA provides re-engineered and simplified business processes that can yield significant benefits, transforming the execution from multi-step, batch-driven processes with latency in terms of key performance indicators to real-time processes with actionable insights.

## Project Management

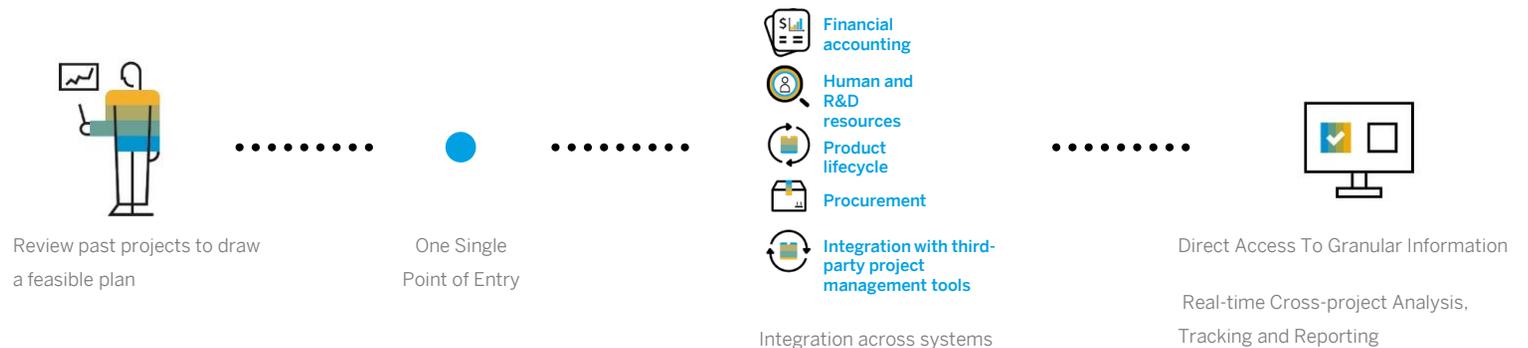
### Traditional ERP

Project-related information is distributed across various ERP applications. Details are lost due to aggregation and replication.



### The New World With SAP Software

An intuitive user experience on any device, providing a single, consolidated source of the truth for all project-related information at the lowest level of granularity.



### TOP VALUE DRIVERS

Reduce Time to Market

Reduce R&D Expense

Increase Revenue from New Products

# Compliant Product Lifecycle Management



## Typical Pain Points

- Inability to bring selected ideas and concepts to market in a timely manner, leads to low brand equity and stagnant growth
- Inability to use existing knowledge or leverage external partnerships, leads to inefficiencies
- Inability to plan and manage engineering change, leads to high downstream costs
- Inability to identify reasons and/or reduce unsuccessful product initiatives
- Inability to manage collaborative work and new requirements



## Current State with ERP on Traditional Database

- Product-related documents that are managed and linked to ERP master data throughout the end-to-end process
- Context-sensitive analytics
- Ability to release engineering changes for a unique lot number and release date
- Collaboration that is managed by using e-mail
- Requirements that are not managed



## SAP S/4HANA (including standard SAP Leonardo capabilities)

- Searchable development history to increase reuse
- Decrease time and investment in development efforts that go nowhere
- Increased profitability from executing engineering changes with full knowledge of downstream costs
- Instant transparency on live data with enhanced context-sensitive analytics



## Cloud and LoB solutions and SAP Leonardo capabilities

- **Efficient definition, structuring, and management of customer requirements in a requirement-driven product development environment with SAP S/4HANA Cloud for intelligent product design**
- **Traceability and impact analysis of requirements to fully understand implications of requirement changes**
- **Collaboration on product data within and outside the organization**
- Document-based collaboration enabled by SAP 3D Visual Enterprise applications
- **Integration capabilities of document management with SAP S/4HANA Cloud for intelligent product design**
- Searching for PLM-related business objects, such as materials, specifications, or change numbers, based on the content of their attached documents



## 2018 Planned Innovations

- **Enhanced authorizations for collaboration**
- **Structured data, collaboration, including BOMs and specifications**
- Enhanced analytics for R&D to feed back learning from product usage data
- Unified change management with sophisticated workflow across all aspects: mechanical, electrical, electronic, and software engineering



## Business Benefits

- Increased revenue from new products
- Reduced engineering change cost
- Faster time to market
- Improved margins
- Reduced engineering change cost
- Reduce project cost overruns

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# Compliant Product Lifecycle Management



## Typical Pain Points

- Lack of a complete, integrated view of cyberphysical products (complete view including smart product aspects)
- No leveraging of tests and simulations in the early design phases



## Current State with ERP on Traditional Database

- Integration of mechanical and electrical disciplines in end-to-end design process



## SAP S/4HANA (including standard SAP Leonardo capabilities)

- Single multidisciplinary product definition across the enterprise, reducing development errors and improving product lifecycle management
- Enhanced CAD integration based on the SAP Engineering Control Center integration tool with market-leading authoring tools (mechanical, electric, and electronics) to support cross-discipline product definition
- Management of embedded software versions



## Cloud and LoB solutions and SAP Leonardo capabilities

**SAP S/4HANA Cloud for intelligent product design to support instant collaboration across the extended enterprise. (SAP Cloud Platform)**

**Requirement-driven engineering and live cockpit through SAP S/4HANA Cloud for intelligent product design (SAP Cloud Platform)**



## 2018 Planned Innovations

- End-to-end 360-degree product view including requirements, mechanics, electronics, software components, and simulation

**Live multilevel BOM explosion**

- **Unified engineering and manufacturing BOM for cyberphysical products (mechanical, electronic, or software)**



## Business Benefits

- Faster time to market
- Reduced engineering change cost
- Reduced fines and recalls due to noncompliance

- Accelerated product development across extended enterprise

- Product development based on requirements
- Reduced manual rework in manufacturing

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# Compliant Product Lifecycle Management

Typical Pain Points	Current State with ERP on Traditional Database	SAP S/4HANA (including standard SAP Leonardo capabilities)	Cloud and LoB solutions and SAP Leonardo capabilities	2018 Planned Innovations	Business Benefits
<ul style="list-style-type: none"> <li>Inability to get product costs under control</li> </ul>	<p>Support for manual effort to do simple costing estimates</p>		<ul style="list-style-type: none"> <li>Calculation of costs and other dimensions for new products in the early stage of the product lifecycle to quickly identify cost drivers and easily simulate and compare alternatives (SAP Product Lifecycle Costing solution)</li> </ul>	<ul style="list-style-type: none"> <li>Costing of new product variants</li> <li>Product costing in cloud</li> </ul>	<ul style="list-style-type: none"> <li>Ability to meet target costs matched to real customer needs</li> <li>Reduced impact on bottom line</li> </ul>
<ul style="list-style-type: none"> <li>No insights on current product usage to improve product design</li> </ul>	<p>Capability not available in ERP</p>		<ul style="list-style-type: none"> <li><b>Capture of performance data with SAP Connected Asset and SAP Connected Product solution, powered by SAP Leonardo</b></li> <li><b>Detailed data collection about issues for analysis by designers with SAP Leonardo IoT Edge</b></li> </ul>	<ul style="list-style-type: none"> <li><b>SAP Intelligent Product Design cockpit brings live product usage data from field (powered by SAP Leonardo)</b></li> </ul>	<ul style="list-style-type: none"> <li>Faster time to market</li> <li>Reduced engineer change cost</li> </ul>
<ul style="list-style-type: none"> <li>Disruption of current business model by digital natives that provide consumer-centric service or digital business models (e.g. product-as-a-service)</li> </ul>	<ul style="list-style-type: none"> <li>Some aspects of creating smart products to enable telematics and billing</li> </ul>	<ul style="list-style-type: none"> <li>Alignment of products to enterprise objectives by integrating with business systems</li> <li>Improvement in the value proposition by moving from things to outcomes</li> <li>Integration of usage, service, and billing data in the digital core to enable new business processes and models</li> </ul>	<ul style="list-style-type: none"> <li>Ability to design smart products</li> <li><b>Sharing of engineering changes including software version upgrades with SAP Asset Intelligence Network</b></li> </ul>	<ul style="list-style-type: none"> <li><b>SAP Leonardo Machine Learning capabilities:</b> <ul style="list-style-type: none"> <li>Anomaly detection</li> <li>Influencer analysis</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Increased revenue from new products and services</li> </ul>

(continued next page)

# Compliant Product Lifecycle Management

Typical Pain Points	Current State with ERP on Traditional Database	SAP S/4HANA (including standard SAP Leonardo capabilities)	Cloud and LoB solutions and SAP Leonardo capabilities	2018 Planned Innovations	Business Benefits
<ul style="list-style-type: none"> <li>Inaccurate recipes for R&amp;D, plant, and site, leads to a breakdown of enterprise processes: procurement, production, service, and compliance</li> </ul>	<ul style="list-style-type: none"> <li>Integration with the SAP Recipe Management application</li> <li>Ability to access rules available in the SAP ERP instance for selected markets and product categories</li> </ul>	<ul style="list-style-type: none"> <li>Accurate recipes for R&amp;D, plant, and site by using different recipe types (with recipe development)</li> <li>SAP Fiori-based UI apps for recipe developers</li> </ul>	<ul style="list-style-type: none"> <li>Ability to create, view, and edit multiple recipes simultaneously</li> <li>Ability to run some key reports live for margin control, such as finding percentage of pure substance in all recipes</li> </ul>	<ul style="list-style-type: none"> <li>Target-driven, streamlined recipe development to optimize compliance process</li> <li>State-of-the-art formulation tool to guide product creation and data maintenance</li> <li>Integration to cloud services for compliance checks and declaration based on up-to-date data</li> </ul>	<ul style="list-style-type: none"> <li>Reduced fines and recalls resulting from noncompliance</li> <li>Reduced scrap</li> <li>Increased gross margins</li> </ul>
<ul style="list-style-type: none"> <li>Lack of access to all compliance obligations for product segment, material, and markets, and inability to keep up to date with ever-changing requirements, leads to high effort, delayed go to market, fines, recalls, and loss of brand equity</li> <li>Inability to connect directly with suppliers and customers to receive and provide product sustainability information</li> </ul>	<ul style="list-style-type: none"> <li>Product safety and stewardship solutions that automate compliance determination and embed compliance metrics in the R&amp;D environment</li> </ul>	<p>New product compliance solution that enables real-time product compliance processes and analytics embedded into core business processes:</p> <ul style="list-style-type: none"> <li>Covering all product compliance processes, including product marketability and chemical compliance, safety data sheet and label management, and dangerous goods management</li> <li>Integrated into core end-to-end business processes</li> </ul>	<p>Simplified, streamlined, and automated product compliance processes and embedded compliance in the R&amp;D environment (SAP Product Stewardship Network and SAP EHS Regulatory Documentation OnDemand content service)</p>	<ul style="list-style-type: none"> <li>Simplified, ready-to-run solution with standardized data model for product marketability</li> <li>End-to-end processes integration with embedded product compliance</li> <li>Improved regulatory and functional coverage to support global marketability checks</li> <li><b>Intelligent compliance management with machine learning capabilities</b></li> </ul>	<ul style="list-style-type: none"> <li>Reduced time to market</li> <li>Reduced compliance management costs</li> <li>Reduced fines and recalls resulting from non-compliance</li> </ul>

(continued next page)

# Compliant Product Lifecycle Management



## Typical Pain Points

- Complex and costly configuration modeling
- Challenging, labor-intensive, and erroneous support of configurations involving multidiscipline definition for individualized products



## Current State with ERP on Traditional Database

- Handling of variant configuration through the complete business process (engineering, sales and distribution, planning, and so on)



## SAP S/4HANA (including standard SAP Leonardo capabilities)

- New, optimized configuration engine in SAP HANA
- New simulation environment with efficient user experience
- Increased business insights with real-time embedded analytics
- Optimized user experience with SAP Fiori UI for classification



## Cloud and LoB solutions and SAP Leonardo capabilities

- New integrated, advanced variant configurator supporting single-level variant configuration models
- Support for make-to-stock scenarios using material variants and make-to-order scenarios using configurable materials
- Improved user guidance through more precise value restrictions and filtering
- State-of-the-art configuration engine leveraging SAP HANA
- New simulation environment for BOMs using SAP Fiori user experience
- Syntax enhancement: negative variant tables
- Integration of variant configuration and classification data into embedded analytics



## 2018 Planned Innovations

- Overview pages for product modeling
- **Requirement-driven product modeling**
- **Machine learning algorithms to support configuration and classification scenarios**
- Tighter integration to configure-price-quote processes
- Solution proposals through digital assistance with improved user guidance, such as more precise values restriction



## Business Benefits

- Increased revenue from new products
- Faster time to market

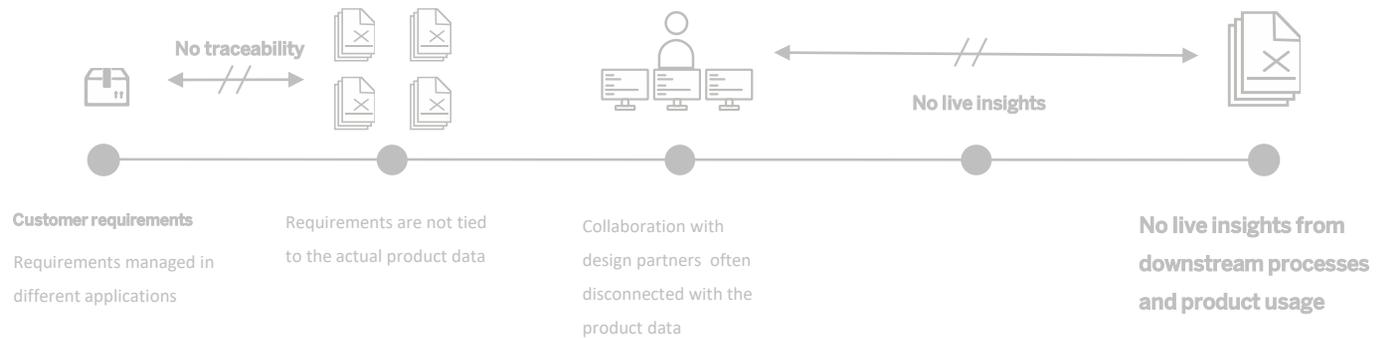
# Reimagine Requirement-Driven Product Development

With SAP S/4HANA, accelerate product innovation with instant collaboration, requirement-driven product development, and actionable live insights across the extended enterprise.

## Requirement-driven Product development

### Traditional ERP

Customer requirements are often not captured or mapped to actual product data leading to disconnect, lack of traceability and inefficiencies in product development



### The New World With SAP Software

Accelerate product innovation with real-time collaboration, requirement driven product development, and actionable live insights across the extended enterprise



### TOP VALUE DRIVERS

Increase Revenue from New Products

Faster Time to Market

Reduce R&D Expense

# Digital Priorities in Research and Development

Emerging digital technologies are helping companies reimagine the way they create their business models, run operations, and execute work.

Below are several digital priorities that will help R&D lead the organization's evolution and enable its transformation.

## Digital Twin

Product design improvements can be made better and faster when based on actual product usage data in the field. Product health, ambience, and usage data are captured with the Connected Products solution. A digital version of the as-designed, as-built, as-maintained BOM (including visuals) maintained in the system enables analysis and decision-making across the product lifecycle.

**SAP S/4HANA and SAP 3D Visual Enterprise solutions** are integrated with development, production, and service processes and systems, enabling traceability and reflecting the actual BOM at each stage. Product engineering changes, and new-product designs are significantly improved because they are based on more accurate and holistic information about issues, usage, and customer feedback.



## Smart Products

Products are becoming increasingly smarter and are often a combination of mechanical, electronics, and software components. A consistent definition of the product is required to achieve market success and efficient development.

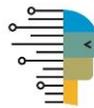
**The SAP Engineering Control Center** provides consistent integration across diverse design tools to create product definitions directly in SAP software. Combined with the ability to define, manage, and link customer requirements to product data, a holistic approach of systems engineering is enabled to support smart product development. Design data combined with business data in SAP solutions provides a 360-degree view of product definitions that is consistent across the enterprise. This accelerates time to market for new innovations and drives efficiency in product development.



## Serving the “Segment of One”

Customers can configure a product according to their needs with the design verified by a configuration engine. This is enabled by integration of configuration, pricing, quoting, and variant configuration functionality.

**Product engineering and production engineering of all variants** is managed by software through rules and involves minimal manual intervention. Integration with SAP Manufacturing Execution application enables complete track and trace of every customized product. Advanced configuration capabilities provide customers enhanced customization by combining product data across the disciplines of mechanical, electrical, electronics, and software.



## Model-Based Enterprise

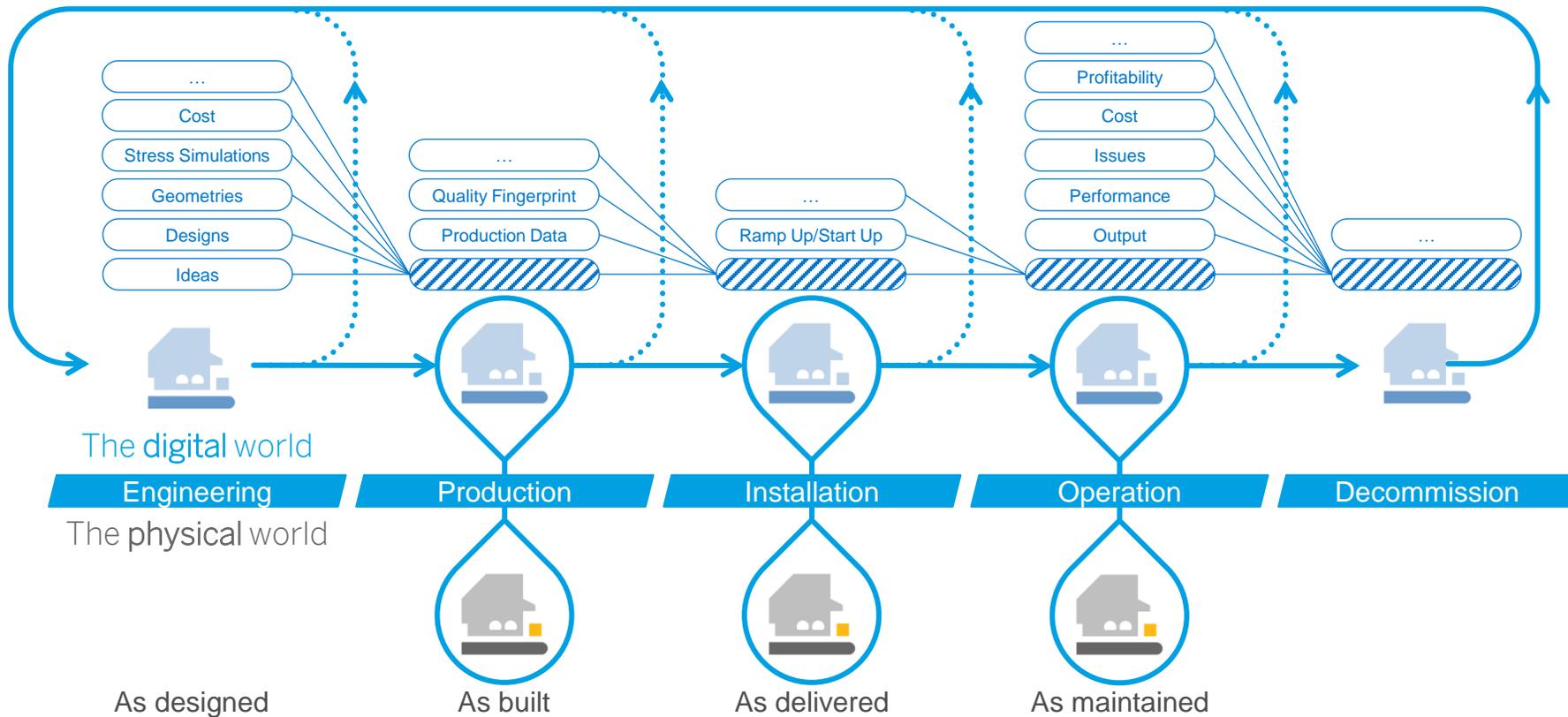
Designs are best communicated with lifelike 3D models. The SAP 3D Visual Enterprise applications extend the digital product definition outside of design engineering and into the hands of the extended enterprise.

**SAP's model-based enterprise capabilities** extend the virtual model to encompass all downstream processes - quality inspection, manufacturing definition, aftermarket spare parts definition, marketing, etc. This simplifies decision-making and processes for manufacturing, training, service, and marketing through intuitive visualization.



# Digital Twin Concept is supported by SAP solutions

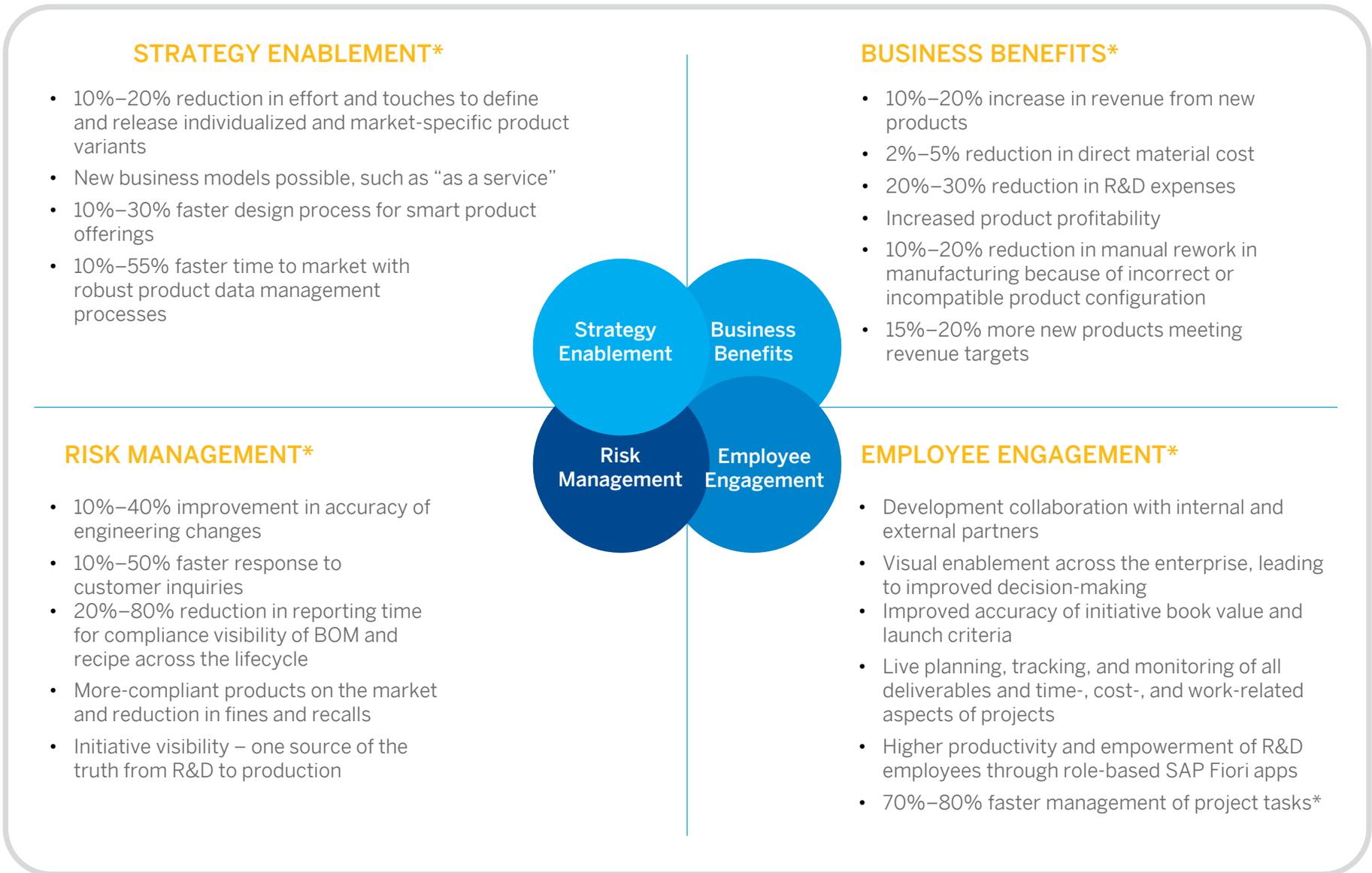
True product lifecycle management is to leverage holistic data from all product stages to continuously evolve the product.



- End-to-end traceability and completeness of product data like design (as designed, built, delivered, maintained etc.), genealogy (source, quality, lot etc.), usage (ambient conditions, work hours), break down data, performance data etc.
- Product performance is analyzed on the complete data that is collected via digital technologies for all stages of products
- Continuous improvements in product design and guidance across all downstream stages

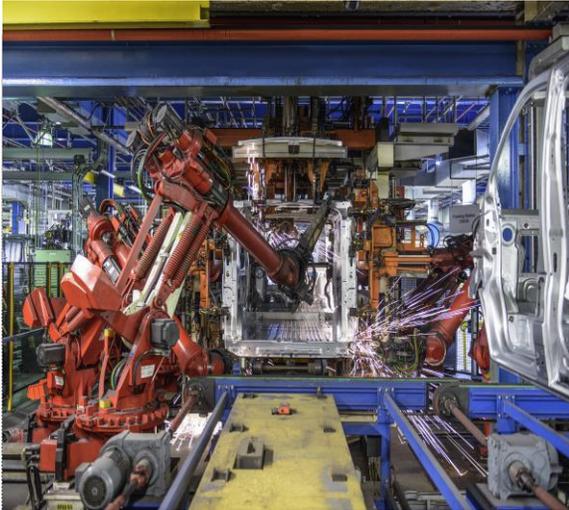


# SAP's Value Proposition for Research and Development



\*Benefits are based on early adopters of SAP S/4HANA or conservative outside-in benefits due to moving from a traditional ERP to enhanced SAP S/4HANA, Cloud/ LoB applications and SAP Leonardo solutions. As each enterprise is at a different level of maturity, our recommendation is to work with you to determine the value proposition for your enterprise.

# ★ Customers are Achieving Value from SAP Software



## VOLVO

- **Research and development costs were reduced by 30%, and reductions in project lead times were achieved.**

Implementing a resource management process based on SAP HANA allowed the Volvo Group to gain insights into the demand and supply of development resources for current and new development projects across the entire organization.

The scope was one central portfolio and project management solution for 13,000 users, including 1,100 project and resource managers, across 24 sites and various business units around the world.

[Click here for Volvo source reference](#)

**Company**  
Volvo Group

**Industry**  
Automotive

**SAP Solution**  
SAP HANA platform and SAP Portfolio and Project Management

**Customer Web Site**  
[www.volvo.com](http://www.volvo.com)



## HERAEUS

- **>1,400 components continually maintained and updated**
- **7-day turnaround covering regulatory requirements**
- **116 countries covered for compliance of product-safety data sheet authoring**

A technology group with a solution portfolio including industry components and coordinated systems, family-owned Heraeus Group wanted to transform business and product-safety processes into a comprehensive SAP software environment.

Heraeus now maintains and classifies components cost-efficiently in the on-premise system.

[Click here for Heraeus source reference](#)

**Company**  
Heraeus Group

**Industry**  
High tech and chemicals

**SAP Solution**  
SAP EHS Regulatory Documentation OnDemand service and SAP Environment, Health, and Safety Management

**Customer Web Site**  
[www.heraeus.com](http://www.heraeus.com)

# ★ Customers are Achieving Value from SAP



## Varian Medical

- **Digitalized the product development and manufacturing process end to end**

Varian Medical Systems Inc. strives to save lives by bringing innovative products to market faster, but paper-based processes stood in the way. Using digital supply chain solutions from SAP, Varian Medical digitalized its product design, development, and manufacturing environment end to end while strengthening regulatory compliance to boost its operational efficiency and profitability.

Varian is using SAP Product Lifecycle Management costing tool to fully control costs of their product development.

[Click here for Varian source reference 1](#)

[Click here for Varian source reference 2](#)

**Company**  
Varian Medical  
Systems Inc.

**Industry**  
Life sciences  
(medical devices)

**SAP Solutions**  
SAP HANA, SAP Product  
Lifecycle Management, SAP  
Engineering Control Center, SAP  
Product Lifecycle Costing

**Customer Web Site**  
[www.varian.com](http://www.varian.com)

# ★ Customers are Achieving Value from SAP



## AGCO

- **There is greater accessibility, transparency, and traceability of product costing with significant savings in time**
- **It will lead to a significant reduction in product costs**

Agribusinesses around the world count on the power and durability of AGCO tractors, harvesters, and equipment. With more than 15 global engineering sites, one global product costing process is a must. But unique costing and enterprise resource planning systems running at each location made cross-country collaboration and insight difficult.

AGCO needed a single global solution. Working with SAP and SAP partner MHP, AGCO deployed the SAP Product Lifecycle Costing solution. Now costs can be analyzed and compared across sites early in the new product lifecycle.

[Click here for AGCO source reference](#)

**Company**  
AGCO Corporation

**Industry**  
Automotive –  
agricultural equipment

**SAP Solution**  
SAP Product Lifecycle  
Costing

**Customer Web Site**  
[www.agcocorp.com](http://www.agcocorp.com)



## BÜHLER

- **Greater cost accuracy**
- **Faster processing and response time**
- **Intuitive user experience**
- **Lower risk of profit loss**

A leading provider of solutions for processing grains, rice, cocoa, coffee, and other raw materials, Bühler also offers die-casting and surface-coating technologies for high-volume application areas such as automotive, optics, and inks. At the quotation stage of a sale, speed, flexibility, and cost accuracy are a must.

Bühler deployed the SAP Product Lifecycle Costing solution to help ensure accurate costs to its quote system for complex, customer-specific machines and solutions.

[Click here for Bühler source reference](#)

**Company**  
Bühler AG

**Industry**  
Industrial machinery  
and components

**SAP Solution**  
SAP Product Lifecycle  
Costing

**Customer Web Site**  
[www.buehlergroup.com](http://www.buehlergroup.com)

# Your Path to Digital Transformation

Every enterprise is unique, with different starting points and end points. Whether you are starting a net-new implementation or undergoing a digital transformation in an existing SAP solution landscape, SAP can help. We have been working with enterprises of all sizes and in all industries. Based on the depth of our experience, we offer a robust portfolio of services.

## Customer engagement methodology

No matter which path applies to your enterprise, SAP has a structured four-phased approach to ensure success – executive alignment, value discovery, validation and executive readiness, and value delivery.

For more details, please see the brochure: [Driving Value in a Digital Economy](#)

## SAP Value Assurance service packages

Take advantage of SAP Value Assurance service packages for SAP S/4HANA to quickly and safely harness the power of next-generation software and in-memory processing.

For all value assurance packages and for a successful transition to SAP S/4HANA, please visit: [Transition to SAP S/4HANA](#)

## SAP S/4HANA Road map

With a three-year detailed road map, SAP gives customers the transparency to accelerate their transition to SAP S/4HANA. See: [SAP S/4HANA Road Map](#)

Start Today with a Trial - [SAP S/4HANA Trials](#)

Key Assets for Next Steps with SAP S/4HANA  
[www.sap.com/s4next](http://www.sap.com/s4next)

## Innovate with SAP Leonardo

SAP Leonardo is SAP's digital innovation system that makes it easy to innovate with new technologies, integrate them into your business, and scale as your company grows.

[Get started today with SAP Leonardo](#)

## Explore SAP Leonardo capabilities

Learn more about SAP Leonardo capabilities and see how customers in a variety of industries are using the system to realize the promise of new technologies, such as the IoT and Big Data analytics.

For details, read the e-book:  
[SAP Leonardo customer stories](#)

## Get an Expert take on Digital Transformation

What are the benefits of blockchain, machine learning, and other transformational technologies, and how are they impacting business?

[Get answers from experts and analysts in this e-book](#)

## Assess Your R&D Digital Maturity

Want to understand your digital maturity?  
Click [here](#) to participate and see how you compare to peers in real time.

## Lay the Foundation for an In-depth Digital Transformation Engagement

Get clear guidance on SAP S/4HANA centric product map through a free self-service for customers and partners.

[www.sap.com/TransformationNavigator](http://www.sap.com/TransformationNavigator)



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